
SYMPOSIUM
OF UNIVERSITY
RESEARCH AND
CREATIVE
EXPRESSION
SCHOLARSHIP FOR LEARNING
SCHOLARSHIP FOR LIFE
SOURCE
2024
CWU
ELLENSBURG CAMPUS
ALL DAY EVENTS
MAY 15-16
AWARDS CEREMONY
MAY 21
5-7:30 PM
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SOURCE

Symposium Of University Research & Creative Expression

How to Access Eventleaf Guide

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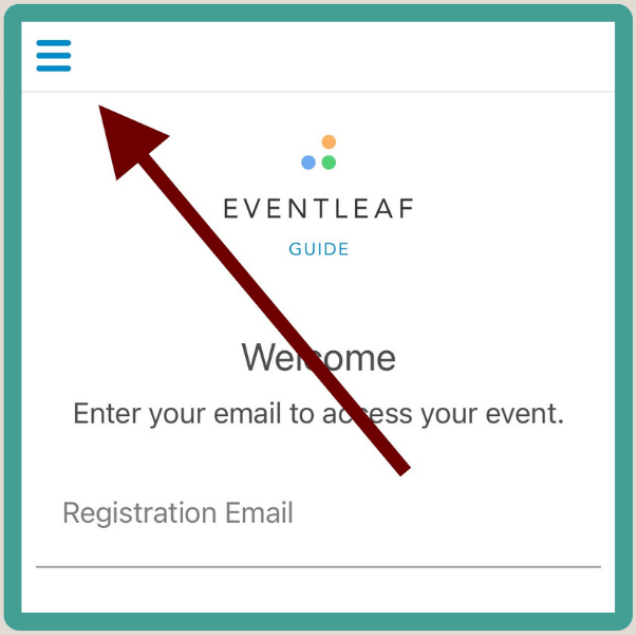

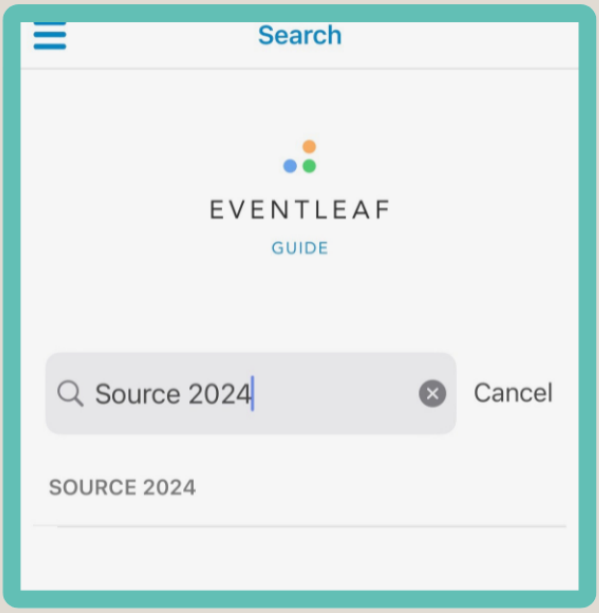

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Central Washington University Presents

SOURCE 2024

The Symposium of University Research and Creative Expression

Program and Proceedings

29th Annual Conference
May 15th & 16th, 2024

Table of Contents

SOURCE Schedule

Day 1: Wednesday, May 15 | SURC

Time	Session
9:00am–12:00pm	Oral Presentations
11:30am-12:30pm	Fashion Show & Poster Presentations
12:30pm–1:00pm	Welcome Lunch | SURC Ballroom
1:00pm–4:00pm	Oral Presentations
1:00pm–4:00pm	Panels & Live Music
See “Special Sessions & Events” Section	

Day 2: Thursday, May 16 | Library

Time	Session
10:30am–12:00pm	Poster Session 1
12:00pm–1:00pm	Museum of Culture & Environment (Deal Hall 101) with refreshments
1:00pm–2:30pm	Poster Session 2
See “Special Sessions & Events” Section	

Virtual Presentations

Pre-recorded presentations can be viewed starting Friday, May 10 at https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe

SOURCE Award Ceremony

Tuesday, May 21st
SURC Ballroom

What is SOURCE?

The CWU Symposium of University Research and Creative Expression is an annual event that showcases all disciplines of research, scholarship, and creative activities.

SOURCE works to connect students with resources and funding to aid them in their research as well as provide students a forum to present their findings in a professional and juried environment.

Where to Start

- Generally, projects are characterized by evidence-based exploration of a question or hypothesis that is important to others in your field of study.
- Get familiar with the methodology of your project field.
- All participants must have a faculty mentor/sponsor to provide project development guidance.
- Attend SOURCE-related events before SOURCE to improve your research and presentation skills.

Participating In SOURCE

Benefits

- Critical thinking
- Public speaking
- Enrich your resume
- Conference experience
- Networking experience
- Mentorship experience
- Self-confidence

What You Can Present

- Oral presentation
- Research poster
- Creative exhibition
- Group or individual project
- Preliminary findings
- In-progress project

CWU | Office of University Student Research

Questions? Contact us!
SOURCE@cwu.edu

Sponsors & Support

2024 SOURCE Planning Committee Members

SOURCE happens because of the efforts of the faculty, staff, and students that serve on the planning committee. Our thanks to the 2024 SOURCE Committee for their support of the SOURCE event.

- Michael Braunstein, *Professor, Physics*
- John Choi, *Assistant Professor, Engineering Technologies, Safety, and Construction*
- Tennecia Dacass, *Assistant Professor, Economics*
- Christy Gilchrist, *Director, Research and Sponsored Programs*
- Della Gonzales, *Assistant Director, Alumni Programs*
- Volha Isakava, *Department Chair, World Languages & Cultures*
- Samuel Lohse, *Assistant Professor, Chemistry*
- Gabrielle McNeillie, *Assistant Professor, Sport and Movement Studies*
- Sarah Oppelt, *Assistant Professor, Biology*
- Ana Paula-Freire, *Assistant Professor, Health Sciences*
- Ash Perron, *Program Coordinator, Undergraduate Studies*
- Shawn Reichert, *Lecturer, Douglas Honors College*
- Rodrigo Renteria-Valencia, *Associate Dean, Graduate Studies*
- Chelsea Riddle, *Assistant Professor, CWU Libraries*
- Chad Shone, *Director, Multimodal Education Center*
- Yoshiko Takahashi, *Dean, Undergraduate Studies*
- Hideki Takei, *Director, Office of University Student Research (OUR)*
- Steve Wenger, *Director, Wildcat Shop*

Thank you to Madilyn Larson who designed the 2024 SOURCE poster.

Our Sponsors

Thank you to our sponsors and campus departments that have supported SOURCE and its students.

Apparel, Textiles, & Merchandising (ATM)
Central Faculty-Student Provost Research, foundry10, & OUR Grants
Central Graduate Student Research/Creative Activity Grant
Central Student & Activities Fee Fund & Committee
Craft Brewing Program
CWU Alumni Association
CWU Brook Library & Staff
CWU Catering
CWU Foundation
CWU Sustainability Council
Eisenhower High School Mariachi & Jazz Bands
Ellensburg Art Commissions
Ellensburg High School
Graduate Student Association (GSA)
Manastash
Matthew Wenz & Class
McNair Program
Mt. Stuart Elementary Robotics Team
Multimodal Education Center (MEC)
Museum of Culture and Environment
Music Department
Office of the President
Office of the Provost
Publicity Center
School of Graduate Studies & Research
Shirley Joan Cook Undergraduate Research Award
Student Leadership, Involvement, & Community Engagement (SLICE)
Student Union Recreation Center & Staff
Students With A Purpose (SWAP)
University Relations
WASER Grant
Washington State Distinguished Fellowship in Biology
Wildcat Printing
Wildcat Shop
William O. Douglas Honors College (DHC)

LETTER FROM PRESIDENT

To our SOURCE 2024 participants and guests:

We welcome you to the Central Washington University's annual Symposium of University Research and Creative Expression, or SOURCE. Now in its 29th year, SOURCE has a long-standing history as CWU's flagship research event where our campus and local communities come together to celebrate the outstanding research and creative work that happens at our university every day.

Here at CWU we are proud of the impact that our hands-on learning approach has on students. The benefits of these High-Impact Practices will be evident in the presentations, demonstrations, talks, and performances you will interact with at SOURCE. The knowledge and experience gained by our students through their preparation for and participation in this event will serve them not only through the remainder of their academic careers, but into the future as they enter the workforce.

The work our students are presenting would not be possible without the guidance of their faculty mentors. The relationships developed while working on these projects encourage critical thinking and analysis and support the growth of oral and written communication skills. Our faculty and students learn from each other throughout the process, and the bond that is built through these collaborations creates lifelong faculty-student relationships that exemplify what it means to be a Wildcat.

As you participate in all SOURCE has to offer this year, you'll gain a better understanding of the quality and quantity of undergraduate and graduate student research and creative expression that is taking place here at CWU. The talent that is displayed makes me excited for our future as we send these students out into the world to continue contributing to their fields.

Thank you again for joining us as we celebrate the students and faculty who have prepared so diligently to share their work with us, and a special thank you to the individuals across our campus who have made SOURCE possible. We couldn't provide this opportunity without the commitment and dedication of everyone involved and we look forward to a memorable event.

Jim Wohlpart, President

LETTER FROM PROVOST

Dear Students, Faculty, and Guests,

Welcome to SOURCE! This year, CWU is holding the 29th annual Symposium of University Research and Creative Expression. It is with great pleasure that I welcome everyone as we gather today to celebrate the outstanding achievements of our students and faculty. Your presence and participation today are a testament to the power and importance of academic inquiry and human creativity.

Central Washington University is well known for our world-class faculty and the unique opportunities they provide students for hands-on, experiential learning. Every day, students are deeply engaged in laboratories, community projects, studios, performances, and field experiences. As you explore all there is to learn and experience during SOURCE, the value of experiential learning for students, and the value that students, in turn, provide to our communities, will be self-evident.

To all the students who have dedicated countless hours to their projects, I commend your hard work, passion, and dedication. Your commitment to intellectual and creative exploration is inspiring! Today is for you to showcase and celebrate the culmination of your efforts and the beginning of your journey as scholars and innovators. To the faculty who mentor students, I extend my heartfelt gratitude for the guidance and support you provide to our students throughout their journey of discovery. Your expertise, encouragement, and mentorship are the foundation that empowers students to push themselves and grow as scholars.

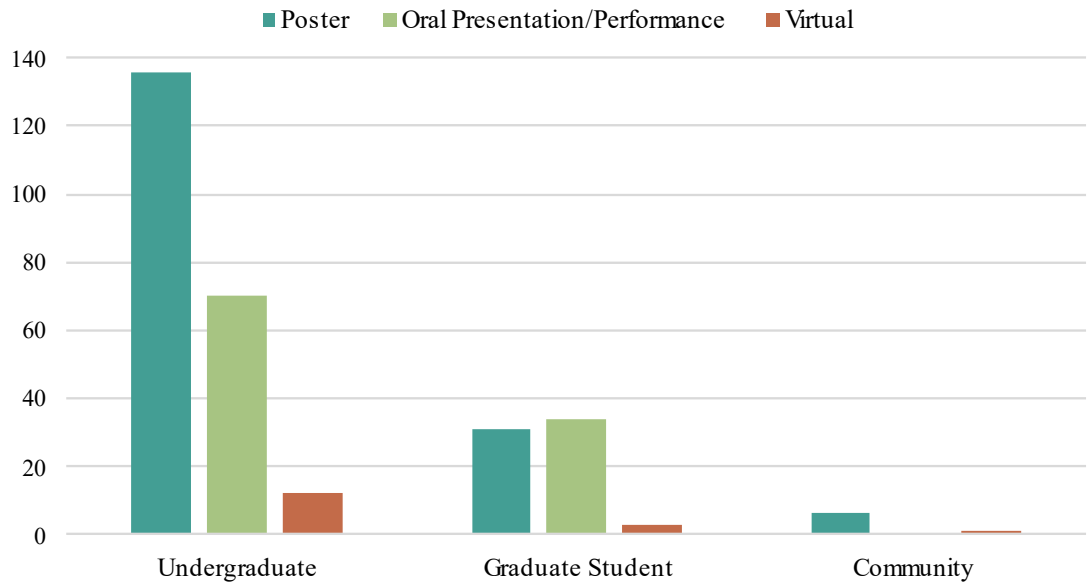
I also want to acknowledge and thank the organizers, volunteers, and sponsors of SOURCE. The team behind the event worked tirelessly to make this event a success. Your dedication to fostering a culture of research and creative expression on our campus is deeply appreciated and it would not be possible without your commitment.

Once again, welcome to SOURCE. Engage and enjoy the insightful discussions, reach out and make meaningful connections, and let us all celebrate the outstanding achievements of our students.

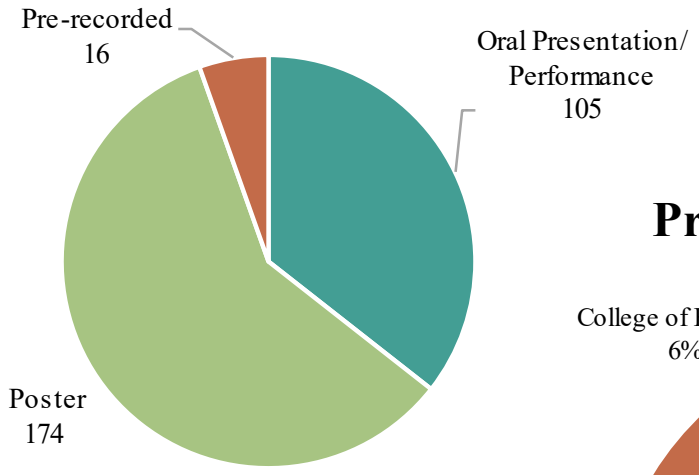
Patrick Pease, Provost

SOURCE Stats & Select Highlights

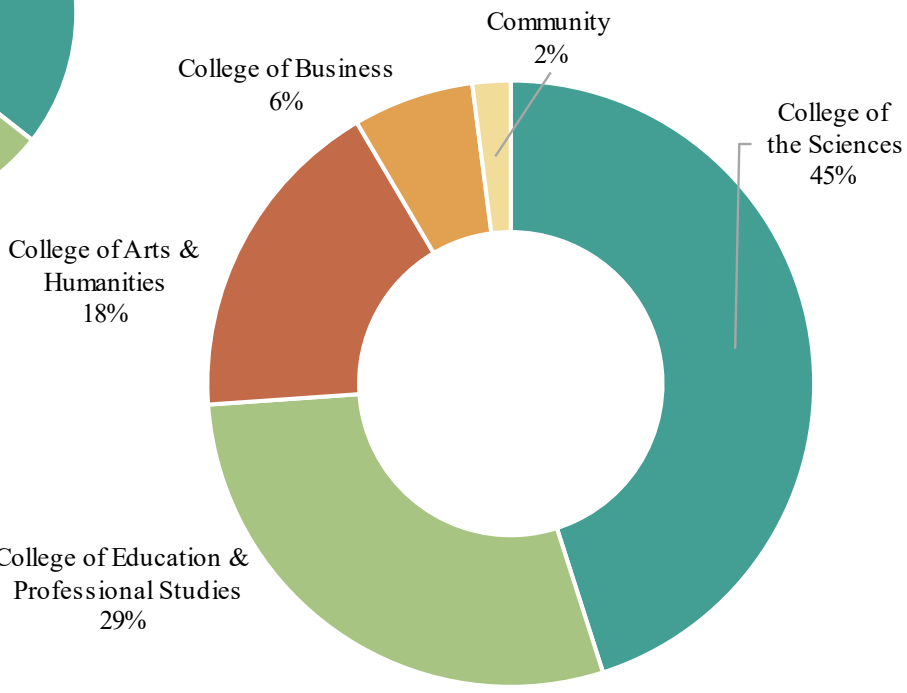
Participants by Affiliation



Presentations by Format



Presentations by College



Day One

May 15, 10am-4pm
CWU SURC
Oral & Recorded Presentations

ATM: Fashion Show Preview
11:30am–12pm
SURC Pit

Join us for a sneak peek of this year's fashion show. Poster session to follow in Ballroom C & D.

Welcome Luncheon
12:30-1pm
Ballroom C&D

Join us for opening remarks from the CWU President and Provost. Light lunch refreshments will be served.

Manastash Launch Party
2–2:50pm
SURC Pit

A poetry reading from this year's Manastash issue and a 30th SOURCE special edition!

Mt. Stuart Robotics Team Exhibition
3-3:50pm
Ballroom C & D

Join us to showcase the brilliance of our young engineers as they unveil their cutting-edge robots, meticulously crafted for thrilling competitions.

Craft Brewing: Non-Alcoholic Beverage Tasting
3–3:50pm
Room 301

Join the CWU Craft Brewing Program for a poster session, demonstration, and tasting!

Virtual Reality SOURCE Prototype
1-1:50pm
Room 301

Presented by the Multimodal Education Center, learn everything VR has to offer!

Live Music and Performances
All day, Theatre

1-1:50PM: World Premiere of Dr. Jiyoun Chung's O.K. Boomer
The CWU Trumpet Quintet
2-2:50PM: Eastern Suite: Music and Climate Justice Advocacy
3-3:50PM: CWU Horn Club presents a Concert in College Style
The CWU Horn Ensemble, featuring student conductors

Day One Special Sessions

SWAP: SOURCE with a Purpose

1-1:50PM, Ballroom B

- Fostering Student Empowerment and Community Engagement: The Impact of Student-Led SWAP Programs on Underrepresented College Student Success
- From Ideas to Action: CWU SWAP Sustainability Initiatives
- Unleashing Potential: Empowering Students through Mentorship and Professional Growth

Sustainability Council: The Climate Action Plan

2-2:50PM, Ballroom B

CWU's Sustainability Officer, Jeff Bousson, will be revealing the final design of CWU's first-official Climate Change Action Plan (CAP). Learn more about the CAP development process, CWU's approach to implementing CAP strategies, and the innovative initiatives underway that will enable CWU to serve as a living laboratory for a diverse range of sustainability solutions.

CWU Learning Commons

3-3:50AM, Ballroom A

- Peer Mentors
- PALs
- Tutors

What do they do and how can they support you and your educational success?

Graduate Student Association Panel

3-3:50PM, Ballroom B

Graduate Student Association (GSA) students will discuss their journeys and experiences in graduate school. They will discuss how the GSA provides graduate students with networking opportunities, professional development skills, and a community. The GSA helps students connect with faculty and resources to prepare them for their future.

SURC Oral Presentation Brief Schedule

SURC	15-May											
TIME	Ball 215 A	Ball 215 B	Ball 215 C & D	135	137 A	137 B	201	202	301	Theatre	Pit	SURC Corridor
10-10:50	Art and Design	Biological Science Anthropology & Museum Studies (Graduate)		English (Graduate)	DHC	Anthropology & Museum Studies	Computer Science	English	History Geography Finance & Supply Chain Management			*Student Engagement Activity (All Day!)
11-11:50	Art and Design (Graduate) English	Psychology Family & Consumer Sciences (Graduate)		Health Sciences Cultural and Environmental Resource Management Geography (Graduate)	Psychology World Language Accessibility Studies	Biological Science	Computer Science	English Communication	Economics		Fashion Show (11:30 - Noon)	*Sign up for the SOURCE Veteran Wildcoats Network (CWU Alumni Office) (All Day!)
12-12:25			Fashion Poster (Noon - 12:25)									*SOURCE25 Promotional Poster Vote (All Day!)
12:30 - 1			SOURCE Welcome Lunch (12:30 - 1 pm) Free admission.									
1-1:50	Computer Science (Graduate)	"SOURCE with A Purpose" by SWAP (Graduate)		Economics (Graduate)	Family & Consumer Sciences	Law & Justice Political Science	Film Theatre Arts	Communication	Virtual Reality SOURCE Prototype by Multimodal Education Center	Music: "World Premier of Dr. Jiyoun Chung's O.K. Boomer"		*The Learning Commons (CWU Peer Mentors, PALs, Tutors) (All Day!)
2-2:50	Computer Science (Graduate)	Inspiring Action: Revealing CWU's Climate Change Action Plan by Sustainability Council		ITAM (Graduate)	Psychology	Physics	Health Sciences ITAM	Communication		Music: "Eastern Suite; or, on the Death of a Desert: Using Composition as a Tool for Climate Justice Advocacy"	Manastash Volume 34 Launch and Reading Party	
3-3:50	The Learning Commons CWU Peer Mentors, PALs, Tutors	Graduate Student Association	Mt Stuart Robotics Team	Computer Science Sociology Curriculum, Supervision, & Educational Leadership (Graduate)	Education, Development, Teaching, & Learning Sport & Movement Studies	Physics	Engineering Technologies, Safety, & Construction Mathematics	Chemistry Geological Science	Craft Brewing poster session and Non-alcoholic beverage tasting	Music: "CWU Horn Club presents a Concert in Collage Style"	Recorded Presentations On Air	

College of Arts and Humanities

The College of Arts and Humanities has presentations from the following departments and programs:

- Art and Design
- Asian Studies
- Communication
- English
- Film
- History
- Music
- Philosophy and Religious Studies
- Theatre Arts
- World Languages and Cultures

Art and Design

The Notion of Craft and its Place in the Art Historical Canon

Joshua Collins
Project Mentor(s): Erika Pazian

While the definition of art began to shift during the twentieth century, the art historical canon maintained strict categories of fine art, typically created by men, and craft, usually associated with women, well into the latter half of the twentieth century. Until recently, art historians have refused to call craft art unless it conformed to certain standards. Despite this, women artists deserve to be recognized as artists within discussions of the canon. It is not that women artists did not exist, but that traditionally feminine arts were actively removed from the Western definition of fine art. While recently, the canon has moved to also highlight art created by cultures outside of Europe, it still lacks in the discussion of women outside of the "Great Artist's" muse. Women created art, but the artforms they were allowed to create were not widely accepted. The canon has historically, especially in regards to women and non-European artists, omitted what does not fit into the Greco-Roman linear timeline. It is the contemporary art historian's job to remedy these issues and present these items as what they are: fine art. This presentation uses visual and comparative methods to analyze the place of craft, specifically embroidery, within the art historical canon to critique the definition of art maintained by art historians and promote the expansion of the canon to include artwork previously labeled as craft.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Art History, Craft, Feminisms

Nestle

McKenzee Guzman
Project Mentor(s): Stephen Robison

Nestle is a ceramic sculpture featuring domestic utilitarian forms that rest in the mountainside of a modeled Mt. Rainier. The vessels depict my significant memories– cherished or otherwise– in underglaze, bringing to life a personal narrative of a young woman piecing together parts of her identity as they relate to the beings in her natural surroundings. So much of what surrounds me is consequently what inspires me. I grew up in Spanaway, WA. Being breath taken by the beauty of Mt. Rainier was a daily ritual and a large part of how I understood my surroundings as a child into adulthood. With this piece, I pay homage to the land that energizes me, the people who raised me, and the artists who mentored me into who I am today. Nestle is modeled of high-fire porcelain, various bodies of high-fire stoneware, and self-harvested natural clay from the Snoqualmie region. The vessels were made in tandem with the coiled figure to achieve a cohesive fit at their surfaces. Underglaze drawings have been applied in the leather-hard and bisque stages before undergoing a final firing using the wood kiln in the courtyard of Randall Hall. This spring quarter concludes my 5th and final year with Central Washington University in which I have been dedicated to learning the intricacies of fine art and managing a productive studio practice. The coursework for my BFA Studio Art degree has thoroughly prepared me to take on this project to bittersweetly conclude my studio practice at CWU.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Ceramic, Clay, Art, Environment, Identity, Memory, Sculpture, Washington, PNW

The Historic, and Ironic Reconstruction of Joan of Arc by The Vichy Regime

Van Parsons
Project Mentor(s): Erika Pazian

The incorporation of Joan of Arc into the imagery of the Vichy Regime represents a significant chapter in the annals of wartime propaganda. Employing her iconic persona, the puppet state's propaganda depicted Joan as both a heroic symbol and a tragic victim. Visual representations, prominently featured in posters, portrayed her as a martyr, ostensibly slain by the English, to galvanize the French populace against Allied forces. In this exposition, I'll be drawing upon the scholarship of Eric Jennings and others to underscore the strategic importance of this visual tactic and its ability to elicit collective sentiments, cultivating a purported sense of indignation among soldiers and civilians towards the English—a recurring theme in Franco-British interactions throughout history. The deliberate transformation of Joan from a revered figure and martyr to a helpless victim served as a means of manipulating French sentiment and met with moderate success until the regime's collapse in 1944. This historical epoch underscores the influential role of symbolism in molding public opinion during times of strife. By elucidating the deliberate utilization of Joan of Arc's imagery by the Vichy Regime, we glean insights into the nuanced dynamics of wartime propaganda and its sway over societal attitudes. Employing visual analysis and semiotics, this presentation will scrutinize the calculated deployment of Joan of Arc as a historical icon during World War II, illuminating the enduring potency of symbols in shaping narratives.
Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: France, Revolution, WW2, Vichy, Regime, Occupied France

Dimensional Drawings: Materiality and Perspective in Gego's Reticularea

Charlie Tadlock
Project Mentor(s): Erika Pazian

This presentation focuses on the 1969 environmental assemblage Reticularea by Venezuelan artist Gego. A seminal work in Gego's career, Reticularea is constructed of metal rods connected at nodes which create 36 independent meshes installed to create an immersive room sized installation. Analyzing the work relative to the traditional conventions of sculptural practice, as well as Gego's larger artistic practice, reveals a key interest in materiality and dimension. Countering conventional sculptural practice by utilizing an inorganic material in organic forms – as well as questioning one of the fundamental principles of sculpture, volume. These elements separate Reticularea from works being created within the Cinéticos movement happening concurrently to Gego's own career within Venezuela and help to distinguish Reticularea both formally and conceptually from these contemporaneous works with more mainstream popularity.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Art History, Sculpture, Latin America, Materiality, Art and Design

Asian Studies

Journey to the East: Yin

Dustin Jackson
Project Mentor(s): Chong Eun Ahn
This is part of a two-part series. This part illustrates insights into a major region of the world through the lens of a lifelong student of Asian and Asian-inspired arts and practices. Initially inspired by media such as anime, Dustin questions and explores physical and metaphysical possibilities. Over time it leads him to find and develop practices such as martial arts and healing arts. This foundation within the arts is what inspired academic pursuits within Asian Studies at Central Washington University. Through his time at Central, Dustin has visited eight countries across East Asia and Southeast Asia. In conjunction with his professional development, he aspires to further his academics in international studies and hopefully play some role in the rising tensions across the Pacific. The poster illustrates past, present, and potential future. Something of a reflection, account of current affairs, and a vision board.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Asian Studies, Eastern Asia, Southeast Asia, Southern Asia, Traditional Chinese Medicine, Filipino Martial Arts, Travel, Tourism, Culture, Popular Culture, Anime, International Studies, World Languages and Cultures, History, Philosophy & Comparative Religion

Journey to the East: Yang

Dustin Jackson
Project Mentor(s): Chong Eun Ahn
This is part of a two-part series. This part introduces and demonstrates concepts and drills used in one blend of styles inspired predominantly by Filipino Martial Arts with additional influences from Southeast/East Asian martial arts. The focus in the practice here is on the concept of flow, utilizing flowing movements and patterns. This will include different ranges of combat and tools. Some tools include staff, stick(s), knife, palm stick, and empty hand.
Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Asian Studies, Eastern Asia, Southeast Asia, Filipino Martial Arts, Martial Arts

Communication

Bilingualism on Academic Success

Ruth Bresee

Project Mentor(s): Christina Denison

My research will look at the impact that bilingualism has on students and their academic success through a quantitative method. The research behind this topic is extensive and looks at the different areas of what it means to be bilingual and the different areas that define academic success. While some approaches can take on a qualitative and individualistic approach to these definitions, other research indicates that there are specific means to measure language proficiency and academic success such as basic interpersonal communicative skills (BICS) or cognitive academic language proficiency (CALP) and grade point averages or class grades. Each of these fields is vast and covers different areas of focus including culture, economics, ethnicity, political or social issues, and motives. For this research, I am surveying Central Washington University students to find a possible relationship between higher academic success and bilingual students. This study will look at the main factors of language proficiency between BICS and CALP and GPA scores. The survey is being finalized and sent out to students currently. I hypothesize that there will be a positive relationship between bilingual students and academic success. Some implications of this research may be a lack of participation from students and not taking into account social or environmental factors that may motivate students in their academic studies.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Bilingualism

Consumer's Waning Trust in Video Game Companies and the Role of Monetization Tactics

Wyatt Dean

Project Mentor(s): Mary Eberhardinger

My exploratory study focuses on communication within online gaming communities, particularly during raids, to understand player retention with a quantitative focus through feedback surveys. Existing research heavily explores teamwork and communication in traditional settings, but there is a gap in understanding these aspects within digital environments, especially 3D spaces. This research is important because by analyzing interactions between experienced players and new players, we can understand the importance of how people teach and learn collaboratively in online games. Unlike traditional settings, games utilize nonverbal communication like gestures to guide teammates and express emotion, so understanding how players leverage these in-game movements can provide valuable insights into how knowledge transfer and teamwork function within a 3D digital space. My research has not been completed yet but by the time I am prepared to present at SOURCE, I will have conducted a quantitative study using a Google survey distributed through Discord servers and gaming community subreddits focused on games with raids. The survey will have branching questions based on whether the participant identifies as an experienced or a new player.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Video Games

In Gaming Raid Environments, How Does Communication by Experienced Players Influence the Learning Process and Teamwork Effectiveness of New Players?

Dilan Dean
Project Mentor(s): Joshua Nelson-Ichido

My study focuses on communication within online gaming communities, particularly during raids, to understand player retention with a quantitative focus through feedback surveys. Existing research heavily explores teamwork and communication in traditional settings, but there is a gap in understanding these aspects within digital environments, especially 3D spaces. This research is important because by analyzing interactions between experienced players and new players, we can understand the importance of how people teach and learn collaboratively in online games. Unlike traditional settings, games utilize nonverbal communication like gestures to guide teammates and express emotion, so understanding how players leverage these in-game movements can provide valuable insights into how knowledge transfer and teamwork function within a 3D digital space. My research has not been completed yet but by the time I am prepared to present at SOURCE, I will have conducted a quantitative study using a Google survey distributed through Discord servers and gaming community subreddits focused on games with raids. The survey will have branching questions based on whether the participant identifies as an experienced or a new player.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Video Games, Communication, Influence

An Application of Social Judgement Theory

Gabriela Gonzalez, Calli Jesmer
Project Mentor(s): Eun Young Lee

Our poster board presentation will focus on reviewing and applying Social Judgement Theory in the form of a theoretical application. Social Judgement Theory was originally proposed by Muzafer Sherif, and has since developed a broad application. Current research utilizing the theory has focused significantly on social movements, public policy, and consumerism. The theory is essential to explaining and predicting behaviors based on an individual's preconceived values, or anchors, in relation to the topic. Key components of the theory include the proximity scale model, latitudes, and ego-involvement. We applied the theory to a theoretical situation in which college students at an ideologically diverse school were asked to engage with a pro-second Amendment representative. Social judgment theory posits that students with a left-leaning political anchor would be less susceptible to persuasion as compared to their right-leaning counterparts. This analysis suggests that there are a variety of factors, including cultural backgrounds, group memberships, and past experiences, that impact how likely an individual is to act on or be persuaded by a message.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Social Judgement Theory

Socialization of Fears in Storytelling Communication in Children's Horror Media

Logan Goodfellow

Project Mentor(s): Joshua Nelson-Ichido

My SOURCE presentation topic will be the Socialization of fears in storytelling communication in children's horror media. It's a qualitative look into the effective means and ways children's storytelling media socializes fear. The previous research looking into this area is very limited. The major points of research are looking at the capabilities and potentiality of children being susceptible to social fear learning and vicarious fear adaptation. The research is important as looking at the cognitive developmental effects of children being exposed to horror content is under-researched. Data collected will be from looking at and analyzing a set of short stories from the child horror series Scary Stories to Tell in the Dark and its film adaptation. The project is currently being worked on and so conclusive results or implications are not available and I'm looking for this SOURCE presentation to be an opportunity to improve and further my research study.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Socialization, Communication, Storytelling

Crafting My Path as a Sports Multimedia Journalist

Charis Jones

Project Mentor(s): Francesco Somaini

KTVH is an organization that aligns with my professional aspirations, and I'll be applying for the position of Sports Multimedia Journalist. The qualifications include having a bachelor's degree or equivalent experience, computer literacy, videography skills, proficiency in editing software, strong writing abilities, and the ability to work in a fast-paced environment. Drawing from my tenure at the Observer and coursework within my degree, I have honed my storytelling and literary skills which have prepared me to produce compelling sports stories across various platforms. I also gained insights from assessments such as the Myers-Briggs and Strengths Quest highlighted my ability to thrive in a fast-paced KTVH sports journalism environment.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Career Preparation

How My CWU Communication Degree and as a Student-Athlete is Perfect Preparation for a Coaching Career

Xavier Kamalu-Vargas

Project Mentor(s): Mark Meister

I will discuss how my experience as a CWU basketball player and Communication student has prepared me for a career as a basketball coach. I will specifically discuss my teamwork, interpersonal communication, and persuasion skills.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Career as a basketball coach

Giambattista Vico Criticism to Artificial Intelligence

Kayden Kim
Project Mentor(s): Nick Temple

This paper is a theoretical application exploring how a humanist, Giambattista Vico, might respond to the recent rise of artificial intelligence. The goal of some artificial intelligence programs is to deliver accurate and reliable information for what is deemed to be true. In this sense, a symbolic comparison could be attributed to Cicero's De Oratore. Studying an ideal helps demonstrate the weaknesses that occur in perfection and showcases the humanistic ideas of inherent value within human nature. The New Science of Giambattista Vico and On the Study Methods of Our Time were analyzed and referenced to gain insight into a humanistic perspective. Based on Vico, a humanist would be opposed to scientific rationalism and glamorization. Ethical considerations of AI, education of rhetoric, and awareness of technology usage would all be supported ideas under this lens.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Artificial Intelligence

The Student Voice: The Importance of University Publications to Bring Forth Awareness of Current Topics

Angela Kyle
Project Mentor(s): Jennifer Green

Using communication outlets to bring forth awareness of vital issues and topics including disabilities. PULSE is our nationally recognized, student-led magazine here at Central Washington University. Students collaborate and bring awareness to issues this generation is dealing with. During my time at Central, I have collaborated with fellow students to create issues of PULSE that bring awareness to many topics. The process starts with brainstorming ideas from all enrolled students, followed by sharing insight on why that topic is important to our readers. The editing teams then come together and assigns topics to writers, designers, and photographers. Over the past 4 years, I have had the opportunity to work on important articles focusing on Epilepsy, Autism, and Inspiration Porn. The more information that is shared, the more knowledgeable people become. Starting these conversations can be a challenge, and through our CWU communications including PULSE magazine, Central Washington University has given students the opportunity to not only create, work on their writing and designing, but to bring forth awareness to the campus community through the power of words and photographs within a magazine.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Communication, PULSE Magazine, Awareness, Disabilities

Relating My Experiences as a CWU Journalist and Strategic Communicator for an Internship at Factal

Maria Mann
Project Mentor(s): Jennifer Green, Francesco Somaini

I present the specific process by which I researched and applied for a journalism internship at Factal. I discuss how my experiences as a journalist and strategic communicator with the Observer, PULSE, and the Central News Agency have prepared me for the internship. I also present insights from my analysis of David Brooks's book How to Know a Person as helpful for addressing my internship application.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Career Preparation

A Fantasy Theme Analysis of Barack Obama's 2004 DNC Speech

Sean McGee
Project Mentor(s): Eun Young Lee

For my SOURCE presentation, I will be making a rhetorical criticism of the fantasy themes present in Barack Obama's 2004 speech at the Democratic National Convention. The previous research on fantasy themes has highlighted the fact that fantasy themes can be used by people to help them think critically about rhetoric that happens in groups. I chose to apply this lens to a political speech because I think doing this is a unique way of looking at the fantasy theme criticism method. This is the keynote speech from the 2004 Democratic National Convention and I analyzed this artifact using the fantasy-theme criticism method. Overall, I found that Obama used fantasy themes throughout his speech effectively to get his points across.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Barack Obama Speech

Student Journalism and The Future of Multimedia Storytelling

Lillith Montgomery, Megan Foster, Isaac Hinson, Gunner Stuns, Yohanes Goodell, Charis Jones, Lizeth Valdes, Brandon Davis, Maddy Larsen, Gracen Bayer, Abu Agyeman, Litzy Rodriguez, Isaac Dobmeier
Project Mentor(s): Jennifer Green, Francesco Somaini

Members of CWU's award-winning student media outlets, PULSE Magazine and The Observer, discuss key takeaways of their attendance at the 2024 Associated Collegiate Press Spring National College Media Conference. Key focuses include transparency in journalism, the importance of multimedia storytelling and the future of the field. Presenters will detail how this opportunity has helped them in their work as student journalists, and how this knowledge can be applied to training future leaders.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Journalism, Magazine, Newspaper, Media, News, Photography

How CWU's Central Communication Agency (CCA) Prepares Students for Careers in Strategic Communication

Litzy Rodriguez
Project Mentor(s): Jennifer Green

Through theoretical application, the student-led Central Communication Agency uses models and concepts learned in our communication classes to work with real businesses and organizations. Students research and analyze the client's public perception to determine objectives and the best communication strategies. By working with real clients and determining effective deliverables, students can apply the communication skills they've learned and further develop them through hands-on experience. Through social media management, event planning, website design, writing press releases, and story pitches, students gather material to build their professional portfolios for future careers. Whether a student majors in communication, marketing, journalism, or film, joining the Central Communication Agency offers the opportunity to find real clients and create quality work by applying the concepts and methods they've learned.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Central Communication Agency, Strategic Communication

Research, Application, and Execution: Applying for My Dream Job as a CBS Sports Associate News Soccer Producer

Taylor Sime

Project Mentor(s): Mark Meister

My presentation discusses the research process I used to identify a job at CBS Sports. I chart how the career assessment process facilitated by TYPEFocus helped me match my educational background, personal strengths, and professional experiences to the position description.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Career Investigation

Everything, Everywhere, All At Once is About Motives

Austin Smith

Project Mentor(s): Eun Young Lee

My paper is a rhetorical analysis of Everything Everywhere All At Once using Burke's pentad. Using research about the power of pentadic ratios, specifically the ratio of purpose: act, I look at how EEAAO makes a statement about motive and being a good person. This research brought me to a greater understanding of not only the film but also what it says about our culture and how to make the world around us better. I did an in-depth look at the entirety of the movie and the multiple agents that it has to analyze what the difference between the agents means - My findings are that EEAAO isolates a person's feelings/situation to emphasize their purpose and what they choose to do.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Kenneth Burke Analysis

The Boss and the Sexualization of Women in Video Games

Chris Velasco

Project Mentor(s): Joshua Nelson-Ichido

This paper will deal with the topic of gender representation in video games and the sexualization of women. Using rhetorical criticism method of feminist theory, the character of The Boss from the video game series, Metal Gear Solid, will be viewed through a critical lens, examining how she upholds or dismantles patriarchal views of women. There has been some research on this topic showing that female characters in video games are relegated to either damsels in distress, or sexual objects for the male gaze. Further studies on this topic can explore whether positive representations of women have been done in games, and how they can improve over time. The artifact that will be analyzed is the 2004 video game, Metal Gear Solid 3: Snake Eater, in which The Boss is the main character in. This artifact is important because it uses classic tropes of spy films to portray women as femme fatales. The character of The Boss, however, proves to subvert many of these tropes by the end of the game and becomes a character with far more agency than the male protagonist.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Video Games

Pursuing a Professional Career in Sports Communication

Kennedi Wilkins

Project Mentor(s): Mark Meister

My love for baseball and hockey and my educational background in Communication are fundamental to my desire for a professional career in Sports Communication. This posterboard presentation outlines my dedicated career path and how my love for sports and communication expertise relate to how my personality matches those necessary for a career in Sports Communication.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Career in Sports Communication

Saltburn and Classism

Matti Wilson

Project Mentor(s): Eun Young Lee

I will be presenting my rhetorical criticism paper on the movie Saltburn. Rhetorical criticism is used to understand different types of communication and the importance of influence that an artifact can have. Understanding how modern movies can impact, entertain, and persuade audiences can help once we understand what type of message a movie is trying to display. I analyzed the movie Saltburn so we can understand what message is being presented by picking apart certain aspects of it and gaining cultural knowledge from where the movie is based. Saltburn truly dives into the UK social class differences and forces us to see how the rich and poor act.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Classism

Applying My CWU Communication Degree for a Career as a Radiation Therapist

Isabelle Zahnow

Project Mentor(s): Mark Meister

My educational background as a CWU Communication student and student-athlete has uniquely prepared me for a career as a radiation therapist. In my posterboard presentation, I highlight how the knowledge and skills related to interpersonal and intercultural communication and my passion for teamwork are profoundly important as I pursue my career in health communication as a radiation therapist.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Career in Health Communication

CWU's Central Communication Agency (CCA), Public Relations Leadership, and My Professional Future as Strategic Communicator in the Airline Industry

Sydney Ziegler

Project Mentor(s): Jennifer Green

My presentation will be on Central Communication Agency at Central Washington University, how I have contributed to CCA in my time in the Public Relations program, and how it will help me with my future job search. I have held an Account Executive position in CCA all three quarters I've been a part of the program, both for PULSE magazine and for the Internal CCA team. I want to use my knowledge and experience in CCA to pursue a career in the travel industry, specifically working for an airline. I would want to work in a corporate position whether it be in public relations or an integrated communications team. I have experience working in many groups throughout my college career, including working with an Agency, a magazine, and an honor society. Each of these has set me up with needed skills such as communication tactics, thinking and working quickly, strategy and idea planning, and having empathy and perspective.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Strategic Communication and Public Relations

English

Ethics of AI Use in the Writing Classroom

Lisa Amick

Project Mentor(s): Dan Martin

This presentation will examine my webtext on the ethics of AI use for the teaching of writing. This project will engage the following research questions: What ethical principles should be adopted when using AI to write and research? How can composition teachers encourage students to use AI ethically? In this presentation, I argue that using AI ethically to write involves rethinking assumptions about both writing and education, and establishing effective instructional practices and policies for the classroom. Teaching students how to use AI ethically is crucial to adapting to technology that will continue to advance and redefine writing. In this presentation, I will briefly discuss some major concerns that AI poses for teaching writing. Then I will define core ethical principles for using AI and analyze various AI assignments and syllabi policies that address AI use in the writing classroom. I will also share the website for my project during the presentation. All of the information in this presentation is on my webtext. Audiences are encouraged to examine the website for extended analysis, commentary, and resources on using AI to teach writing.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: AI, Large Language Models, Ethics, Education, Teaching, Writing

Gods of Jade and Shadow a Product of Postfeminism Sensibilities

Lindzie Ashby
Project Mentor(s): Paula Collucci
This essay focuses on the post-feminist sensibility found in the book Gods of Jade and Shadow by Silvia Moreno Garcia.
Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Post-feminist sensibility Gods of Jade and Shadow by Silvia Moreno Garcia

When Fiction Becomes Reality - A Short Story

Ashley Ayling
Project Mentor(s): Ali Unal
Fiction is one of the great forms of communication. It grips its readers in and sets them on a journey that they themselves could never have in real life. But the real-world inspirations for many stories and how stories interact with reality shouldn't be ignored. The short story "When Fiction Becomes Reality" is a story about a group of camp counselors at Camp Indianola. When they were told that the last night was always the most emotional, the counselors didn't realize that warning wasn't for their campers. Joking and telling stories in the darkness of the Driftwood Deck while their campers slept soundly inside didn't seem like a bad idea. They were safe from the world, miles away from any large towns. The only thing that could get them was the fear of their own ghost stories. That was until a message from another counselor left them reeling. There was an unidentified man trying to get into the cabins at camp. As the counselors of Driftwood cabin launched into action, they began to wonder if reality was closer to fiction than they thought. Through the short story "When Fiction Becomes Reality" I pose the question of "real or not real?" to show just how important connecting our own lives to fiction really is.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Short Story, Fiction, Non-fiction, Reality, Inspiration, Analogy, Metaphor

Fragmented Unity: A Look at Maggie Nelson's Bluets Through Caroline Levine's Theories on Form

Clair Cook
Project Mentor(s): Katharine Whitcomb
By applying Caroline Levine's groundbreaking theories on form, this paper seeks to analyze the intricate narrative structure of Maggie Nelson's Bluets. Nelson's work presents a fragmented yet cohesive exploration of the color blue across 240 vignettes, making it a unique text that contains a world of observation, emotion, and reflection. Through the study of Levine's theories on Whole and Network, this paper will unveil the underlying unity within Nelson's fragmented narrative. The theory of Whole illuminates how Bluets forms a unified body poetic where the color blue acts as a bounded enclosure, connecting diverse themes and narratives that reflect the interconnectedness of the human experience. This paper also explores how Levine's theory of Network highlights the intricate web of connections within Nelson's work, revealing how the color blue acts as a unifying force across seemingly disparate musings on art, philosophy, the natural world, desire, love, grief, and identity, among others. This study seeks to navigate the interconnected fragments through the lens of Levine's forms in search of meaning and coherence. The ultimate goal is to contribute to a deeper understanding of Nelson's innovative narrative techniques and the profound insights they offer into the human condition. By applying Levine's theories on form, this paper seeks to uncover the hidden unity within Nelson's fragmented masterpiece, shedding light on its enduring significance in contemporary literature.
Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Literary Theory, Maggie Nelson, Bluets, Caroline Levine, Whole, Network

How Genre Structure Helps The Left Hand of Darkness Convey its Message of Political Cooperation

Kevin Dowdell
Project Mentor(s): Sarah Sillin
Since its initial publication in 1969, Ursula Le Guin’s science fiction novel The Left Hand of Darkness (or TLHoD) has garnered considerable attention from the literary community for its bold exploration of gender and political issues. Yet even as the novel is clearly positioned as science fiction, it fits more broadly into the genre or mythos of romance, as defined by literary theorist Northrop Frye. The book also contains elements of the tragedy genre/mythos, secondary to the overarching romance structure. These higher-level classifications provide a vital lens through which to analyze how TLHoD’s narrative structure conveys its political commentary—particularly the value of cooperation and the dangers of factionalism. This project reads Le Guin’s novel through Frye’s Anatomy of Criticism and other relevant literary and cultural scholarship, focusing its analysis particularly on a passage early in TLHoD. This passage is rich in formal elements—such as diction and figurative language—that reflect the novel’s adherence to Frye’s romance and tragedy genres/mythoi and exemplify the novel’s larger structural pattern. This analysis indicates that TLHoD fits squarely within a romance (primary)/tragedy (secondary) narrative structure and reveals that the nature of the hero, the villains, and the tragic figure all contribute to a mythological/folkloric narrative. By deploying these structures, Le Guin clearly communicates and maximizes the impact of the novel’s message, inviting us to root for the characters who recognize that, in the political sphere, states lose out when they close themselves off to cooperation.
Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Literature, Literary Genre, Narrative, Science Fiction, Romance, Tragedy, The Left Hand of Darkness, Ursula K. Le Guin

"Deconstructing Form in Monica Youn's 'Greenacre': A Critical Examination"

Miranda J. Gardner
Project Mentor(s): Katharine Whitcomb

Crafted for English 565: Advanced Poetry class under the guidance of Professor Whitcomb in Winter 2024, this presentation delves into the intricacies of Monica Youn's 'Greenacre.' Embarking on a captivating journey through a labyrinth of form, the focus lies not solely on content but on the ingenious and inventive structures that Youn employs. With a dazzling display of poetic prowess, Youn showcases many techniques, including imagery, metaphor, alliteration, assonance, symbolism, and enjambment. Through a tapestry of themes encompassing environmental concerns, human impact, infertility, and societal expectations, Youn expertly constructs a multilayered poem that exemplifies her mastery of diverse poetic forms. Going beyond static creation, Youn advocates for a dynamic approach to writing, urging writers to embrace a continuous evolution of ideas. Moreover, she champions courage in integrating personal experiences, fostering innovation and experimentation as vehicles for artistic expression.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Creative, Form, Monica Youn

Examining structure in Miranda J. Gardner's poem "ADHD: Questionnaire & Diagnosis

Miranda J. Gardner
Project Mentor(s): Katharine Whitcomb

In crafting the poem "ADHD: Questionnaire and Diagnosis" by Miranda J. Gardner, the initial decision was to utilize free verse form to mirror the unstructured and personal nature of the speaker's experiences. This choice allowed for the raw emotions and reflections of the speaker to be captured without the constraints of rhyme or meter. During the revision process, the focus shifted to enhancing the poem's coherence. Attention to the pacing and rhythm of the lines ensured they flowed naturally and conveyed the speaker's journey of self-discovery and acceptance. Techniques such as enjambment and line breaks were utilized to create pauses and emphasize critical moments in the narrative. Additionally, the thematic progression of the poem was carefully considered, organizing stanzas to effectively explore themes such as identity, education, stigma, and empowerment. The idea for the poem was inspired by Eugenia Leigh's poem "Bipolar II: First Evaluation" from her book Bianca. Professor Katharine Whitcomb provided valuable guidance by suggesting incorporating a list format akin to a questionnaire. This led to adapting a questionnaire taken before diagnosis, which was adjusted to reflect the poet's personal experience. Throughout the revision process, attention was maintained on the language and imagery used to evoke empathy and understanding in the reader. Words and phrases were chosen to resonate with authenticity and emotion, allowing the speaker's voice to shine through. Ultimately, after multiple rounds of revision, the poem was crafted to capture the nuanced experiences of living with ADHD while advocating for acceptance, support, and empowerment.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: ADHD, Free Verse, Form, Resiliency, Diagnosis, Progress

“You Can Do Better Than This, Jo”: Louisa May Alcott and Sensational Literature

Anna Gillihan
Project Mentor(s): Sarah Sillin

Louisa May Alcott is best known for her novel Little Women, and this association has cemented her in the public consciousness at the author of sentimental, domestic, and morally upright fiction. However, many do not know that before publishing Little Women, Alcott had a successful literary career writing gothic thrillers and sensation stories under the name “A.M. Barnard.” In her sensation stories, Alcott wrote characters who committed violent crimes, gave in to vices, and engaged in schemes, very different from the morally upright characters in her later work. In particular, her writing of women differs greatly between her sentimentalist fiction and her sensation stories. However, despite Alcott having achieved great financial success in the sensationalist genre, she wrote a plot into Little Women that treats that genre with contempt, referring to sensation stories at “trash” and implying that writing them “desecrated” a woman’s character. Both Alcott’s treatment of the sensationalist genre in Little Women and her choice to distance herself from her own sensationalist writing by using a pseudonym may indicate that Alcott feared the judgement of her community. This fear, along with the stark difference between how Alcott depicted women in the two genres, speaks to the strict expectations of female behavior common at the time. This paper will attempt to answer how these expectations may have affected Alcott’s writing, and how they may have affected which of her works Alcott was willing to own publicly.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Literature, Louisa May Alcott, 19th Century

Manastash Volume 34 Launch and Reading Party

Manastash Volume 34 Contributors
Project Mentor(s): Ali Ünal

Manastash is a student-run organization founded in 1990. It is dedicated to presenting Central Washington University (CWU) student’s literary and visual works. An issue containing poetry, prose, and various visual art forms is printed annually in May. Each year the journal works around a theme and for the 34th edition the theme is “Humanity VS Machine,” which is topical considering the recent advancements of artificial intelligence. The theme is always up to interpretation by the artist, which is why there’s such a diverse collection of stories in each issue. Some of the contributing artists mention machines or AI in their pieces, others take a more nuanced approach to the topic. In any case, in this digital age it’s hard to deny the impacts technology has on our day-to-day lives, and the potentially greater impacts it could have in the future.

Presentation Type: Live Reading (May 15, 2:00pm–2:50pm, SURC Pit)

Key Words: Literary Art, Poetry, Prose, Visual Art

Problematic Language in Current Medical Descriptions of Intersexuality

Coy Ryan
Project Mentor(s): Griff Tester, Seokhoon Ahn

Intersexuality is an understudied field. Recent scholarship suggests intersexuality is part of natural human variation, not a disorder. Yet, many medical sources do not reflect this emerging research. For this survey-based study in progress, I used a mainstream medical description of intersexuality, published in MedlinePlus, as the negative description of intersexuality and changed the negative language to informational via targeted rewording, resulting in a neutral-informative description. Lastly, I inserted additional information about intersexual variation being part of human diversity to create the positive description. Participants begin by responding to intersexuality knowledge and attitudes questions. Then, they are randomly assigned to groups and asked to read either the negative, neutral, or positive descriptions. All three groups then read the same report about an intersex athlete, which uses negative conceptions and criticizes intersex athletes. Finally, participants respond to knowledge and attitudes questions again. I hypothesize the following: Participants exposed to the negative description will show lower understanding of intersex variation and hold more negative attitudes towards intersex people compared to those who read neutral or positive descriptions. Participants exposed to the neutral description will demonstrate a better understanding of intersex variation and hold fewer negative attitudes than those exposed to the negative description but may have lower understanding and more negative attitudes compared to those exposed to the positive description. Participants exposed to the positive description will exhibit improved understanding of intersex variation and more positive attitudes towards intersex people compared to those who read the negative or neutral descriptions.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Intersex, Social Science, Advocacy, Medicine, Language, Disorders of Sexual Development, DSD

A Theoretical and Practical Pedagogical Reflection on Teaching First-Year Composition

Mariah Sebastiani
Project Mentor(s): Dan Martin

This research project investigates how my FYC (First-Year Comp) content transfers into my students' diverse classes, majors, and professional discourses. By interviewing and surveying my past students, I will use transfer theory to evaluate what pedagogical tools and methods lead students to effectively or ineffectively transfer FYC concepts, such as writing process, rhetorical situations, and discourse communities, into their current classes and professional lives. I will also focus on how multimodal activities impacted the learning environment and concept retention. I will interview and survey my students about how FYC knowledge transfers into their other classes. Using this research, I will reflect on my pedagogical development throughout my three quarters teaching FYC and develop strategies to continue to improve my teaching quality. I will examine my pedagogy using a writing-for-transfer framework. Additionally, I intend to add to an already robust field of transfer theory by examining how my students use FYC concepts and skills in their other classes.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: First Year Composition, English 101, Transfer Pedagogy, Pedagogical Reflection, Rhetorical Situation Theory, Discourse Community Theory, Writing Process Theory

Seeking Mr. Hyde: The Secret Self's Subversion of Victorian Values in "The Strange Case of Dr. Jekyll and Mr. Hyde"

Lori Swanson
Project Mentor(s): James Seth

Robert Louis Stevenson's tale "The Strange Case of Dr. Jekyll and Mr. Hyde" has long been lauded as a Gothic masterpiece illuminating the struggle between the darker and lighter natures of man. This essay seeks to delve beneath this superficial duality and into the rich portrait of the 19th century English gentleman's secret self as painted by Stevenson's cast of characters. When Dr. Henry Jekyll and Edward Hyde were created in 1886, Victorian society boasted a complex system of class-based virtues and moral codes. Contemporary views on genteel attributes, class expectations, crime, and individual responsibility are masterfully woven throughout the story's hero, villain, and supporting characters. Through the interplay of Victorian values and Stevenson's use of classic Gothic characterizations, a fresh portrait of Hyde emerges—that of a projective figure created and emboldened by 19th century male anxieties regarding personal conduct and reputation, and one whose inevitable self-destruction reflects the dangers of self-abnegation in the face of social acceptance. Ultimately, this paper seeks to reveal that Hyde himself is not a monster as his contemporaries define him but a mirror reflecting anxious denials of their own concealed degeneracies.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Robert Louis Stevenson, Dr. Jekyll and Mr. Hyde, Gothic, Horror, Victorian, Society, Responsibility, Values

Film

Alien (1979): A Queer Allegory

Amy Walker
Project Mentor(s): Jennifer Green

Seminal texts in their respective fields, Eve Sedgwick's Epistemology of the Closet (1990), and Laura Mulvey's Visual and Other Pleasures (1989) are the foundations of queer and feminist film theory. While Sedgwick and Mulvey tangentially criticize the gender binary, both adhere to it for the sake of argument. A subversion of the gender binary can be found in a film that predates these texts but is only understood through a queer and feminist lens. Alien (1979), directed by Ridley Scott, is lauded for its phenomenal set design, acting, and suspense, as well as its frightening xenomorph, the titular 'alien' that stalks the crew of the Nostromo. Another important but often overlooked aspect of the film are the renegade depictions of sex and gender. The film articulates this point through the conflict between androgynous science-fiction protagonists, Ripley and the Nostromo crew, and carnal horror monsters, the facehugger and xenomorph. Sex, gender, and body horror intersect at arguably the film's most iconic scene, the infant xenomorph's gory birth from a crewmate's torso. Subversive and gruesome, Alien's premise trespasses societal boundaries by presenting a counter narrative: the gender binary is an invasion on an otherwise genderless population. This presentation analyzes the character design and body horror found in Alien using queer and feminist theory to discuss the film as an allegory for genderqueer individuals in a binarized society.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Film, Queer Theory, Feminist Theory, Gender, Body Horror

History

The Geopolitics of Revolution: How 1848 Influenced German Unification

Adam Fadich
Project Mentor(s): Dr. Shawn Reichert, Dr. Melissa Jordine
This research paper will contextualize and analyze how the European situation preceding, during, and following the revolutionary period during the spring of 1848 contributed to a geopolitical goal of the German nationalists, radicals, and liberals within the German Confederation to unify into a singular nation-state. A goal of this paper is to clearly identify and define multiple core themes and terms critical to European institutions and methods of thought relating to the time period, and how a disagreement between different class strata and political elite within the numerous German states would affect the institutions of the following German state to be. Alongside this goal will be a related ambition to analyze the incentive networks and causes for this discussion of national unification, along with the geopolitical situation prior to, and ramifications of, a united Germany. It is of great importance to understand the 1848 Revolutions and how it affected the rise of the modern nation-state, and in particular a unified Germany; which would drastically alter the European balance of power and have serious ramifications going into the future of the Concert of Europe. In this paper I will attempt to link and assert that the 1848 revolutions and the outcome of these failed revolutions, alongside the role the Kingdom of Prussia would play within the German Confederation, would lead to a militaristic, authoritarian, and reactionary Germany in stark contrast to the Frankfurt assembly's dream for a liberal and united German empire.
Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: German Confederation, Nationalism, Congress of Vienna, Liberalism, Absolutism, German Dualism

The Hanford Effect: Atomic Secrecy and the Fight for Justice

Stephen Hoberg
Project Mentor(s): Daniel Herman
In between endless rows of sagebrush in the former agricultural community of Hanford, Washington lies one of the largest environmental cleanup projects in the world. The Hanford Site, one of the three major nuclear production facilities during the Manhattan Project, was responsible for enriching uranium isotope U-235 into plutonium during the facility's nearly forty-year operational history. My paper argues that the War Department's acquisition of the towns of Hanford and White Bluffs caused negative economic and social impacts during their forced removal. Additionally, this paper will analyze how the secrecy of the Manhattan Project caused military officials to mislead judicial and public officials during the residents' struggle to obtain just compensation for the taking of their properties.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: History, Atomic Age, The American West

Comfort Women: The Reintegration Into Their Community

Kennedy Shook

Project Mentor(s): Lacy Ferrell

This will Examine Comfort Women and the reintegration into their communities after WW2. At this time women from all across Asia were taken from their homes and from their country, and displaced into different countries and used as sexual slaves, a lot of these women would endure till the end of the war. Where they had to also then escape for their freedom. After the war they had another struggle which was returning to a community that didn't want them and having to reintegrate into the community and rebuild their lives. I will be incorporating evidence from peer reviewed journals, videos of the interviews with these women. This will examine and understand life after the war and being reintroduced into society. It will discuss these women and their lives and what life was like for them and the possible struggles of life after a horrendous experience they had endured as Comfort women for the Japanese Military.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Comfort Women, Japan, World War 2, Sexual Slavery

Through the Empress's Wardrobe: Power and Style in 19th Century Russia

Naomi Whiting

Project Mentor(s): Roxanne Easley, Hope Amason, Marilyn Levine, Volha Isakava

This project investigates the role played by elite fashion in creating national and cultural identity at the end of the Romanov Empire. Analysis shows that elite fashions reflected tensions between socioeconomic modernization and an antiquated political ideology. This project serves to connect previous research on the symbology of court dress with scholarship about the rapidly changing social, political, and cultural atmosphere at the end of the Russian Empire. I recreated three historical garments based on written and visual evidence. These garments form the centerpiece of a museum display and an article-length thesis. The garments both reflected and exacerbated tensions in the empire, exemplifying the importance of elite fashion in understanding historical development.

Presentation Type: Museum of Culture & Environment Exhibition (May 16, 12:00pm–1:00pm)

Key Words: Fashion, Historical Fashion, Imperial Russia

Music

Collections by Eli

Eliasib Alvarado

Project Mentor(s): Eliasib Alvarado

A collection of music that depicts different stories.

Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Composition

CWU Horn Club Presents a Concert in Collage Style

Beaumont Fry, Alec Chinnery, Alex Coon, William Forbes, Jordyn Gribble, Eamon Hill, Lucy Jacky, Allison Knaff, Gabrielle Kosoff, Julia McConnachie, Alex Morris, Jaime Ramos*, John Roeder, Isaac Rosado, Kellen Schuetze*, Connor Schwarz, Tori Seward, Jaeden Tellvik, Emma Tranum*
Project Mentor(s): Jeffrey Snedeker

The CWU Horn Ensemble will give a performance featuring music for 19 CWU Horn Club members led by our director, Dr. Jeffrey Snedeker. This performance represents a concert that the ensemble performed at the Northwest Horn Symposium, a regional professional conference hosted by the Northwest Horn Society in April 2024 in Pullman, Washington. The invited program includes a varied repertoire of music that pays tribute to the history of horn ensemble music, including famous arrangements, such as Queen's Bohemian Rhapsody and Michael Kamen's soundtrack for Robin Hood: Prince of Thieves, as well as standard pieces and new works by under-represented composers. The CWU Horn Club has also commissioned CWU faculty composer Dr. Jiyoun Chung for a new work which we have not yet received but hope to premiere at the SOURCE presentation; this work will also be performed at an international conference in the summer 2024. The CWU Horn Club strives to pursue art and music in unique pathways that stimulate the audiences. A unique aspect of this performance is that it will be presented in a "collage" style. A collage concert involves creating a free flowing, continuous musical performance where pieces fade in and out of one another, creating a soundscape that does not end until the concert is finished. This concert will feature a variety of ensemble settings ranging from small horn quartets to ensemble pieces that utilize all 19 members. Additionally, this concert will feature student conductors*. Please see page 181 for the full performance program.

Presentation Type: Performance (May 15, 9:00am–4:00pm)

Key Words: Music, Concert, Horn, Ensemble, Collage

Eastern Suite; or, on the Death of a Desert: Using Composition as a Tool for Climate Justice Advocacy

Stephen Williford
Project Mentor(s): Jiyoun Chung

The desert is an inhospitable place. But, when one immerses oneself in it, there is an entire world apart. Willows cling to the few small ponds and the edges of the winding Columbia, the only bastions of hope for the native creatures. Dust blows across the arid ground, sagebrush shudders in the wind. Rattlesnake Mountain looms in the distance, jutting from the ground like the spine of some ancient creature long gone. This piece is based on my home in the southeastern shrub steppe of Washington state, the hills and wildlife preserves I grew up wandering. They are built on an intimate knowledge of these landscapes, but do not require such familiarity from the listener. Their structure is very modular in design, with each movement following a core scale, technique, and/or compositional idea. The goal of this work is to confront listeners from all backgrounds with the reality of the eradication of our natural desert landscapes, and make them aware of the beauty we are losing through our inaction. Although this piece makes use of academic compositional techniques, the intention of the work is to be approachable and clear such that audiences from all walks can understand the importance of environmental advocacy, as well as understand how the message relates to the music they are experiencing. In this presentation, I hope to challenge preconceptions of the value of nature and demonstrate ways in which we, as artists, can push for more conscious and environmentally-focused policy and lifestyles with our works.

Presentation Type: Performance (May 15, 9:00am–4:00pm)

Key Words: Music, Music Theory, Piano, Composition, Climate Justice, Climate Change, Climate Activism

World Premier of Dr. Jiyoun Chung's O.K. Boomer

The CWU Trumpet Quintet

Project Mentor(s): John Harbaugh

O.K. Boomer (2023), a new composition by composer and music theorist Dr. Jiyoun Chung, discusses the divide between people belonging to different generations and advocates for more unity and peace between age groups. O.K. Boomer was commissioned by the CWU Trumpet Quintet for their participation in the 2024 National Trumpet Competition (NTC). Playing at NTC 2024 is something that everyone in this group wanted because it is an invaluable experience that would allow us to survey what the best trumpet players across the country are doing. NTC also served as a catalyst for our own networking and professional development. The CWU Trumpet Quintet successfully advanced to the quarterfinal round of NTC 2024. This year, NTC was hosted by Texas A&M University Kingsville (TAMUK) from March 8 to March 11. In our preparation for the competition, our group practiced and rehearsed tirelessly to successfully capture the meaning of the piece as well as to connect musically with each other. The CWU Trumpet Quintet will perform O.K. Boomer for the SOURCE audience, accompanied by narration which will serve to enhance the performance by providing context and understanding for listeners.

Presentation Type: Performance (May 15, 9:00am–4:00pm)

Key Words: Contemporary Music, Post-Modernism, Live Performance

Philosophy and Religious Studies

Internalized Capitalism and Its Effects on Guilt

David Barnett

Project Mentor(s): Janie Zencak

As a species, we like to order, sort, and define things. We are constantly attracted to ideology and are not always aware of where our ideas of how we should be come from. Systems of ideology are constantly attempting to adjust people’s standards of morality and how one should live. Capitalism is one of these systems. Like any other ideology, it attempts to assert a good and a bad, a right and a wrong. For capitalism, the ultimate good is that one should be productive. Capitalism does not only affect people on the macro level by dictating one’s economic standing but also affects the individual on a personal, and psychological level. Capitalism urges individuals to be productive constantly because that is what capitalism values most. If people do not live up to the standard of economic productivity that capitalistic society sets as the universal goal, then they are susceptible to feelings of guilt and inadequacy which are used to perpetuate this system. This pervasive sense of societal guilt is a byproduct of a social and economic system that values production and economic progress over all else.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Philosophy, Capitalism, Guilt, Existentialism

Theatre Arts

Expenses of an Actor How Much Does it Really Cost to be an Actor?

Francesca Corso
Project Mentor(s): Emily Rollie

Doing art of any kind can be quite an expensive ordeal and little costs here and there add up extremely fast, especially in the theatre world. As an actor there are many steps that we take before we even reach the stage and probably one of the costliest steps is auditioning and the steps that lead up to even that. As a student who does not make a lot of money, I have become very aware of these costs and in a day in age where self-tapes (the act of videoing yourself to send to an auditioner for an audition) are becoming more and more popular the expenses are piling on. I as an actor am looking to examine the expenses that accumulate in an audition season and see how much it will cost me to go to all the auditions, I want from January 2024 to July 2024 here in the Pacific Northwest. From gas to headshots to gear I plan to show each and every cost.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Actor, Audition, Costs, Theatre

Broadway vs. West End: A Musical Theatre Study

Avery Hilt
Project Mentor(s): Grace Pearsons

Since the start of the 20th century, the Atlantic Ocean separates two live theatre cultural landmarks: The United States' New York City and The United Kingdom's City of London. New York's Broadway and London's West End (the respective name of each theatre scene) maintain economic, cultural, artistic, and even audience differences that create a stark contrast of different sub-cultures in the live theatre genre. In this presentation, I will be using my study abroad experience, history, and data to discuss the pasts and presents of both parties and what these similarities and differences mean for the future of live theatre. (This project is a required culmination experience project per terms and conditions upon being awarded the 2023 Betty Evans Shakespeare Scholarship.)

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Theatre, Musical Theatre, Live Theatre, Study Abroad, Culture, Music, Acting, Broadway Theatre, West End Theatre

World Languages and Cultures

Gaps Between Intention and Outcomes of Educational Policies Targeting Poverty: The Case Of France and the U.S.

Adelaide Palko
Project Mentor(s): Michael Johnson
Globally, children in poverty are academically underperforming relative to their peers in most metrics. While there are many policies in place to support children in poverty and boost their academic performance, a majority of these fail to effectively aid students. Using research from the Organization for Economic Co-operation and Development (OECD), the United Nations Educational, Scientific, and Cultural Organization (UNESCO), and France's Department of Educational Evaluation, Foresight, and Performance (DEPP), I analyze the effectiveness of three separate policies in France in terms of how they meet the needs of underprivileged students. Despite these efforts, according to a study published by UNESCO, these policies have fallen short in several ways. This paper compares the shortcomings in France's educational system in serving children in poverty to that in the United States. France, much like the United States, struggles with school segregation. In both countries, students of affluent backgrounds live in wealthy neighborhoods and attend well-funded public schools, while impoverished students live in disadvantaged neighborhoods and attend underfunded public schools. The effect that this lack of funding has had on their education is assessed with test scores, graduation rates, post-graduation achievement metrics, and reported student happiness. Highlighting similarities and differences in the policies used by each country, I address what the U.S. should be learning from shortcomings in France's policy. This paper proposes three solutions to reduce the effect of poverty on educational outcomes: redistributing school funding, relaxing school zoning laws that limit access to education, and funding more early intervention programs.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Education, Policy, Poverty, France, United States

College of Business

The College of Business has presentations from the following departments and programs:

- Economics
- Entrepreneurship
- Finance & Supply Chain Management
- Management and Marketing

Economics

Victim as Offender and Offender as Victim: Preferences for Justice

Jocelyn Cruz
Project Mentor(s): David Zuckerman

When a monetary transgression occurs, how do the past histories of the offender and victim affect third-party preferences for restoring justice through compensation and punishment? We consider scenarios where the offender was previously a victim or the victim was previously an offender of an equivalent monetary transgression. We investigate how previous justice concerns affect the decisions third parties make in response to the current transgression. For example, do third parties generally subscribe to the notion that “two wrongs make a right”, and punish offenders less if their victim had also previously been an offender? To study these concepts, we pair participants in an online experimental setting, and have them engage in a monetary game, where one can take $5 from the other. We then assign new participants to the role of the third party; they make decisions regarding compensation for the victim and punishment for the offender, based on different past history scenarios. We compare the compensation and punishment decisions made across the different scenarios, to see how past history can affect our preferences for restoring justice following a transgression.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Justice Preferences, Compensation, Punishment, Past Histories, Fairness Perceptions

Understanding Role of ESG in Sustainable Development Within the United States

Kameron Eck
Project Mentor(s): Toni Sipic

This research evaluates the effect of state-level ESG regulations on corporate sustainability and financial outcomes in the United States. Amidst a contentious political landscape, where ESG implementation varies widely across states, this study aims to uncover how these differing policies influence corporate performance. Employing a mixed-methods approach, including legislative analysis, data collection, and fixed effects regression, it seeks to illustrate the impacts of state ESG regulations on firm financial and ESG performance. The findings will indicate whether ESG policies materially affect corporate sustainability and financial metrics or amount to political posturing. This study contributes to an understanding of the role that policy plays in corporate financial, environmental, and social responsibility within the framework of sustainable development.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: ESG, Sustainable Development, Culture, Finance, Regulation, USA, Corporation, Sustainability

Central Washington University Student Price Index Project: Improved and Expanded Methodology

James Gibson, Caden McNair
Project Mentor(s): Yurim Lee

The Student Price Index at Central Washington University creates a price index that reflects the cost of living for students at Central Washington University. While the Consumer Price Index calculated by the Bureau of Labor Statistics provides a general overview of the cost of living faced by people nationwide, the Student Price Index enables a more specific look at the unique cost of living for a CWU student. A survey is conducted periodically to determine relative student spending on various items they purchase, ranging from tuition to groceries. Prices for each of these items are gathered monthly. An index is generated when the relative spending weights from the survey are used to calculate a weighted average of monthly prices. This year, the Student Price Index is improved in several ways. While the previous methodology used a weighted average of absolute prices to calculate the monthly Student Price Index, the current methodology uses a weighted geometric mean of relative prices. This makes methodology more consistent with the Bureau of Labor Statistics methodology for calculating the Consumer Price Index. The Student Price Index has also been updated to use a more recent and more comprehensive survey to calculate item weights used in the Student Price Index. Further, prices of all textbooks are incorporated into the index, rather than just those used in Economics 201 and Economics 202, giving a more balanced view of cost of living faced by students across campus.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Economics, Price, Inflation, Student

Are Skilled Immigrants More Likely to Experience Occupation-Education Mismatch Within the U.S.?

Betty Mittelstaedt, Tennecia Dacass, Devon Lynch, Elif B. Dilden
Project Mentor(s): Tennecia Dacass

Using the National Survey of College Graduates data from 2003 to 2021, we examine differences in the probability of experiencing an occupation-education mismatch among immigrant men and women relative to similar natives within the U.S. Additionally, we estimate the wage penalty associated with a mismatch. Our results indicate that immigrant men are less likely to experience occupational-educational mismatch compared to native-born men. In contrast, immigrant women are more likely than their native-born counterparts to encounter a mismatch, particularly immigrant women educated abroad. Our analysis underscores the wage penalty incurred by individuals who work outside their field of study, with immigrant workers experiencing a larger wage penalty.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Female, Assimilation, Immigrant, Annual Salary, Occupational-Education Mismatch

Measuring the Effectiveness of Carbon Pricing: The Impact on Corporate ESG Performance and Carbon Emissions

Betty Mittelstaedt

Project Mentor(s): Toni Sipic, Tennecia Dacass, Sterling Quinn

Climate change and the increasing regulatory environment present a significant challenge to businesses, leading to a surge in companies' carbon data disclosures and 'green' advocacies. However, there is a lack of certainty regarding the effectiveness of companies' emission reduction efforts, as highlighted by the discrepancy between disclosed climate efforts and actual emission reductions. This raises questions about the accuracy of Environmental, Social, and Governance (ESG) ratings in reflecting corporate environmental performance, particularly in the face of limited measuring techniques and the lack of regulations around ESG rating agencies. This study aims to investigate the impact of carbon pricing policies, such as carbon taxes and Emission Trading Systems (ETS), on companies' ESG ratings, specifically focusing on environmental performance and carbon emissions reduction. I estimate a fixed-effect regression model using Institutional Shareholder Services (ISS) ESG and carbon emission data. The results show that carbon pricing significantly improves corporate ESG ratings and reduces carbon emissions. However, when looking at just the environmental pillar rating, I find that only ETS prices significantly improve the ‘E’ rating. The results suggest that overall ESG ratings might capture other factors that are impacted by carbon prices and thus, not just improve the environmental pillar of ESG but also the social and governance pillars.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Environmental Regulation, ESG, Corporate Environmental Sustainability, Carbon Tax, Emissions Trading System

A Synthetic Difference-in-Difference Analysis of Paid Family Leave in Washington State

Amneet Pawar, Jeremy Rexus, Maddie Shirley
Project Mentor(s): Chad Wassell, Tennecia Dacass

Due to a variety of factors, birth rates have declined in the United States since the 1970s. Our research aims to delve into the impact of paid family leave policies on birth rates in Washington State. The goal is to see if there is a correlation between the availability of paid family leave and birth rates in Washington. We believe paid family leave policies will have a small positive correlation to fertility. We suspect that the overall fertility rate in Washington will continue to decrease following the implementation of paid leave laws but that the decline in fertility will be less severe when compared to states lacking similar initiatives. This study employs a difference-in-difference and synthetic analysis to investigate the impact of paid family leave policies. The research spans from 2011 to 2022, encompassing both pre-treatment and post-treatment phases with fertility rates observed each year. The treatment group consists of Washington, while the control group comprises a "synthetic" Washington. These control variables help to ensure the reliability and validity of our findings. The synthetic Washington will be comprised of portions of Colorado, Pennsylvania, and Massachusetts. These states are dependent on data availability and may change. We will be collecting data from these states, and then utilizing a regression model that incorporates state-specific and time-specific fixed effects while controlling for potential confounding factors, to find the differential effect of paid family leave policies. We will do so by estimating the interaction term between policy implementation and the post-treatment period. Statistical significance tests are employed to ascertain the presence of a significant difference in birth rates between Washington with and without paid family leave policies. The results of this analysis will help us better understand this relationship and have implications for policymakers/stakeholders interested in the intersection of family leave policies and population dynamics.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Washington, Paid Family Leave, Fertility Rate

Entrepreneurship

Unfiction, The Unnoticed Side of Fiction

Demetrios Elias
Project Mentor(s): Janie Zencak, Lemu'el Cannonier, Sarah Cannonier

An in-depth analysis of the Unfiction Genre, the parent-genre of the Analog Horror Genre and found footage media style. A genre of fiction, focused on total immersion for audience members and asks what if reality was different.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Unfiction, ARG, Analog Horror, Found Footage, Immersive Media, Audience Participation

Future Leaders of Entrepreneurship

Angel Fitch

Project Mentor(s): William Provaznik, Janie Zencak

A statement regarding the importance of leadership skills gained through the entrepreneurial program. Focusing on team work, collaboration, and directing. Entrepreneurship shows young students how to be an effective leader both academically, and professionally.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Entrepreneurship, Leadership, Entrepreneur, Leader

From Zero to Business: Immigrant Entrepreneurship and the American Dream

Melinna Lopez

Project Mentor(s): S. Moss

This project delves into the compelling narratives of immigrant entrepreneurs who have transformed their lives from humble beginnings to successful business ventures, embodying the quintessential American Dream. Through a detailed examination of their stories, this study aims to extract valuable insights and strategies that aspiring entrepreneurs can adopt to pursue their own entrepreneurial endeavors. The research employs a qualitative approach, utilizing in-depth interviews and case studies to capture the diverse experiences and challenges faced by immigrant entrepreneurs. By analyzing common themes and success factors, the project constructs a roadmap for reproducing their achievements. Central to the study is the development of a comprehensive business plan fitted to aspiring entrepreneurs, drawing inspiration from the strategies and methodologies employed by the featured immigrant entrepreneurs. This business plan integrates practical advice and innovative approaches, providing a blueprint for navigating the complexities of launching and scaling a successful business. Moreover, the project offers actionable recommendations for aspiring entrepreneurs, derived directly from the wisdom and experiences of immigrant entrepreneurs. These insights encompass aspects such as resilience in the face of adversity, leveraging cultural capital, building diverse networks, and adapting to evolving market dynamics. Ultimately, this research not only celebrates the remarkable journeys of immigrant entrepreneurs but also seeks to empower future generations of aspiring business leaders to pursue their entrepreneurial ambitions with confidence and determination, thereby perpetuating the timeless promise of the American Dream.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Migrant Stories, Low Start Ups, American Dream

DM Real Estates New Possibilities for Low-income Families.

Daviale McClure

Project Mentor(s): Janie Zencak

Welcome to DM Real Estates. Here we are committed to helping all find their dream homes. Specifically Low-income families and first time home buyers.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Real Estate, Entrepreneurship

Strength in Numbers: Leveraging Your Network for Success

Megan Rogge

Project Mentor(s): Janie Zencak

Project description: An eye-catching SOURCE poster to promote networking and how it can lead you to success in the real world.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Networking, Business, Planning, Entrepreneurship

BUS 392: Guiding Tomorrow's Business Leaders

Kamoana Ross

Project Mentor(s): Janie Zencak, Bill Provaznik

This poster aims to highlight the essential skills required for successful completion of the BUS 392 Leadership Practicum, where mentors play a pivotal role in guiding CWU business students towards mastering tactical business skills. The practicum involves regular check-ins with mentees, grading assignments, and providing comprehensive guidance on crucial aspects such as group work, critical presentation skills, and successful public speaking.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Mentorship Skills

Unlocking Consumer Minds: A Neuromarketing and Behavioral Economics Approach

Hannah Roswell

Project Mentor(s): Jainie Zencak

In today's competitive marketplace, understanding consumer unconscious behavior is crucial for companies aiming to target their ideal audience effectively. This research focused on the intricate workings of the nervous system and behavioral economics to illuminate the subconscious mechanisms influencing consumer decisions. By examining the electrical activity of neurons, the role of the limbic system in emotional responses, and the principles of behavioral economics, this study provides insights into how companies can identify and engage their target market. The research explores the dominance of unconscious decision-making through platforms such as TEDxBlaine and academic resources like PubMed, with up to 95% of decisions being made without conscious awareness. Behavioral economics concepts, including cognitive distinctiveness, normative economics, and loss aversion, shed light on the factors shaping consumer preferences and choices. Furthermore, the work of behavioral economist Richard Thaler on nudging and choice architecture offers strategies for guiding consumer decisions without infringing on autonomy. By leveraging these insights, companies can craft advertisements and marketing strategies that resonate with consumers subconsciously, effectively influencing their purchasing behavior. This research also emphasizes the importance of ethical considerations in neuromarketing and behavioral economics practices, advocating for transparency, privacy, and informed consent. Ultimately, by integrating neuroscience, psychology, and marketing principles, companies can navigate the complex landscape of consumer behavior to better identify and engage their target market, leading to improved marketing effectiveness and long-term success.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Mentoring, Personal Growth, Management, Business, Feedback

Fast Fashion vs the World

Hazel Thornton

Project Mentor(s): Janie Zencak

Fast Fashion perpetrates environmental harm, unethical work environments, overconsumption, and health risks. The objective of this research aims to identify and address the impacts of fast fashion and propose changes to implement in our society for a healthier, better future. Through collective action, we can make necessary improvements to eliminate fast fashion.

Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Fashion, Marketing, Management, Strategy

Exploring the Impact of Meditation and Mindfulness on Professional Career Development

Cameron Wertz

Project Mentor(s): Janie Zencak

This research project investigates the influence of effective meditation and mindfulness practices, on professional career development and success. Through a comprehensive review of literature and empirical analysis, I aim to reveal the correlations between these practices and key indicators of professional performance, such as productivity, decision-making, and stress management. By examining the experiences and strategies of successful leaders, paired with quantitative assessments, this study seeks to provide valuable insights for aspiring leaders and practitioners alike. The findings will contribute to the growing body of knowledge in both professional development and personal development, offering practical implications for enhancing professional effectiveness in today's business landscape.

Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Stress Management, Decision-Making, Productivity, Mindfulness

Finance & Supply Chain Management

The Power of Chaos and Pressure

Samson Dwyer, Campbell Robb

Project Mentor(s): Janie Zencack

This poster is referring to the growth of students in the class management 200 and the opportunity for the mentors to observe it in Business 392. The class is chaotic and creates pressure on the students which allows for massive growth and relationship development for each individual. The poster includes social network that is not very connected except through very few points, and then a social network that is condensed from the pressure and chaos. These two classes force others to become friends and it should be required for every student in the university. The relationships and skills created through the class go far outside of the quarter the class is taken. There is a background of silhouettes representing the relationships and cooperativeness.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Management, Pressure, Chaos, Relationships

An Analysis of the Financials and Intrinsic Stock Price of NVIDIA

Andrew Stosich, Janice Hale, Hunter Carlson, Anna Baturevych
Project Mentor(s): Noman Hossain

Using the company NVIDIA's financial statements such as Cash Flow, Income Statement, and Balance Sheet we calculated financial ratios, WACC, Costs of Equity, and Forecasting scenarios to determine the intrinsic value of the stock NVDA. Using these values, we forecasted values such as Operations, Capital Structure, Costs of Capital, Sales, and Free Cash Flows for the next five years. Utilizing Target WACC, Free Cash Flows, Terminal Value, and the value of all investments, assets, and debts we calculated the predicted intrinsic value and determined whether or not to buy or sell this particular stock.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Finance, Investments, Analysis, Stocks

Management and Marketing

Do Hunters Get a Shot at Jobs Too?

Parker Leonard
Project Mentor(s): James Avey

In the abstract with help from Professor Avey, I gave out two resumes along with a job description with everything the same but the companies they worked at and their hobbies were different. Then gave it to the class and asked them questions about the resume but each student only saw one resume and had no idea the other resume existed until I gave the presentations. It was to see if people would be biased towards guns and hunters when given their resumes.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Hunters, Guns, Hiring Mangers

College of Education and Professional Studies

The College of Education and Professional Studies has presentations from the following departments and programs:

- Curriculum, Supervision, and Educational Leadership
    - Accessibility Studies
- Education, Development, Teaching and Learning
- Engineering Technologies, Safety, and Construction
- Family and Consumer Sciences
    - Apparels, Textiles, and Merchandising (ATM)
    - Hospitality, Tourism, and Event Management
- Health Sciences
- Information Technology and Administrative Management
- Sport and Movement Studies

Curriculum, Supervision, and Educational Leadership

Trigeminal Neuralgia: An In-Depth Look Into the Suicide Disease

Angela Kyle
Project Mentor(s): Naomi Petersen

The human body has 12 sets of cranial nerves that control the motor and sensory functions of the head and neck. The anatomy of cranial nerves can be intricate, and its knowledge is crucial to detecting nerve disorders. The Trigeminal Nerve is one of the twelve nerves and branches to the forehead, cheek, and lower jaw. What is Trigeminal Neuralgia (TN), and why is it referred to as the suicide disease? Further investigation into how TN affects the individual not only physically but also mentally. Intense, stabbing, electric shock-like pain is caused by irritation of the nerve; triggers include wind, talking, eating, and more. For this research's purpose, the focus of the intersectionality of TN extends from mental health, age, gender, and ability. TN individuals' diagnoses and experiences are vastly different. Trigeminal Neuralgia is more prevalent in women and individuals older than 50. It affects many abilities including eating, talking, social interactions, and the ability to work. Why is this not a commonly known condition within the medical community? Connecting with other TN-diagnosed individuals through a social support group, findings showed that a single condition illustrated the vast differences in symptoms, mental health, and prescription side effects. The importance of bringing awareness to this diagnosis is critical. Through the lens of a medical model, looking at medical procedures that individuals can take to help with TN. Spreading awareness about disabilities, making them less intimidating due to lack of knowledge, is vital. Angela Kyle, author, was diagnosed with Trigeminal Neuralgia (TN) in 2023 and a brain tumor was found pressing on the TN and Optic nerves and excised in 2024. This research focuses on awareness of TN, the diagnosis, symptoms, potential reliance on prescription medications, ER protocol recommendations, the capability of living daily, and mental health. Understanding everyone’s experience with TN is different, no two are the same, and conversations about disabilities such as Trigeminal Neuralgia are vital for understanding.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Trigeminal Neuralgia (TN), Cranial Nerves, Suicide Disease

Accessibility Studies

Intersectionality of Disability and Gender in the Context of Gender-neutral Restrooms

Jess Eavenson
Project Mentor(s): Lynn Swedberg, Naomi Jeffery Petersen, Nils Petersen

This project explores the universal design of gender-neutral restrooms and the usability of them by people with disabilities as compared to their sex-segregated counterparts. It examines the history and importance of accessible restrooms and gender-neutral restrooms. The project also examines the prominent history of intersection between the disabled and 2LGBTQIA+ communities. The project culminates with descriptive research of the gender-neutral and sex-segregated restrooms on the Central Washington University Ellensburg campus to discover if they meet the standards of universal design.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Gender-Neutral Restrooms, Unisex Restrooms, Intersectionality of LGBTQ and Disabled Communities, Universal Design, Restroom Accessibility

Interior Accessible Design Audit of Central Washington University Residence Halls

Madison Hart
Project Mentor(s): Dr. Naomi Jeffery Petersen, Lynn Swedberg

Central Washington University (CWU) provides housing in on-campus residence halls to approximately 2,500 students. CWU Housing claims to be committed to providing quality service and responding to students' needs, across 16 different residence halls/dorms, in addition to a first-year student live-on requirement for students. Being able to provide on-campus housing to a wide range of students requires CWU Housing also to provide housing accommodation, while already having halls that are up to date on accessible design, due to the challenge people with disabilities can experience navigating settings that are not compliant with the ADA standards for accessible design. Using the 2010 ADA Standards for Accessible Design, Guidance on the 2010 ADA Standards for Accessible Design, and ADA Checklist for Existing Facilities to create an audit, which will be used to perform an interior accessible design audit in residence halls at CWU, to determine if the halls follow the ADA standards for accessible design. Ultimately CWU is a public institution that provides on-campus housing which is required to meet state and local regulations for ADA standards for accessible design, along with providing all needs as well as accommodations of the students living in residence halls.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: ADA Accessibility Standards College Dorms, 2010 ADA Standards for Accessible Design; Housing at a Place of Education, Residence Halls, Accessible Design in College Dorms, Housing Accommodations, ADA Checklist for Existing Facilities, Campus Climate, Disabled Students

Education, Development, Teaching and Learning

Yelm Teacher Academy: Building Tomorrow's Teachers Today

Taliah Boyd, Bailie Fowler, Ki Neir, Glennah Wofford
Project Mentor(s): Bruce Palmquist, Hillary Hull, Bruce Palmquist

The Yelm High School Careers in Education program includes both intra and extra curricular activities designed to cultivate skilled and diverse educators. Focused on meeting the evolving needs of the education sector, the program integrates theoretical knowledge with hands-on experiences. Participants engage in a dynamic curriculum, including internships and mentorship programs, to develop a well-rounded skill set encompassing teaching methods, classroom management, and educational psychology. Yelm Teacher Academies is an innovative program that is dedicated to encouraging high school students to become k-12 educators. This class focuses on developing the learner's teaching philosophy, breaking down barriers to effective teaching, being inclusive and equity focused all while creating a safe and welcoming learning environment. Teacher Academies students value the practicum experience and look forward to spending each week with their own classroom of learners. This program also exposes participants to multiple field trips, externships, and hands-on experiences within the field of education. In addressing the ever-rising demand for proficient education professionals, the Careers in Education program aims to inspire and empower a new generation of dedicated educators. This concise overview of the program's structure, objectives, and impact provides stakeholders with valuable insights into its potential contributions to our society as a whole.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Education, College in the High School

Content-Area Teachers and a Multilingual Stance Within the Classroom

Parker Foster
Project Mentor(s): Kate Mastruserio Reynolds

In teaching English to speakers of other languages (TESOL), teachers integrate content and language in K-12 classrooms for students learning English as an additional language. To promote an inclusive classroom for English learners and to facilitate the acquisition of English, de Jong and Gao (2022) promote teachers taking on a welcoming stance for other language use in their classes; "A multilingual stance as a perspective that builds on …'bilingualism is a resource at all times to learn, think, imagine, and develop commanding performances in two or more languages' (García and Kleyn 2016, 21)"(de Jong and Gao, 2022). To further investigate how teacher candidates learn to assume a multilingual stance in their instruction, Dr. Reynolds and I conducted a diary study, which is an "introspective journal [the data collection process] …analyzing the patterns and anomalies in the journal entries over time" (Curtis and Bailey, 2022, 472). Research questions were 1) how is a multilingual stance promoted in the course, and 2) what strategies do teacher candidates acquire for using learners' home languages in content classes? Since the diary study is a systematic reflection and observative practice, we recorded notes every class period. We observed instructional strategies teacher candidates acquired to promote multilingualism. The findings include explicit messaging and normalization through modeling of multiple language usage in class. We also noted various purposes and types of multilingual stance strategies. For instance, there "public" (i.e., whole class strategy) and "private" (i.e., individual strategy) forms of assuming a multilingual stance.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Multilingual, Education, TESOL, Content-Area Instruction, Education Strategies, Diary Study

Engineering Technologies, Safety, and Construction

RC Baja: Drivetrain & Chassis

Ahmad Adam, Daniel Davis
Project Mentor(s): John Choi, Sam Wang

This project aims to employ engineering techniques in the design and construction of an RC Baja car, which ensures that the chassis and drivetrain are sufficient for participation in the ASME RC Baja competition. In approaching this problem, various analyses were conducted during fall quarter, in deciding the design of the RC car. For example, one analysis established the necessary output power to attain a maximum speed of 25 miles per hour within a 15-second timeframe. The analysis employed acceleration and power equations to arrive at its conclusions. The outcome of the analysis indicates that a minimum of 67.45 Watts of power is essential to achieve the required acceleration. Utilizing a decision matrix helped determine Aluminum 6061 T6 as the material to be used for the chassis. Aluminum is relatively easier to manufacture, allowing for intricate designs and precise fabrication of chassis components. With this selection complete, the manufacturing and assembling of the RC car took place during the winter quarter. Methods of manufacturing such as 3D printing and machining were employed. The tools utilized includes end mill, bandsaw, and the lathe which helped in constructing the RC car parts. During spring quarter, The RC car achieved a speed of 20 mph within 25 ft from a complete stop on a concrete surface. Also, the RC car weighed less than 15 pounds fully assembled which meets the anticipated requirements.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: RC Baja, Aluminum, Analysis

RC Baja: Steering & Suspension

Rogelio Arroyos, Roberto Vieyra
Project Mentor(s): Dr. Jeunghwan "John" Choi, Charles Pringle, Mr. Chris Berkshire
Students attending Central Washington University teamed up to manufacture an RC car to compete against peers in the RC Baja competition events as a senior project. The project was split between the two individuals, Rogelio was responsible for the steering and suspension, while Roberto was responsible for the chassis and drivetrain. The team collaborated to brainstorm ideas that would fit the requirements applied. The RC was mainly built with 3D printed parts and designed using engineering methods such as mechanics of materials, dynamics, and statics to successfully compete in the BAJA events and meet requirements. Before it was ready for competition, the RC underwent various tests, and the team was able to gather data to compare it to the calculated data. The slalom competition and straight-line sprint race reflected the performance of the RC's drivetrain, suspension, and steering as it worked in unison with the chassis. The final competition put the entire project to the test against the rest of the competitors. The suspension was expected to compress 0.5", but it only compressed 0.25". The steering radius was expected to be 4 feet, but it was recorded as 6 feet. In addition, the steering range was expected to be 60 degrees and the team recorded 70 degrees of range. The 3D printed components were required to not bend more than 0.1" and they were recorded to bend 0.07". Instruments and manufactured jigs were used to take measurements.
Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: RC, Suspension, Drivetrain, 3D Printing

Articulating Balsa Wood Bridge

Kyle Barayuga
Project Mentor(s): Charles Pringle, PE
Bridges have been used worldwide to allow passage between untraversable terrain. These bridges are built according to their terrain and environment, while also withstanding the forces of objects going across them. This project explores building a bridge under specific design restrictions to be able to simulate objects traversing across and under it. The device consists of a bridge, utilizing a Pratt truss design, and an articulation tower which are mechanically linked using a hinge. The articulation tower allows the bridge to be raised and lowered, simulating an object to be passed under. Raising and lowering the bridge consists of using a motor controlled by an Arduino. Both the bridge and articulation tower are designed and built using balsa wood, making the device very lightweight. The device is tested through several methods. A tape measure and an applied load is used to test the performance. The results found that the bridge withstood a center load of 19 kg. The center of the bridge also deflected less than 25 mm when the load was applied. Other tests that meet specification requirements were completed, such as making sure the device was under the required mass of 85 kg and measuring the middle of the bridge when it's raised to be at least 140 mm.
Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Balsa Wood, Bridge, Articulation, Design

Recharging a Custom Lithium Ion Battery Pack Using a Scalable Battery Management System

Tristan Beacham
Project Mentor(s): Lad Holden

A battery management system (BMS) is comprised of operational amplifiers and transistor shunt dissipaters, which allows lithium-ion cells to be fashioned in any desired configuration. Batteries offer both portability and reusability within emerging technologies, which is rapidly expanding as more industries aim to achieve electrification. The operational amplifiers will be utilized to control the current and voltage into the battery system, to maintain safe charging parameters. The transistor shunt will remove the power across the battery when the cells achieve full charge. Two cells will be connected in parallel, and four sets of two will be connected in series, which will be the custom configuration used to test the BMS. A voltage sensor will be connected to each individual cell, eight in total, to confirm the state of charge of each cell and the state of the charging process. When the cells reach their maximum charge voltage, the BMS will shunt the power away from the cells, into the diode array. This will determine the successful deployment of the battery management system.
Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Batteries, Lithium, BMS, Battery Management System, Charging

Articulating Balsa Wood Bridge

Cole Blevins
Project Mentor(s): Charles Pringle, PE

The objective of this project was to design and construct an articulating bridge consisting of only balsa wood and glue to meet a set of given requirements. The main requirements include a maximum bridge weight, minimum load to be supported, and a minimum height that the bridge must raise to utilizing an electric motor. To meet the objective of the project, a series of engineering analyses were completed to determine suitable dimensions and geometry for each component of the bridge and articulation structure. Before conducting analyses for the bridge, a few different truss structures were considered including a Pratt truss, Warren truss, and K truss. The final bridge design consists of two modified Warren Trusses. The design analyses conducted utilize many principles of mechanical engineering including but not limited to structural analysis, mechanics of materials, and mechanical design. The bridge was successfully designed and constructed to meet all requirements. All structural components of the bridge and articulation structure are constructed of balsa wood and glue. Mechanical components for the articulation structure were created using 3-D Printing. The bridge supported a load greater than the 20 Kilogram minimum requirement while weighing less than the required 85 gram maximum. The bridge was also successful in raising to a height of 140mm measured from the surface of the abutments to the midpoint of the bridge.
Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Bridge, Stress Analysis, Mechanical Design, Balsa Wood

Combat Robot

Riley Buxton
Project Mentor(s): Charles Pringle, PE; Mr. Chris Berkshire; Austin Taylor
In the sport of combat robotics, the goal is to build a robot that can incapacitate an opposing robot before it becomes incapacitated itself. For this project, a combat robot was designed and tested to compete in Western Allied Robotics' first competition at Central Washington University. The robot was built to compete in the beetle weight class which means the entire robot had to weigh less than 3 lbs. To ensure the robot was competitive, a number of important design choices were made. Firstly, an effort was made to ensure that the design was simple and easy to take apart and put back together in the event that parts needed to be replaced. Secondly, durable, yet light materials were selected such as TPU and carbon fiber on the chassis so that the robot could survive impacts while being under the 3 lb. weight limit. Extensive testing was performed on the materials of the robot in order to ensure that they can survive the extreme forces of robot combat. Finally, a spinning kinetic weapon was designed to transfer an immense amount of energy onto the opponent by maximizing the mass moment of inertia of the spinning weapon and the speed that the weapon spins at. The robot's weapon was able to output a kinetic energy of 170 joules. The robot was able to maneuver at a speed of 7 mph. Finally, any part on the robot was able to be replaced entirely in less than 10 minutes.
Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Mechanical Engineering, Robotics, Design, Mechanics of Materials, Dynamics

Safe Driver Assistance Device

Austin Commons
Project Mentor(s): Lad Holden, Greg Lyman
Newly manufactured vehicles are equipped with safety systems that aid the driver and help them make decisions. A common safety system automotive companies use is Forward Collision Warning; this notifies the driver if there is the possibility of a front-end collision so they can react accordingly. These systems have reduced traffic accidents and deaths since they were introduced. Unfortunately, older vehicles do not have these systems and do not have an option to add them to existing vehicles. The Safe Driver Assist Device is meant to be an auxiliary safety device that can be added to older vehicles to improve their safety by incorporating FCW. The Safe Driver Assist Device uses a Laser Distance Sensor to measure follow distance and a Hall Effect sensor used to determine vehicle speed. These values are sent into a microchip as inputs and ran through a program that will determine if the follow distance is appropriate for the vehicle speed. The output of this program will be displayed on an LCD screen to the Driver as well as shown by an array of flashing LEDs indicating "SAFE", "CAUTION", and "UNSAFE" conditions for the driver. The SDAD System was successfully installed and operational on a 2004 Dodge Dakota.
Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Safety, Transportation, Automotive, Vehicle Safety

IEEE Rising Stars Conference Exploratory Research

Austin Commons, Jeff Little, Jay Howard, Nathan Kanz
Project Mentor(s): Greg Lyman

The members of the CWU IEEE Club want to improve their employability, gain experience with cutting edge equipment, and learn project management and professional skills from industry professionals to help guide our future research. The IEEE Rising Stars Conference gave us an opportunity to learn new and cutting-edge topics and allowed us to expand future undergraduate research with new ideas in industry. This event gave us real world experience, learning about technology not available at CWU and helping us gain professional insight from leaders and innovators in the electronics and electrical STEM Fields. We conducted exploratory research at this conference to introduce students to new ideas that will progress future undergraduate research. This event helped us gain insight into the resources that IEEE offers to both students and young professionals working on various types of research projects. We will be presenting our collected research at SOURCE with the goal of inspiring students in a variety of majors to explore new ideas in STEM Fields through IEEE.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: IEEE, Engineering, Electronics, Conference, Exploratory Research

Dueling Robot

Abigail Coy
Project Mentor(s): Charles Pringle, Lad Holden, Jeff Wilcox

This project was undertaken as a personal challenge to combine a Mechanical Engineering Technology degree and an Electrical Engineering Technology degree into a single final project showing the cumulative knowledge gained. It was determined that a robot to participate in Western Allied Robotics would be designed and manufactured for the 3 lb. weight class. A two-part power system was designed to provide more power to the weapon arm. This design combined a compressive spring's kinetic energy with the torque from the electric motor. Research determined all of the purchased components required and analysis were performed to determine the geometry and materials for the manufactured components. The robot was built primarily using a 3D printer. Overall, 15 parts were manufactured by the student, 14 of which were 3D printed. Articulation of the weapon arm was maximized by implementing a microprocessor and various sensors throughout the robot's system. All of the programming for the sensors and microprocessor took place in C using Visual Studio Code. The analysis and research performed early in this project facilitated a crushing force of 12 lbs. on impact and can move at 14 MPH. This will provide quick and forceful strikes against an opponent in the arena. The sensors allow for reliable and consistent control of the weapon system without over taxing the system to the point of stalling or breaking.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Robot, Robotics, Battle Bot, Mechanical Engineering, Electrical Engineering, Programming

RC Baja - Steering and Suspension

Daniel Davis

Project Mentor(s): Dr. Jeunghwan "John" Choi, Mr. Chris Berkshire, Sam Wang

Engineers enrolled in the Mechanical Engineering Technology program at Central Washington University were tasked with developing a vehicle to compete in the ASME Baja competition. The engineers were in teams of two, one focused on suspension and steering and the other focused on drive train and chassis. To begin the design of the vehicle, engineering analyses were completed on each of the components to comply with the requirements set by the team. After completion of multiple analyses for the components of the vehicle, the dimensions were validated and have been created in a CAD program to allow for virtual assembly of the vehicle before manufacturing takes place. Multiple methods of manufacturing were used for this project, but it was primarily 3D printing to compensate for the complex geometry of the parts without difficulty of manufacturing. After the manufacturing stage, the vehicle must be tested under multiple tests. The vehicle endured a drop test, a turning test, and a weighted speed test. During the drop test, the vehicle did not experience deformation from the 4 foot drop. The turning test proved that the vehicle could complete a 180° turn at speeds of 8 mph with a turning radius of 3.5 feet. The weighted speed test, where an additional 15 pound weight was added to the vehicle, showed that the vehicle was able to maintain a speed of 25 mph.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Keywords: Mechanical Engineering, Baja, CAD Program, Manufacturing, Deformation

NASA Student Launch Payload Kinetic Energy Absorption

Harrison Fishburn, Brycen Geck

Project Mentor(s): Charles Pringle, Jeunghwan Choi, Chris Berkshire

The challenge given by NASA was to design and build a reusable payload capable of a human survivable landing, without the use of a parachute or streamer. The method chosen to accomplish this was a large spring to extend and mitigate impact forces over a few seconds. The device was attached to the lower end of the payload to act as a secondary force reducer, with the primary device being the gyrocopter assembly built by Brycen. Two 6061 aluminum rods, attached together with a spring, act as the main structure of the payload, connecting the spring assembly, the capsule, the connector, and the gyrocopter assembly together. To maintain a rigid structure, the small rod overlaps with the large rod by at least four inches, and the spring allows them to overlap by another nine inches when compressed. The lower payload acts like a crumple zone for a car. Where instead of a collapsing structure, the spring compresses, increasing impact time and absorbing most of the force. Testing measured survivability metrics from the capsule housed in the middle of the main structural rod. Accelerometers were used to measure G forces experienced in the capsule. To succeed the payload needs to meet human survivability metrics. The payload achieved less than 30 G of instantaneous G forces during testing. In addition, testing measured and assessed payload stress and damage to ensure the payload was reusable.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Human Survivability Metrics, Gyrocopter, Aluminum 6061, Crumple Zone, Instantaneous G Forces, Accelerometer

NASA Rocket Payload Airfoil Deceleration

Brycen Geck
Project Mentor(s): Charles Pringle, Darci Snowden

NASA Student Launch Initiative gave a requirement that a lander must descend to the ground from a height of 400-800 feet with predetermined human survivability without using parachute or streamers. Around sixty colleges were chosen from around the United States to compete in competition. This competition and data taken will help innovate the rocket and lander programs in full scale space exploration in the future. Design of the payload involved intensive design, testing and aerodynamic analysis. Majority of the manufacturing revolved around 3D printing, aluminum 5051 sheet and carbon fiber vacuum bagging. PLA and PETG was used on components which gave the payload unique shapes and functions due to the versatility of 3D printing. Aluminum 5051 sheet was waterjet cut and formed to make mounts, which secured the airfoils to body of payload. SolidWorks was used religiously to make sure fitment of components to themselves and within the body tube of the rocket. These processes came together in the form of a gyrocopter with eight airfoil blades generating lift to decelerate the payload to specified rate. There were multiple ejections tests which resulted in controlled retentions and ejection to prove the payload would decelerate to the ground with human survivability. The airfoils were able to withstand the forces of the payload mass of nine pounds as well as the forces of being ejected from 450 feet. Which concludes that the payload efficiently follows all requirements given by the NASA Student Launch Initiative.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: NASA, Payload, Gyrocopter

RC Baja Competition

Skyler Gordon, Sam Wang
Project Mentor(s): Dr. Jeunghwan Choi, Mr. Chris Berkshire

The objective of this project is to design and construct a vehicle that will compete in the RC Baja Competition. As this project will be split between two students, this paper will be focusing on suspension and steering while the partner will focus on chassis and drivetrain. The vehicle will be tested in three different categories: the sprint, the slalom, and the Baja. These categories will test its speed, turning capabilities, and its overall capability in rough terrain. As this paper focuses on the suspension and steering. Several analyses and decision matrix were used to find the best dimension along with material needed for the structural components. The Baja will test the vehicle's capability in handling stress along with finding the necessary suspension and turning radius. To ensure success in the sprint portion, the vehicle deviates less than 5 inches when driving for 50 feet. To give a competitive edge in the slalom the vehicle has a turn radius of 10 inches. Finally, the wishbones have been tested in deflection and buckling capabilities. The wishbones will not buckle under a 75 lb. axial load, nor deflect more than 0.2 inches (5mm) under a 25 lb. perpendicular load. Furthermore, the vehicle can be dropped at 3 feet with the springs only compressing 1 inch. All of this ensures the vehicle will have the capability to survive the rough terrain in the Baja competition.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Sprint, Slalom, Baja, Suspension, Steering, Vehicle, Analyses, Decision Matrix

Articulating Balsa Wood Bridge

Nate Harris
Project Mentor(s): Charles Pringle, John Choi

This report describes the design, construction, and testing of a small-scale articulating balsa wood bridge that allowed passage over normally impassable terrain. The bridge was required to span a 400mm gap, while also articulating the midpoint of the bridge 140mm above its resting position. The bridge also needed to support a 20kg point load in the center of the bridge, and the bridge and articulation tower together needed to weigh less than 85 grams. To construct the bridge, statics and mechanics of materials was used to design a truss that was calculated to support the load with a safety factor of 1.25. An articulation tower was constructed, and string was attached from the bridge to a motor that allowed the bridge to be raised. A switch on the motor allowed the motor to articulate the bridge up and down. All bridge and tower members were constructed using balsa wood and wood glue. The parts were manufactured by measuring and cutting stock balsa wood to length. Once constructed, the final weight of the bridge was 84 grams and spanned 429mm in length. The bridge was able to hold 20kg without failure, and none of the truss members experienced fracture. The bridge articulated 140mm above its resting position and articulated to its max height in 2 seconds.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Bridge, Truss, Mechanics of Materials

RC Baja: Drivetrain and Chassis

Caden Harris, Chayce Williams
Project Mentor(s): Dr. John (Jeunghwan) Choi; Charles Pringle, PE; Ray Harris; Nicole Harris

The engineers in the CWU Mechanical Engineering Technology program were asked to design and manufacture a remote-controlled Baja car to compete in several different events. The car was required to compete in a drag race, slalom event, and Baja event against other cars created by engineering students. To compete at the highest level, the cars needed to finely balance ruggedness, weight, torque, and top speed. This report is dedicated to the designing, manufacturing, and testing of the drivetrain and chassis that supported the RC car as it competed in the school-sanctioned competition; a partner was responsible for the steering and suspension portion of the project. After creating a list of project requirements during the Fall quarter, the engineers applied a multitude of engineering principles in their analyses to ensure that the car would meet all design criteria and project requirements. The team designed the entire car during the Fall quarter, manufactured it during the Winter quarter, and conducted the testing and racing during the Spring quarter. Upon the project's completion, the team was able to qualitatively determine the success of the drivetrain and chassis prototypes through extensive testing during the spring quarter. With a top speed of 31 MPH, an acceleration from zero to 20 MPH in under 5 seconds, and a chassis deflection of less than 0.2” when a 25-pound load was applied at the center, this project was considered a success.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Engineering, Baja, Remote-controlled, Design, Manufacture, Test

RC Baja Drivetrain & Chassis

Boe Hartman, Jarvis Hudnall
Project Mentor(s): Charles Pringle, PE; Dr. Jeunghwan "John" Choi; Mr. Chris Berkshire
The object of this report is to design, manufacturer, and build an RC Baja Car to compete in the annual ASME RC Baja Competition. In order to design, manufacture, and build the RC Baja Car, various methods and approaches are utilized throughout to meet the specified criteria of the competition along with the teams' personal requirements. Initially, after an overall design was acquired, analysis is done to ensure a working device. Analysis such as power requirements to verify the motor will meet ROAR requirements and suffice for the 4wd system utilized in the device. Statics and dynamics analysis are utilized on individual components accounting for the overall weight to ensure the device withstands all forms of testing along with the abuse of the competition. In addition, decision matrices and material research are conducted to certify the best material is chosen for device. Next the manufacturing methods utilized such as, 3D printing for the chassis and differential housing's along with machining for the drivetrain components are performed in order to assemble/build and test the RC Baja Car. Testing of the device shows to meet the specified requirements along with competitively competing in the competition. The RC Baja Car is capable of achieving 15 mph in 5 seconds. Each component of the device is able to withstand the torque the car experiences underload when achieving maximum speed off 22.5 mph. The chassis of the RC Baja Car does not deflect more than 5/16 of an inch during testing and standard driving.
Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: RC Baja Car, 3D Printing/Machining, Testing

Power Trainer Back-Up Power Demonstrator System

Jay Howard, Chris Berkshire, Trevor Davis, Dr. Charles Pringle, Peter R. Zencak, Lad Holden, Greg Lyman
Project Mentor(s): Greg Lyman, Peter R. Zencak, Lad Holden, Chris Berkshire
To enhance the Transmission and Distribution of Power course for the Electronics Engineering Technology Bachelor's program, an additional Flywheel module was made for the Industrial Power Systems Trainer units in Houge Hall. The module is a culmination of many principles covered lightly in other courses, and used for backup power systems in industry, but not shown to students. This system condenses all that material into one demonstration that students can learn from efficiency and quickly. The Flywheel module was created to store mechanical energy from a motor, then, when the motor is switched to generator mode, send it's stored power, converted back into electrical power, to a Buck Converter, which will be converted to a voltage and current based on the Pulse Width Modulator of a controller that determines it's Pulse Width command signal via the RPM from a Tachometer sensor that reads the RPM of the flywheel. This power from the generator is converted to constant 24 Volts DC, and variable Current DC, which is fed into a DC to AC converter designed for backup power systems. That AC output, of 120 Volts AC, is sent to a common household load to demonstrate its functionality to students.
Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Energy, Industrial Systems, Engineering, Education

RC Baja Car Suspension & Steering

Jarvis Hudnall, Boe Hartman
Project Mentor(s): Jeunghwan "John" Choi, Charles Pringle, Chris Berkshire
Students at Central Washington University were faced with a challenge to engineer an RC Baja Car with a focus between drivetrain and chassis or suspension and steering for a competition. The different foci were split between two team members and the engineering for this report is focused on steering and suspension. The suspension and steering components underwent the process of developing calculations for all individual parts for design. The design process included using CAD software to provide a 3D model for each individual part. To save time, 3D modeling software helped find fitment issues before the RC Car was manufactured and assembled. Succeeding the design process was the manufacturing of all the designed parts. The parts were manufactured using 3D printers, CNC machinery, vertical milling machines, band saws, and various hand tools. Once all parts of the were created, the car was assembled by combining all parts of the car to make a final assembly. The RC Baja Car was tested to ensure that it met all predetermined requirements which were created to guarantee it was ready for the competition. The steering components rotated 10 degrees and the deviation was less than 5cm at 10 mph for 2 meters. Additionally, for the suspension, it was able to maintain a force greater than 20 pounds. These parameters verify that the suspension and steering solidify all requirements.
Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Keywords: RC Baja Car, Engineered Device, Baja Competition

Payload Survivability Metrics and Ejection Controls

Nathan Kanz
Project Mentor(s): Lad Holden
This paper concerns the use of advanced electronics to: employ a remote-controlled ejection system, measure overall flight telemetry, and survivability metrics for an in air deployable payload. This project was undertaken to support the Wildcat Rocketry team in their NASA Student Launch Initiative competition. To achieve this, three subsystems were constructed that used multiple serial data protocols for communication. The system consists of a ground station to send the ejection signal, an upper payload section to use the ejection signal, and a lower payload section to measure the payload flight data and survivability metrics of model astronauts named STEMnauts. Each of these subsystems had multiple revisions, with the upper payload having the most revisions and the lower payload having the most generic additions to its capabilities throughout the lifespan of the project. After going through all these revisions, a final system was made that accomplishes all the features set out at the beginning of this project. Other payload designs and three test launches aided in the direction of these revisions. Despite these revisions, there are ways to improve this system to make it more user friendly and robust.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Payload, Rocketry, Electronics, Communications, NASA

Articulating Balsa Wood Bridge

Samuel Katsuda

Project Mentor(s): Charles Pringle, Jeunghwan Choi

The objective of this project was to design, construct and test an articulating balsa wood bridge. It needed to fit certain requirements pertaining to material limitations, design constraints, load capacity, and functionality. The aim was to both create a product, but also give the student a chance to demonstrate their practical knowledge in engineering and going through the processes. To complete this project the student began by creating an initial design and performing a series of analyses on the components. This determined whether or not the bridge would fit the necessary minimum requirements. Other design processes were followed such as using decision matrices to determine the best process to use for manufacturing components. With the design completed, manufacturing could commence, involving creating components and final bridge assembly. After completing testing of the bridge, it performed as designed. It was able to withstand the required load of 20kg before fracturing down the middle of the bridge where the beams were at the most stress. It was also able to fully articulate 140mm at reasonable speeds and maintain the 140mm articulation for 10 seconds. The bridge also fit the design weight and dimension specifications. It was determined that the bridge was successful in meeting the requirements of the project, fitting all the necessary requirements while maintaining low costs and easy manufacturability.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Balsa Wood Bridge, Articulation

JCATI Carbon Fiber Recycler – Conveyance System

Victor Limwanich

Project Mentor(s): Charles Pringle, PE; Chris Berkshire; Austin Taylor

The JCATI Carbon Fiber Recycler shreds, transports, and bakes carbon fiber within its system to recycle it by burning off the resin within the material at temperatures over 500 Celsius. The conveyance portion of the recycler, as it stood in previous iterations, has not been able to transport then batch the shredded material before going into the oven. Doing so would introduce more system independence without the need for someone to manually collect the shredded batches from the conveyor belt. After designing the project in SolidWorks to meet the objective, it was manufactured using various methods. Some parts were purchased or donated to be a part of the assembly process. Some parts were created through processes done on the CNC machine. Many other parts were created through 3D printing, milling, band saws, and drilling and tapping by hand. The methods created many small parts to be part of an intricate assembly. The project resulted in the successful production of a conveyance system which could collect, transport, and batch carbon fiber at a controllable rate. The conveyor belt moved at 1 foot per minute while carrying loads at 0-30 degrees of angle with a speed controller. The hopper was able to hold 30 square feet of shredded carbon fiber, and its motor could be controllable to batch and send off the fiber as requested by the oven every 30 minutes. By the end, 90% of the material was able to reach the oven through the belt and hopper.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Conveyor Carbon Fiber Recycler Hopper

The Contactless Switch

Jeffrey Little

Project Mentor(s): Lad Holden, Jeff Wilcox

The goal of this project was to combat the limited lifespan and function of electro-mechanical switches. The Contactless Switch is a sound-activated switch that allows a user to control multiple electrical loads using hand gestures. A standard electro-mechanical switch is prone to degradation with its reliance on moving parts. Additionally, they are only capable of performing one function. A prime example is the household light switch that controls the on or off state of a light or set of lights. Switches like these are also hotspots for germs and bacteria. Something familiar, the light switch in your home can contain up to 217 bacteria per square inch. The Contactless Switch enables the user to perform multiple functions without the chance of spreading or picking up bacteria. It uses a microphone to detect a clapping sound and a gesture sensor to detect hand movements from the user. This data is sent to and processed in a STM32-based microcontroller. On the microcontroller, a program uses the signal created by my hands clapping to turn on or off both fans simultaneously. This program will also use the signal generated by my gesture sensor to determine the speed and direction of either fan.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Electronics, Microcontroller, Sensors

Balsa Bridge

Caleb Lovett

Project Mentor(s): Charles Pringle, PE

We presented a report to create a small-scale bridge made entirely out of balsa wood and glue, that could withstand substantial force, as well as perform a lifting/lowering cycle. Other requirements associated with the bridge were properties of weight, deflection, size, and shape. We presented a challenge that tested the mathematical side of engineering, being strongly reliant on statics, mechanics of materials, and mechanical design analyses. The first step to solve this problem was to complete in depth calculations of the chosen design. With this done, manufacturing and assembly was able to be completed. With a prototype of the bridge completed and ready for testing, engineering methods were employed to test and improve the design. These methods included testing the bridge weight via a scale, as well as testing the strength with weights anchored at the bridge center. The articulation cycle was tested using repeated cycles and trials, which was aimed to help fine tune the cycle accuracy and speed. The results of these tests helped shape the bridge design. The bridge weighed in at 91 grams, which was 6 grams overweight, meaning the design of the bridge needed refining to lose weight. Aside from this, the results of the light weight testing demonstrated the bridge's strength; it was able to withstand 80% of the required final load, without any visible deflection or buckling. The articulation cycle was tested using a timer, and the full cycle was able to be completed within 20 seconds.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Balsa Wood, Bridge, Manufacturing, Refining, Articulation

Sustainable Phone Housing

Jonah Milnor, Kevin Lomax, Jaap Donker
Project Mentor(s): Charles Pringle, PE; Dr. Susan Rivera; Mr. Chris Berkshire
Most commercially available smartphones posed a challenge to consumers due to the use of adhesives, which not only served to seal out dust and water but also hindered repairability and hardware replacement. Drawing inspiration from successful smartwatch designs employing gaskets for water resistance, this project aimed to adapt such design principles to the smartphone form factor. Utilizing SolidWorks for design and subsequent 3D printing and CNC machining for prototyping, 3D models of a smartphone housing were crafted. The objective was to attain a level of water and dust resistance equivalent to that of model smartphones, utilizing sealing methods equivalent to smartwatches. The target Ingress Protection (IP) Rating stood at 67, claiming the device housing is dust proof and heavily water resistant. Through submersion tests conducted for 30 minutes at a depth of one meter, the prototype smartphone housing successfully achieved the desired IP rating, demonstrating its viability for real-world application. This innovative approach, characterized by a modular design facilitating repairability, not only aligns with the ethos of the right-to-repair movement but also promises cost savings for consumers and repair shop owners. Moreover, by prolonging the lifespan of smartphones and mitigating the need for frequent replacements, this solution presents a sustainable alternative to the prevailing market trend of planned obsolescence further reducing e-waste generation.
Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Smartphone, Repairability, Water Resistance, Gasket, Ingress Protection Rating, Right-To-Repair, Modular Design, Sustainability

MET RC Baja - Chassis & Drivetrain

Beni Ntanda, Noah Stevens
Project Mentor(s): John Choi, Mr. Chris Berkshire, Sam Wang, Taylor Austin
The RC vehicle comprises 4 crucial subsystems: the chassis, drivetrain, suspension, and steering. This paper will cover the chassis and drivetrain, and my partner Noah Stevens will cover the suspension and steering. The chassis serves as a robust framework housing all vehicle components, while the drivetrain transmits power from the motor to the wheels, propelling the vehicle. An efficient drivetrain typically sacrifices speed for enhanced torque, aiming to minimize energy losses. Meanwhile, an ideal chassis features minimal deflection and user-friendly mounting points. This RC vehicle participated in the CWU RC Baja competition, aiming to rank among the top contenders. The student conducted a range of analyses that formed the basis of their engineering project. Statics, Mechanical Design, and Dynamics were the primary methods employed in the report. These analyses served to guide the student in designing parts to meet specified requirements when assembled. Following the design phase, manufacturing took place utilizing CNC machines, a Horizontal Bandsaw, Lathe machine, Mill machine, and 3D printing. Subsequently, the testing phase commenced, during which the student evaluated how well the vehicle's components met the testing criteria. The project resulted in a fully functional vehicle capable of competing, and potentially excelling, in the RC Baja competition. The vehicle demonstrated great acceleration, braking, and maneuvering abilities in both forward and reverse directions. Both the suspension and chassis proved resilient, enduring the challenges presented during both the competition and testing phases. Notably, from a stationary position, the vehicle achieved a top speed of 25mph within a 100-meter distance.
Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Engineering, RC Baja, Analyses

Balloon Camera Payload

John Richins

Project Mentor(s): Charles Pringle

The engineering problem for this project was related to designing a payload to take photographs of the sun, while being subject to higher altitudes, and low temperatures, as well as any instabilities. The goal was to make a reliable stable device in these conditions. This device was created to be used during the 2024 eclipse in Texas as part of the Nationwide Eclipse Ballooning Project. Once the early sketches were developed, analysis was performed for different components and systems where dimensions or other specifications were calculated. Dynamics, materials, statics, and fluids were all considered in the design. Next, the manufacturing plan was created and executed, mostly involving 3d printing and laser cutting, modifications were made along the way to adapt to any errors. Finally, through testing, the devices performance was compared to the requirements. Throughout the entire process, various tools and methods would be used to ensure a working device. Testing showed that the payload could survive cold temperatures with minimal deviation on the equipment readings, of near .5%, below the requirement, and could last about eight hours on battery power, more than the entire required six hours. Also due to the parachute selection and the ring profile, its fall speed was less than the required 50 ft/sec at about 40 ft/sec, allowing relatively soft landings.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Ballooning, Payloads, NEBP, Sun, High Altitude

Development of a Muscle Activation Sensor

Isaac Sipe

Project Mentor(s): Lad Holden

This paper presents the development of a wearable muscle activation sensor designed for real-time monitoring of muscle activity using electromyography (EMG) technology. The sensor is intended for applications in biomechanical analysis, sports science, rehabilitation, and bodybuilding. By placing the sensor directly on the skin over the targeted muscles, it captures electrical signals generated during muscle contraction, providing valuable insights into muscle function and performance. The sensor design incorporates miniaturized EMG electrode adhesive pads, signal conditioning circuitry, and wired communication to an engineering software called LabVIEW. This will enable data collection during various activities but most specifically for my case, lifting weights in order to discover which exercises are the most beneficial for muscle growth. Engineering considerations such as electrode placement, impedance matching, and noise reduction techniques are integrated into the sensor design to optimize signal quality and reliability. Overall, this study demonstrates the feasibility and effectiveness of the developed wearable muscle activation sensor for non-invasive, continuous monitoring of muscle function.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Electromyograph

RC Baja - Steering and Suspension

Noah Stevens, Beni Filemon
Project Mentor(s): John Choi

The engineers at Central Washington University were each asked to produce a device to compete in the ASME RC Baja competition. The principle-engineer set out to create a system that allowed an RC car to be controllable over a variety of terrain utilizing suspension and steering principles. The steering and suspension designed by the engineer was implemented in part with a drive train and chassis that was designed by a partner engineer. The Engineer chose to utilize an independent front suspension with a solid rear axle for his design. This design was chosen because the independent front end allowed for the front to stay very stable and the trailing arms in the rear allowed for the car to have a lot of suspension travel and suspension flex. This proposal covers the design, manufacturing, and testing of the device throughout the fall, winter, and spring quarter. The device was completed at the end of the winter quarter and testing began at the beginning of the spring quarter. The testing results showed that the device met some key requirements, the suspension deflection was 3” after a 3’ drop and the steering angle met the 50-degree requirement. The device performed well and met the engineer’s requirements stated in the proposal.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: RC Baja, Independent Suspension, Solid Rear Axle

RC Baja Drive Train and Chassis Senior Project

Roberto C Vieyra Avalos, Rogelio Arroyos
Project Mentor(s): Dr. Jeunghwan Choi, Dr. Charles Pringle

The students in charge of the project, seniors at Central Washington University were tasked with the design and manufacturing of the RC Baja to compete in the Slalom and Sprint event and the Baja event where the maneuverability and acceleration are demonstrated. The project was divided between Roberto, in charge of the drivetrain and chassis and Rogelio, in charge of the steering and suspension. There were also various requirements like velocity and deflection, ensuring the device reaches 30mph and keeping the deflection of components to a minimum and many others which can be seen in section D of the introduction. The RC vehicle was designed using various engineering methods using subjects such as mechanical design, dynamics and mechanics of materials to ensure that the device was going to meet requirements. The main manufacturing method was 3D printing as the intention was to keep the weight as minimal as possible. Once all manufacturing and analysis was completed, various tests were performed to gather data on various aspects of the vehicle like acceleration and velocity. The 3D printed components were required to not exceed a deflection of .1”. The vehicle was expected to achieve a velocity of 30mph, and the suspension was calculated to compress .5” while the turning radius which was expected to be 4’. In summary, with the testing, it was possible to determine that the vehicle would be meeting the various requirements like the velocity and showed that it would also withstand the drop test as was intended.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Drivetrain, Chassis, RC, 3D Printing, Suspension, Steering

Remote Controlled Baja Buggy

Sam Wang, Skyler Gordon
Project Mentor(s): John Choi

The RC Baja project aims to develop a high-performance RC vehicle for Baja-style racing through a comprehensive design, manufacturing/prototyping, and testing. The objective is to address engineering challenges related to ensuring durability, efficiency, and performance while navigating rugged terrains and obstacles. To achieve this objective, the engineers conduct extensive research to guide the design process, with a specific emphasis on the drivetrain and chassis components. Detailed CAD modeling is utilized to refine the design of the drivetrain, incorporating elements such as gear ratios, differential systems, and torque distribution to enhance power delivery and traction. Similarly, the chassis design prioritizes factors such as weight distribution, ground clearance, and structural integrity to withstand the stresses encountered during aggressive off-road driving. The implementation of engineering principles yields promising results in both the drivetrain and chassis components. Testing reveals the function of the vehicle to meet expectations and requirements which allow the engineers to compete in the ASME Baja competition. The drivetrain design demonstrates improved efficiency, maximizing power transfer to the wheels and minimizing energy losses. This resulted in a top speed of 35 mph. Similarly, the chassis design enhancement results in increased durability and responsiveness, allowing the vehicle to withstand impacts and rough terrain while maintaining agility and control. This resulted in a deflection of less than 1/8 of an inch. Overall, the project's focus on refining the drivetrain and chassis components which contributes to the development of a high-performance RC Baja vehicle capable of excelling in competitive off-road racing scenarios.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: RC, Engineering, Design, Gear Ratios, Research, Chassis, Drivetrain

Baja Buggy Steering and Suspension

Chayce Williams, Caden Harris
Project Mentor(s): John Choi, Charles Pringle

The engineering objective of this project are designing, manufacturing, and testing the most efficient and strongest possible RC Baja Steering and Suspension system that the engineer could produce with the provided or acquired equipment, and materials. This was all done successfully over the school year. During the Fall quarter, the RC car was undergoing designing, and in these design processes, mechanics of materials, statics, and dynamics, were used to come up with the most adequate materials and design. Computer aided designed (CAD) models were then created to get a RC Baja CAD assembly. Winter Quarter of the school year was the manufacturing, and construction process of each and individual part for the RC car. Spring quarter of the RC Car was testing of the entire car to confirm whether the car satisfies the requirements stated in the beginning of the quarter or not. In the suspension components, the front and rear suspension was to have a 2" articulation. Along with this, the car was listed to have a usable 1" of suspension travel front and rear under its own static weight. It was also noted that that the car needed to make a 180 degree turn in a 3.5' radius, and the car completed this in only a 2' radius, almost a 60% tighter turning radius. After all the research was done, the car met all requirements. Each part of the car met or exceeded the initial requirements made by the engineer.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: RC Baja, Design, Manufacturing, Testing, Steering, Suspension

Family and Consumer Sciences

How Distance is Related to Parent-Child Relationship Quality in College

Kyle Day, Matthew Worrall, Libby McClendon, Isabelle Marks
Project Mentor(s): Amy Claridge

Previous research has highlighted the relationship between proximity to parents and parent-child relationship quality, but primarily among older adults rather than college students in emerging adulthood. The goal of this study was to examine how distance from parents relates to parent-child relationship quality of college students in emerging adulthood; additionally, we wanted to understand the relationship parent-child communication has with these variables. The target population was college students between the ages of 18 and 25. For recruitment, we used a convenience sample, gathering 358 eligible participants. Participants took an online survey through Qualtrics. We found no relationship between distance from parents and parent-child relationship quality. Instead, means to visit and communication were positively correlated with parent-child relationship quality. This study has implications for the development of resources to improve means to visit and parent-child communication in order to improve the relationships of emerging adult college students who are living away from their parents for the first time.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Parent Child Relationship Distance, Geographical Quality, College Students, Distance Miles, Communication, Emerging Adults

Parent Marital Status and Romantic Relationship Satisfaction in Emerging Adults

April Divens, Angie Yang, Dr. Amy Claridge
Project Mentor(s): Dr. Amy Claridge

Existing literature highlights studies that focus on attachment security and relationship satisfaction, but few studies have examined the relationship between parental marital status and relationship satisfaction. The purpose of this study was to examine parental marital status and the functionality of relationship satisfaction and its effects. The current study examined the relationship between parental marital status, and emerging adults' romantic relationship satisfaction (N =227) by implementing a quantitative survey method. The results did not indicate that those who reported divorced or separated parents, had lower levels of romantic relationship satisfaction. While parental divorce was not related to children's relationship dissatisfaction later in life, other analyses showed there were higher levels of attachment security with participants who had parents that were still married, compared to those who had lower levels of attachment security with parents that were divorced. Findings suggested there is a need for more research looking at moderators of attachment style and its effects. There were no significant findings between emerging adult romantic marital status and their parental marital status. Additional analyses revealed strong relationships between age of parental divorce or ended parental relationship and the difficulty of the divorce or ended parental relationship. Implications of the survey, sample and results will be discussed.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Romantic Relationships, Marital Status, Attachment Style, Emerging Adults

Accessibility Barriers of Tourism Transportation

Nicole Gillespie, Faith Wilson
Project Mentor(s): Carla Jellum

This study explores tourism transportation barriers that people may experience who have experienced disability. It aims to analyze if those barriers can be minimized to support positive and simplified travel experiences for everyone. Qualitative and quantitative data was collected using an online questionnaire distributed across social media platforms. Responses were collected from 65 participants, who provided insights into personally identified barriers. Individuals that identify, and those who do not, as having a disability both indicated barrier contributors include poor communication, safety concerns, lack of space, infrequent access to public transport, and inaccessible infrastructure. This study aims to contribute to the conversation on current accessibility efforts being made in the tourism transportation industry. Furthermore, it provides recommendations for practices that can be expanded or improved upon to support travel inclusion for an increasingly underserved population of travelers.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Accessibility, Tourism, Transportation

Experience of Parental Divorce in Childhood and Emerging Adult Sibling and Romantic Relationships

Nicole Jacobson, April Divens
Project Mentor(s): Amy Claridge

Parental divorce may influence many aspects of children's adult relationships. This presentation includes data from two studies examining adults' sibling (N = 258) and romantic relationships (N = 228) in relation to childhood experience of parental divorce. Data were collected through anonymous online surveys. Results indicate that more difficult parental divorce tends to be related to lower attachment security, and attachment security moderated the association between age at time of divorce and romantic relationship quality. Divorce also moderated the association between sibling age gap and sibling relationship quality, such that siblings tended to report strong relationship quality regardless of sibling age gap among participants who experienced a divorce in childhood. Taken together, the findings from both studies suggest that experience of parental divorce in childhood may contribute to attachment security, romantic relationship quality, and sibling relationships among emerging adults, in complex ways. Implications will be discussed.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Divorce, Adult Sibling Relationships, Attachment, Romantic Relationships, Sibling Relationship Quality

The Relationship Between Community Connection and Family Resilience Among Rural Low-Income Female Caregivers

Loi Lutes
Project Mentor(s): Sarah Feeney

Family resilience is the process through which a family utilizes their strengths in times of stress. Having a strong level of resilience is based on a family's ability to adapt to stressors with positive coping skills. These coping skills can be influenced by protective factors such as community and family support systems. The role of perceived community connection in supporting resilience in military families has been well established, but research among rural families is limited. Therefore, this study examines the association between perceived community connection and family resilience among rural low-income female caregivers. Given that the support systems within a healthy community can provide emotional benefits and help families face and overcome adversity, it is hypothesized that there will be a positive relationship between perceived community connections and family resilience. Data from a sample size of N = 1,134 was gathered through an online Qualtrics survey. Initial correlation analyses were conducted to determine which demographic variables should be included as controls. Next, a multiple regression analysis was run with family resilience as the dependent variable. Results showed a positive relationship between community connection and family resilience, controlling for respondent age and the age of the youngest child in the household. These findings are consistent with previous research among military populations. This information can be utilized across rural America to help communities prioritize support systems and events that will provide opportunities for families to build community connections while increasing their family resilience.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Rural, Community Connection, Family Resilience, Low-Income, Female Caregivers

Parent-Child Communication and Child Romantic Relationships

Kathryn Peck, McKenna Prouse, Grace Busenius, Nidia Marin Chavez
Project Mentor(s): Amy Claridge

Previous research has found a positive association between parent-child relationship quality and romantic relationship quality in adolescence, but few studies have examined the quality of parent child communication and romantic relationship quality for emerging adults. The purpose of this study is to understand if there is an association between parent child communication quality and romantic relationship quality in emerging adulthood. Data were collected using an anonymous Qualtrics survey distributed via social media websites such as Instagram. Eligible participants were between the ages of 18 to 25 (N = 321). Results indicated parent child communication quality was slightly positively correlated with romantic relationship quality in a way that is approaching statistical significance. Findings suggest further research is needed with the moderator of emerging adult romantic relationship status. Findings also suggest higher education should provide increased support for parent-child relationship quality and communication for emerging adults.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Romantic Relationship Quality, Emerging Adulthood, Parent-Child Communication Quality

Examining the Role of Social Factors in Active and Passive Parent Participation in the IEP Meeting

Zaire Preston
Project Mentor(s): Amy Claridge

Parental involvement in children's education is an important factor to increase academic performance and student achievement. Parent participation during the Individual Education Program (IEP) meeting is mandated under the Individuals with Disabilities Education Act (IDEA). While the efficacy of IEP meetings has been well explored, research currently faces a gap in examining social factors that may influence the degree of parental participation during IEP meetings. To examine the relationship between social factors and parent participation, this study surveyed a sample of 64 parents with children in U.S. public schools on an active IEP. A quantitative self-report questionnaire collected demographic information and measured parents' perceptions of their involvement. This study utilized convenience sampling from social media platforms, Facebook Advertisements, and physical flyers to recruit participants. Results indicated significant differences in levels of parent participation based on parents' income and education such that parents who reported higher income and higher level of education reported more involvement in their child's IEP and fewer barriers to participation. Results of this study highlight two important aspects of parent participation: Income and education are associated with parents' access to participate; and when parents perceive fewer barriers, they are more engaged in the IEP process. Based on these results, special education staff may need to use new strategies to motivate and support parental involvement in the IEP process, especially for parents facing barriers to participation. School systems can use this information to adjust or create new parent programs to support, educate, and encourage parent involvement.

Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Special Education, Parent Involvement, IEP, K-8 Grades

The Effects of Parental Financial Assistance and the Parent Child Relationship

Emma Zawadzki, Gracie Glover, Melissa Merino-Ortiz
Project Mentor(s): Amy Claridge

Previous literature shows a relationship between parental financial assistance and parent child relationship quality. During emerging adulthood, the parent-child relationship goes through a period of change as young adults gain more independence from their parents (Lindell et al., 2017). Our study examined the association between parental financial reliance of college students and the parent child relationship. Our study method includes convenience sampling through a Qualtrics survey where those who are willing will take this survey. For our analysis of results, we ran a correlation analysis. We hypothesized that there will be a positive association between college students' ages 18-24, financial reliance on their parent(s) and the quality of the parent-child relationship. We found an association between the reported ages of participants and their perception of financial support. Results of the correlation analysis revealed that there was a slight negative association between age of the participant and the level of financial support provided. This suggests that older participants reported less financial support while younger participants reported higher levels of support. These findings might suggest that colleges provide more financial support to students to help students maintain good quality relationships with their parents.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Parent-Child, Financial, Relationships

Apparel, Textiles, and Merchandising

Highland Masquerade

Storm Haight

Project Mentor(s): Andrea Ecklund

My design, affectionately named Mariana after the model it's tailored for, epitomizes my dedication to craftsmanship and creative expression. Crafted meticulously with a vision to grace the runway of the CWU student fashion show in June, Mariana is not just a garment but a testament to my deep-rooted inspiration drawn from Scottish history and my cherished Scottish heritage. In the meticulous construction of Mariana, every stitch and pleat serves a purpose. The bodice and skirt pieces were artfully draped on the dress form, necessitated by the intricate fabric manipulations within the skirt and to ensure a flawless fit. This corset top is planned to be finished with a rhinestone portrait of Saint Margaret who was the Queen of Scotland and a major fashionista herself. The skirt features a captivating "crisscross" tuck peat fabric manipulation on the yoke, complemented by delicate 1-inch knife pleats adorning the bottom portion. The corset top, a striking centerpiece, boasts a bold 100% polyester plaid fabric of my own design, expertly lined with cotton coutil for both structure and comfort. Meanwhile, the skirt, crafted from luxurious cotton sateen, exudes elegance and sophistication. Mariana stands as a proud member of my spring collection, five designs curated with passion and ingenuity. My collection can be seen at the 28th Annual CWU Fashion Show brought to you by the Apparel, Textiles & Merchandising program in conjunction with the Theatre Department on June 1st at 3pm & 7pm in Milo Smith Theatre. More information on ticketing @cwu_atm.

Presentation Type: Fashion Show (May 15, 11:30am–12:00pm), Poster (12:00pm–12:30pm)

Key Words: Scotland, Fashion, Design, Fashion Show

Sassy & Classy

Tatum Mohagen

Project Mentor(s): Andrea Eklund

My design is named Autumn's Asymmetrical Tie-Scarf Dress The purpose of this design was to challenge my draping abilities and create an elegant custom-fit dress. This design took inspiration from traditional business wear and incorporated a modern elegant twist. To begin the process, I sketched out my design. I took my model measurements and proceeded to drape the dress using muslin. I converted the draping pieces into patterns, using those to make a sample. We had a fitting in the sample to make necessary changes to ensure proper fit. Due to the complexity of this design, I completed 3 fittings. Adjustments were made to the pattern before the final garment was cut and sewn with polyester thread. This design was a new concept, which presented difficulties in the construction process as well as pattern making and fitting. The dress was fully lined and finished with an invisible zipper. With sustainability in mind, my materials were all sourced second-hand. The fashion fabric is a thin reflective silver polyester and lined with white polyester. The tie scarf is structured by interfacing to have it hang like a traditional men's tie. Additionally, I used tear-away paper to help stabilize my slippery, thin fabric. This is one of five designs for my collection shown at the 28th Annual CWU Fashion Show, produced by the Apparel, Textiles & Merchandising program in conjunction with the Theatre Department on June 1st at 3 pm & 7 pm in Milo Smith Theatre. More information on ticketing @cwu_atm.

Presentation Type: Fashion Show (May 15, 11:30am–12:00pm), Poster (12:00pm–12:30pm)

Key Words: Fashion Show, Apparel Design

Witching Hour

Sami Nixon, Kelsey Sells (Model)

Project Mentor(s): Andrea Eklund

Witching Hour was created to challenge myself to create styles that were outside my comfort zone, styles that closely followed the lines of my model and because of this left little room for error. The process to do this was broken down into four basic stages: measurements, patterning, fittings, and final product. Measurements are self-explanatory the model came in and was measured head to toe. With these in hand, I found slopers that matched (mostly) to her size and modified them to fit the desired style. I made a sample from muslin from the patterns that the model could try on. During the fitting, any issues with the fit were marked so they could be fixed in the pattern. Since the changes were large a second fitting was necessary. Once the second fitting was complete, I moved on to the final product. In this specific outfit, I used an invisible zipper in the back as well as a hook and eye closure. The dress achieves a fitted look through well-placed darts. In this look, I used a 100% cotton plain weave, all-purpose thread, and a stiff fusible interfacing for the bow. This is one of three designs for my spring collection. My collection can be seen at the 28th Annual CWU Fashion Show brought to you by the Apparel, Textiles & Merchandising program in conjunction with the Theatre Department on June 1st at 3pm & 7pm in Milo Smith Theatre. More information on ticketing @cwu_atm.

Presentation Type: Fashion Show (May 15, 11:30am–12:00pm), Poster (12:00pm–12:30pm)

Key Words: Fashion, Design, ATM, Fashion Show

The Knight

Hope Pringle

Project Mentor(s): Andrea Eklund

This Design is called The Knight, and it involves three garments, the Akira crop jacket, Fiore Doublet, and Chappel shorts, and it was created with inspiration from various dark fantasy aesthetics. Fantasy is also steeped in queer culture, which contributed greatly to the materials and silhouettes used in my line. I used mostly flat patterning with this design, creating a custom pants block, and creating a corseted doublet pattern from slopers. Patterns were then sampled and fitted on my model, and adjusted accordingly. Once the patterns were satisfactory, I cut out of final fabrics and began assembly. The fashion fabrics used were a black peach skin, purple two tone chiffon, and a metallic jacquard, with cotton canvas and poly cotton broadcloth for structure and lining. The doublet is specifically interesting as a corseted piece, which means it has a lace up back and is boned in many places with a synthetic baleen. It is also bound at most edges with a custom taffeta bias tape. The crop jacket is done delicately with French seams and decorated with hand stitched lace appliqué. The lace applique runs through the entire line. This is one of five designs for my spring collection. My collection can be seen at the 28th Annual CWU Fashion Show brought to you by the Apparel, Textiles & Merchandising program in conjunction with the Theatre Department on June 1st at 3pm & 7pm in Milo Smith Theatre. More information on ticketing @cwu_atm.

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Key Words: Fashion, Design, Apparel

Almas Eternas

Meli Rivera Garcia

Project Mentor(s): Andrea Eklund

Bella is a design inspired by Chicanx and Latinx culture, specifically pachuco culture. The design features a plunging V-neck halter with a lace modesty panel, back necktie, and center back invisible zipper. The pants are heavily inspired by 1930's zoot suit pants, featuring a dart from the knee to the hem and an invisible side seam zipper. In the process I took measurements of the models and made adjustments to the slopers. The top features a halter top with gathering at the bust dart and an empire midriff, while the pants have a curved knee dart from the hem to the knee for fullness/ The fabric used in the design is 100% cotton, with the modesty panel made of 100% cotton Nottingham lace. The pants are made of 100% plain weave cotton, with all fabric for the line being thrifted. Hook & eyes are used for the top of the invisible zipper in the pants, and interfacing for the waistband is used. This is one of three designs for my spring collection. My collection can be seen at the 28th Annual CWU Fashion Show brought to you by the Apparel, Textiles & Merchandising program in conjunction with the Theatre Department on June 1st at 3pm & 7pm in Milo Smith Theatre. More information on ticketing @cwu_atm.

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Key Words: Fashion Show, Fashion, Apparel Textiles, and Merchandising

Tulip

Ximena Rodriguez-Tapia

Project Mentor(s): Andrea Eklund

Purpose: This design was inspired through the shape and silhouette of the design from the wrap detail and A line silhouette of the skirt to the tied shoulder detail of the bodice. The overall aesthetic was a soft flowing look for the spring and summer. Process: The first step in the design process was taking my models measurements, finding the correct size sloper, and flat patterning my design through the slash and spread method. Contouring was also added to the neckline and armholes for better fit. My professor then checked my patterns by walking the patterns and a sample was made. Next was a fitting with the model, adjustments to the pattern from the fitting, and finally constructing the finished garment. Techniques: The technique I used in make this design is flat patterning, waistband facings. Tie shoulders, straight stitches, serging and standard seams. Materials: polyester satin fabric, cotton plain weave fabric, all-purpose thread, interfacing, buttons. This is one of three designs for my spring collection. My collection can be seen at the 28th Annual CWU Fashion Show brought to you by the Apparel, Textiles & Merchandising program in conjunction with the Theatre Department on June 1st at 3pm & 7pm in Milo Smith Theatre. More information on ticketing @cwu_atm.

Presentation Type: Fashion Show (May 15, 11:30am–12:00pm), Poster (12:00pm–12:30pm)

Key Words: Fashion Show, Fashion, Apparel Textiles, and Merchandising

Simple, But Daring, Too

Tess Sparks

Project Mentor(s): Andrea Eklund

My design name is called “Simple, But Daring, Too.” The purpose of my design was to create a challenging look that I could envision people wearing to feel like a princess in everyday life. I love the look of pearls on clothing and was inspired by Karl Lagerfeld’s iconic 1980s Chanel designs featuring pearl elements everywhere, used as necklaces, design elements, belts, bracelets, and more. I wanted to revive this with my own twist using satin fabric. First, I decided on my processes, then I measured my models. For the bodice I flat patterned a bustier, and for the skirt I used a sloper altered to my model’s measurements. My professor reviewed them, and I created a muslin sample which I had an initial fitting with. I adjusted the patterns so the garment fit my model. Finally, I created my final look and added draped pearl elements. The bodice and the skirt are finished with lining and an invisible zipper. I used 100% polyester satin fabric, interfacing, all-purpose thread, foam for the cups of the bustier, invisible zippers, pearls, jump rings, and clasps for the pearl strands. This is one of three designs for my spring collection. My collection can be seen at the 28th Annual CWU Fashion Show brought to you by the Apparel, Textiles & Merchandising program in conjunction with the Theatre Department on June 1st at 3pm & 7pm in Milo Smith Theatre. More information on ticketing @cwu_atm.

Presentation Type: Fashion Show (May 15, 11:30am–12:00pm), Poster (12:00pm–12:30pm)

Key Words: Fashion Show Look #1

Hopistality, Tourism, and Event Management

Travel Behaviors of Young Adults: A Study on the Effects of the COVID-19 Pandemic Over Time

Madeleine Surface

Project Mentor(s): Carla Jellum

This study aims to determine a change in American travel behaviors outside of one’s hometown that may be correlated to the COVID-19 pandemic. Participants aged 19-30 were asked to respond to a questionnaire to depict travel habits from 2019 to 2023. Data collection methods included a combination of utilizing Snapchat, Instagram, and one Central Washington University (CWU) class recruitment. Respondents discussed the years when they traveled, how far they traveled, who they traveled with, and why they traveled. Results (n=60) suggest that during the COVID-19 pandemic there was a change in the distance participants traveled, preferring locations closer to home (average distance <60-1,000mi). Overall, regardless of a public health crisis, results suggest that most participants prefer medium-distance (average distance 60-1,500mi) travel experiences that last an average of 3-7 days. The results of this research has important implications for tourism professionals and can be used to more accurately advertise destinations, experiences, and lodging to young adults.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: COVID-19, Travel Behavior, Young Adults, Travel Distance Change

Health Sciences

Fueling Strategies in Ultra Trail Runners

Kimberly Biladeau
Project Mentor(s): Kelly Pritchett, PhD, RDN, CSSD

It has been suggested that ultra trail runners may fail to meet hourly carbohydrate intake guidelines during training and competition due to improper knowledge around fueling for performance. Runners may experience pressures to maintain a low body mass, body dissatisfaction, belief that lower body weight improves performance, and lack of knowledge around fueling strategies. The consequences of this can include poor performance and an increased risk of low energy availability (LEA). PURPOSE: Examine self-reported fueling habits during training and competition in male and female ultra-trail runners. METHODS: Trail runners between the age of 18-40 (n=1,899; males: n= 510, females: n=1,445) participated in a cross-sectional study. Participants completed a Qualtrics survey that included questions regarding fueling and carbohydrate intake practices during training and racing. RESULTS: 45.6% of male and 47.6% of female reported fueling with carbohydrates during their workouts. 47.5% of males and 45.2% of females reported sometimes fueling with carbohydrate during workouts. 7.1% of female athletes and 6.9% of male athletes reported not incorporating any carbohydrates into workouts. 25.7% of male and 36.2% of female ultra-trail runners reported intentionally restricting energy intake during easy training days. 35.9% of males and only 19.7% of females reported training fasted. CONCLUSION: General recommendations for carbohydrate consumption during exercise lasting 1-2.5 hours and >2.5 hours are 30-60g/hr and 60-90g/hr, respectively. However, ultra-endurance and other elite athletes should seek individualized guidance from sports dietitians to ensure necessary energy requirements to avoid LEA.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Exercise Science, Nutrition, Dietetics, Ultra Trail Running, Carbohydrate Intake

Prevalence of Podcasts and Social Media Use in Health Sciences Students

Saige Carney, Kelly Pritchett, Robert Pritchett, Ana Paula Freire
Project Mentor(s): Ana Paula Freire

Design: An anonymous survey was distributed among students in the Health Sciences Department at Central Washington University over three weeks. The questionnaire included 12 questions including age, year in school, intended major, podcast or social media usage for educational purposes in Health Sciences. Results: Out of 114 college age students (20.76 ±3.1 years) that participated on the survey 52 (45%) identified as women and 62 (55%) identified as man. 84 students (74%) reported to listen to podcast however, only 43 (37%) of students are using podcast for educational purposes. Only 6 students (5%) reported using educational podcasts with daily frequency, 13 (11%) monthly. 89 students (79%) reported that they would listen to a podcast that complemented their studies if there was one available. Students also reported on usage other educational resources, including YouTube (n= 78; 70%) for supplement their studies. Social medias were also reported as educational resources including Instagram (n=39; 34%) and 31 people (27%) reported using ticktock for studying. Facebook and X had low numbers of students that reported using these platforms for educational use, Facebook had a reported 3 people (2.7%) and X showed 8 people (7.1%). Conclusion: We found that the majority of Health Sciences students do listen to podcasts. However, only half of those students listen for educational purposes. YouTube was the most common platform used as additional educational resource and there is a need for more educational podcasts reported by students.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Podcast Use, Health Sciences, Education

Facilitators and Barriers to Breastfeeding Among Mothers Recovering from Opioid Use Disorder

Amelia Chestnutt
Project Mentor(s): Tafere Belay, Kelly Pritchett, Katy Williams

Background: Opioid use disorder (OUD) affects all demographics, including pregnant individuals. Medication for opioid use disorder (MOUD) is a common treatment, but infants exposed in utero can still experience withdrawal as they do from illicit opioids. Fortunately, breastfeeding while taking MOUD is safe and beneficial for infants. However, mothers taking MOUD tend to breastfeed for shorter durations than the general population. Research on the barriers and facilitators to breastfeeding in this population has mainly been conducted in urban areas and the Midwest, South, and Eastern United States. Research aim: This study aimed to identify facilitators and barriers to initiation and continuation of breastfeeding among mothers recovering from OUD in Central Washington. Methods: We conducted semi-structured focus groups with women who took MOUD during pregnancy and/or breastfeeding. Our qualitative data was analyzed using thematic analysis. Results: We identified three themes: (A) I wanted to breastfeed my baby, but I did not know what that looked like during addiction recovery, (B) treatment for mothers in recovery helped me breastfeed and I want to see more similar programs, and (C) respectful, consistent, and supportive hospital environments are rare and difficult to access. Theme A encompasses educational and systematic barriers, Theme B includes clinic and community facilitators, and Theme C discusses treatment gaps and stigma. Conclusion: This study increases understanding of the aids and hindrances to breastfeeding in mothers recovering from OUD in Central Washington. It also highlights the demand for better access to treatment programs and groups tailored to this population's specific needs.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Breastfeeding, Medication for Opioid Use Disorder, Barriers, Facilitators

Risk of Low Energy Availability, Disordered Eating, and Exercise Dependence in Female Recreational, Competitive, and Professional Cyclists

Jennifer Cole
Project Mentor(s): Kelly Pritchett, Robert Pritchett, Namrita Brooke

In the cycling population, low energy availability (LEA) may increase the risk of disordered eating (DE), and exercise dependence (EXD). The purpose of this study was to evaluate the prevalence of risk for LEA and its association with risk of DE, and EXD, during training and competition in female cyclists. Competitive, and recreational cyclists between the age of 18-40 (n = 279 females) completed a 45-question survey using Qualtrics that included training and racing characteristics, questions regarding carbohydrate intake during training and competition, the Low Energy Availability in Females Questionnaire (LEAF-Q), the Disordered Eating Screen for Athletes (DESA-6), and the Exercise Dependence Scale-21 (EDS-21). Among the cyclists, 48.8% (n = 81) were at risk for LEA. Furthermore, cyclists at risk for LEA were more likely to be at risk for DE ($X2 = 28.05$; $p < 0.001$), and risk for EXD ($X2 = 4.1$; $p = 0.043$). It was determined that there was a high prevalence of subjects at risk of LEA, and this contributed to the prevalence of subjects at risk for DE and EXD. It is advised that cyclists at risk for LEA should consult with a sports dietitian to help determine fueling needs.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Low Energy Availability (LEA), Disordered Eating (DE), Exercise Dependence (EXD), Cycling, Energy Availability

Physiological and Perceptual Responses to Running on an Anti-Gravity Treadmill

Jacob Cruz, Pedro Amarillas, Carly Huber, Manuel Martinez, Melissa Porter, Ashlea Renschler, Megan Sexton, Rudy Velasquez
Project Mentor(s): Tim Burnham, Eric Foch, Robert Pritchett

The Alter G treadmill is a conventional treadmill enclosed in a flexible chamber. This chamber seals around the waist and can be inflated with air. The air pressure lifts the participant upward, reducing body weight (BW) up to 80%. PURPOSE: Investigate the effects of BW reduction on physiological and perceptual responses while running. METHODS: Ten subjects (5 male, 5 female), 19-24 years, who ran at least 5 miles a week, volunteered to participate. Each subject ran at a speed that elicited an RPE of 11 “Fairly Light”, under 3 conditions in a randomized order: 100%, 60%, and 20% BW. RESULTS: Heart rate dropped significantly from 100% to 20% bodyweight (162>132 bpm) $p = .01$. RPE significantly decreased $p = .004$, Oxygen consumption dropped significantly by 36% $p = .01$, energy expenditure decreased significantly by 39% $p = .01$. O2/pulse decreased 22% but was not significantly different $p = .27$. CONCLUSION: Reducing BW from 100% to 60% to 20% while running on the Alter G treadmill, resulted in significant reductions in heart rate, RPE, oxygen consumption and energy consumption. These reductions occur because a decrease in BW decreased the physiological and perceptual responses. The Alter G may have value for athletes rehabilitating from lower body injury by reducing impact and stress. This treadmill may also have utility for those with orthopedic issues who cannot exercise at full BW. Running at reduced BW, reduces physiological and perceptual responses, and may be a useful tool in the rehabilitation of athletes or clinical populations.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Anti-gravity, Unweighting, Alter G

An Overview of Vitamin B12 Deficiency in US Non-Hispanic Asian Adults NHANES 2011-2014

LiLi Doran

Project Mentor(s): David Gee, Tafere Belay, Katy Williams

The National Health and Nutrition Examination Survey (NHANES) studies various markers of health and nutritional status in US adults and children, but did not start specifically sampling for Non-Hispanic (NH) Asians until 2011. Some of these markers of nutritional status, such as vitamin B12 deficiency, are associated with many adverse health effects. As such, SAS® software version 9.4 was used to analyze NHANES data on vitamin B12 deficiency and supplementation in the US population. Of the total population, 4.8% were found to be deficient in vitamin B12. The populations with significantly higher prevalence of deficiency from the average were females, older adults (60+yrs), and NH Asians; conversely Mexican Americans had a significantly lower prevalence of deficiency. Approximately one quarter of the surveyed population used dietary supplements containing vitamin B12. Use of dietary supplements were higher in NH Whites, females, older adults (60+yrs), those with an overweight BMI, higher income groups, higher educational attainment, and the highest acculturation status groups in NH Asians and Mexican Americans. In conclusion, vitamin B12 deficiency can cause many adverse health effects, and is not uncommon in the US population. Up until 2011 there was not sufficient data on NH Asians in current NHANES databases; as such this study provides an update on the vitamin B12 status in US adults, as well as opens up new avenues for research on vitamin B12 status, deficiencies, and supplementation.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Vitamin B12 deficiency, dietary supplements, National Health & Nutrition Examination Survey, NHANES, Non-Hispanic Asians

Autonomic Function After COVID-19 in Young Adults: An Observational Study

Michael Eleruja, Kelly Pritchett, Leonardo J. D'Acquisto, Karen Roemer, Fabio Santos Lira, Bruna Spolador de Alencar Silva, Ana Elisa von Ah Morano, Vanessa Ribeiro Dos Santos, Telmo Pereira, Manuel Joao Coelho-E-Silva, Armando Caseiro, Ana Paula Coelho Figueira Freire

Project Mentor(s): Ana Paula Freire

Introduction: During the Coronavirus disease 2019 (COVID-19) pandemic, emphasis on research was placed on the elderly population leading to neglect of the young adult population. Studies evaluating long-term follow up of autonomic function after COVID-19 in young adults, modulation by physical activity are lacking as well as comparing autonomic function between unvaccinated and vaccinated, infected young adults. Materials and Methods: This was an observational prospective study. Twenty-three control and 23 post-COVID-19 subjects, 20 – 40 years were followed for 20 months before and after vaccination. Secondarily, 23 unvaccinated and 10 vaccinated, infected young adults were also evaluated. Heart rate variability indexes (HRV) were measured via heart monitor and physical activity was assessed via a triaxial accelerometer. Results: No significant differences were observed in autonomic function between both groups. However, moderate to vigorous physical activity increased between baseline and follow up in both groups. Significant differences were observed in mean hear rate (HR) and mean RR interval between unvaccinated and vaccinated, infected young adults. Mean HR increased in unvaccinated, infected individuals (83.5 ± 12.6 bpm; p=0.004; mean difference (MD): -9.58 ± 4.15 bpm; confidence interval (CI): 3.34 to 15.81) compared to the vaccinated infected individuals (73.9 ± 4.91 bpm). Mean RR interval increased in vaccinated, infected individuals (812.90 ± 52.06 ms; p=0.02; MD= -77.47 ± 30.6 ms; CI: -139.90 to -15.03) compared to the unvaccinated, infected individuals (735.43 ± 123.78 ms). Conclusion: After a 20-month follow up, no difference was observed in autonomic function in the long COVID-19 young adult group.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: COVID-19, Young Adults, Vaccination, Physical Activity, Heart Rate Variability

Analysis of Conclusiveness Over Time of Cochrane Systematic Reviews in Physiotherapy: A Methodological Study

Kailei J. Eustis, Ana Paula Freire, Gordon Smilanich, Italo Ribeiro Lemes, Mark R. Elkins, Rafael Zambelli Pinto

Project Mentor(s): Ana Paula Freire

Introduction: Cochrane systematic reviews (CSRs) are relevant to decision-making in healthcare and health policies. Although CSRs tend to be of higher quality than other systematic reviews, there is still a debate regarding their conclusiveness. Purpose: Determine the proportion of conclusive CSRs in Physiotherapy and investigate whether conclusiveness has increased over time. Methods: We performed a systematic search in the Physiotherapy Evidence Database (PEDro) for CSRs and extracted a random sample of 200 reviews, with 50 from each of the four periods: 2000-2005, 2006-2010, 2011-2015 and 2016-2020. Two independent researchers extracted the main information of the review. Grading of Recommendations Assessment, Development and Evaluation (GRADE) data for primary outcomes was used to assess conclusiveness. For reviews without GRADE, a GRADE assessment was performed by the researchers. A CSR was considered conclusive when at least one primary outcome provided high certainty of evidence. Results: Outcomes with very low certainty of evidence represented 21% overall and increased 20% from 2000-2005 to 2016-2020. Outcomes with low certainty of evidence composed 55% overall and remained proportionally consistent. Moderate- and high-certainty outcomes also remained consistent, composing 22% and 2% respectively. Proportion of high-certainty outcomes never exceeded 4% per period. Conclusiveness remained unchanged and composed 3% of all reviews. Proportion of conclusive reviews was highest in 2016-2020 at 6%. Reported need for further studies represented 91% of all reviews. Conclusion: Proportion of conclusive CSRs remains very small and has not changed over time. Further research is necessary in Physiotherapy to provide higher quality evidence and improve conclusiveness.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Systematic Reviews as Topic, Methods, Physical Therapy Modalities

Impact of Advancing Age on Morphological Characteristics of Skeletal Muscle: A Cellular Perspective

Colton Hart, Jared M. Dickinson
Project Mentor(s): Jared Dickinson

A major contributor to reduced physical function with aging is the progressive loss of skeletal muscle mass and function, termed sarcopenia. The purpose in this investigation was to characterize morphological characteristics, at the cellular level, associated with aging skeletal muscle. Vastus lateralis muscle biopsies were collected from 9 young (Y; 27±3yr) and 6 older adults (O; 67±6yr). The morphological characteristics of skeletal muscle were assessed through immunofluorescent microscopy. Images of the entire muscle specimen were obtained via automated stage and image tiling (Zeiss). Samples were assessed for fiber size, myosin heavy chain (MHC) fiber type, satellite cell (SC), and capillarization. Young individuals exhibited a greater percentage of MHCII fibers (Y=71±4; O=54±7%), whereas older adults exhibited a greater percentage of MHCI fibers (Y=29±4; O=46±7%) ($P<0.05$). MHCI fiber size was similar between young and old (Y=4,662±1,290; O=4,906±1,558μm), however, MHCII fiber size was smaller in older adults ($P<0.05$; Y=5,884±1,043; O=4,0616±1,696μm). SC per MHCI fiber was similar between young and old (Y=0.04±0.03; O=0.04±0.04), however, SC per MHCII lower was lower in older adults ($P<0.05$; Y=0.08 ±0.05; O=0.03±0.02). Independent of fiber type, capillaries per fiber was lower in older adults ($P<0.05$; Y=4.59±0.85; O=1.53±0.34). Aging is associated with lower capillarization of muscle and morphological differences directed to MHCII fibers. These findings highlight potential therapeutic targets for preservation of skeletal muscle mass and function with advancing age.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Skeletal Muscle, Immunohistochemistry, Aging, Sarcopenia

Investigating the Relationship Between Diabetes Specialist Visitations on Patients' Hemoglobin A1C Status: NHANES 2013-2018

Samantha Kester; David L. Gee, PhD; Tafere Belay, PhD; Katy Williams, MS, RDN, CD, CSSD,
Project Mentor(s): David L. Gee, PhD; Tafere Belay, PhD; Katy Williams, MS

The aim of this study was to investigate the relationship between Diabetes Specialists (DS) visitations and participant's hemoglobin A1C (HA1C) status utilizing NHANES database 2013-2018. Adequate glycemic control, as defined by the American Diabetes Association's (ADA), was measured using Hemoglobin A1C (HA1C), following the ADA's goal for adults with diabetes set at equal to less than 7%. Evaluation of diabetes status and diabetes specialist visitation frequency was based on the subject's response to the diabetes section of the NHANES questionnaire. No study to date has used the HA1C laboratory data in tandem of exploring the frequency of Diabetes Specialist (DS) visitations using NHANES 2013-2018 cycle years. RESULTS: A total of 2367 eligible adult participants with diabetes were included in this study, comprising 48.5% who achieved a HA1C status of equal or less than 7%. Those who saw a DS within two years demonstrated a glycemic goal attainment rate of 42.7%, potentially linked to the diagnosis of diabetes with significantly elevated initial HA1C levels. The largest success rate, at 54.5% was observed in participants who saw a DS more than two years ago, further demonstrating the extended time required to bring extremely elevated BG levels into an appropriate range. While there is not a direct association of recent DS visits and better glycemic control found among adults with diabetes, noteworthy findings indicated that DS consultations positively impacted glycemic control in individuals aged 60 years and older compared to young adults and in women compared to men.

Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Diabetes, Hemoglobin A1C, NHANES

Cardiovascular Disease and Coronavirus Disease (COVID-19) Outcomes Prevalence in Yakima Region

Uduak Okon

Project Mentor(s): Amie Wojtyna; Casey Mace Firebaugh, PhD, MPH; Tishra Beeson, DrPH, MPH; Debbie Rich, MPH, DrPHc

Yakima County, Washington, is a highly agricultural, rural county in Central Washington with a 50% Hispanic/Latino population. During the COVID-19 pandemic, disease outcomes emerged as a significant health challenge in this region. Studies have identified the Hispanic/Latino population to be disproportionately affected by COVID-19 outcomes (Firebaugh et al., 2020). Recent findings have revealed a statistically significant relationship between cardiovascular disease (CVD) and COVID-19 mortality ($p < .001$) (Vasudeva et al., 2022). This presentation aims to provide results of the further investigation of the prevalence of CVD and COVID-19 outcomes (Long-COVD) and potential associations between them in Yakima County based on an analysis from a Central Washington University student-faculty collaboration. Findings will reveal the prevalence of self-reported health conditions such as CVD and Long-COVID-19 disease in the Yakima region. A descriptive analysis of demographics, including sex, gender, ethnicity, income, education, and occupation, will be presented. Lastly, a prevalence odds ratio will be highlighted to give insight into a possible association between CVD and COVID-19 outcomes.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Cardiovascular Disease, Coronavirus Disease, Long-COVID-19, Yakima County, Prevalence

Interval Exercise Stimulates a Greater Transcriptional Response Than Continuous Exercise Within Aging Human Skeletal Muscle

Rachel Perez

Project Mentor(s): Jared Dickinson

Exercise is a highly effective strategy for preserving skeletal muscle health with advancing age. However, the molecular mechanisms producing these benefits are less established, and thus to what extent various modes of exercise can be utilized to target impairments in aging muscle is not fully understood. PURPOSE: To identify the transcriptional response of older adult skeletal muscle to acute high-intensity interval (HIIE) and moderate-intensity continuous (MIC) cycling exercise. METHODS: Eight older adults (5M, 3F; 67±2yr; BMI: 26±2kg·m-2) completed two exercise trials separated by ~1 week. One trial consisted of HIIE cycling (ten, 1-min intervals, 85-95% heart rate max, 1-min rest between intervals) and the other consisted of MIC cycling (30-min, 65-70% VO2peak). Muscle biopsies (vastus lateralis) were obtained before and 4h post exercise. Whole transcriptome next-generation sequencing was performed on cDNA synthesized from skeletal muscle RNA. Sequencing data were analyzed using HTSeq. RESULTS: 264 genes were only responsive to HIIE whereas 149 genes were only responsive to MIC. TNFRSF12A, a gene associated with muscle growth, was upregulated by HIIE but not by MIC ($P<0.05$; normalized counts above pre-exercise [mean±SE]: 292±131 vs. 56±29). CONCLUSION: These data highlight that despite less total work, acute HIIE stimulates a greater transcriptional response within the skeletal muscle of older adults as compared to MIC in the immediate hours following acute exercise. While future work is necessary, HIIE may provide a better stimulus than MIC to promote muscle growth/delay muscle loss in older adults.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Muscle, Exercise, Health

Sex Differences in Standing on an Anti-Gravity Treadmill

Melissa Porter, Jacob Cruz, Pedro Amarillas, Carly Huber, Manuel Martinez, Ashlea Renschler, Megan Sexton, Rudy Velasquez

Project Mentor(s): Tim Burnham, Eric Foch, Robert Pritchett

The Alter G treadmill is a treadmill enclosed in a flexible chamber that seals around the waist and is inflated with air. The air pressure lifts the participant upward, reducing body weight up to 80%. This may provide enough pressure to increase venous return to the heart, leading to an increase in stroke volume and a decrease in heart rate. Little information is available on male/female differences to standing while un-weighted. PURPOSE: Examine the physiological and perceptual responses between males and females to standing at 3 different levels of bodyweight: 100, 60, and 20%. METHODS: Ten subjects (5 male, 5 female), 19-24 years, who ran at least 5 miles/week volunteered for the study. Each subject stood for 3 minutes under 3 conditions in a randomized order: 100%, 60%, and 20% of bodyweight. Oxygen consumption, heart rate, RPE, energy expenditure and O2/ pulse were recorded. O2/pulse was used as a surrogate for stroke volume. RESULTS: No significant differences between the sexes were found across the three conditions ($p>.05$) in heart rate (89.4 -91.8 bpm female, 90.3-73.8 bpm male) oxygen consumption (285.7-317.1 ml O2 female, 405.3-461.5 ml O2 male), energy expenditure (1.3-1.5 kcal/min female, 1.9-2.1 kcal/min male) or O2/pulse (3.3-3.6 mlO2/beat female, 4.6-6.2 mlO2/beat male) or RPE. CONCLUSION: While non-significant, heart rate did decrease in males while standing from 100% to 20% bodyweight and O2/pulse did increase. However, female subjects showed little change in heart rate and only a slight increase in O2/pulse across these conditions. Further study with more subjects is needed.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Anti-Gravity, Unweighting, Alter G

Physiological and Perceptual Responses to Standing on an Anti-Gravity Treadmill

Melissa Porter, Jacob Cruz, Pedro Amarillas, Carly Huber, Manuel Martinez, Ashlea Renschler, Megan Sexton, Rudy Velasquez

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Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Anti-Gravity, Unweighting, Alter

Impact of the Use of Nutrition Information on Glycemic Control in Adults with Diabetes

Katelyn Richardson
Project Mentor(s): David Gee, Nicole Stendell-Holli, Katy Williams
Aim: The purpose of this study is to examine the association between glycemic control in adults with diabetes and the use of nutrition information. Methods: A cross-sectional design evaluated adults with diabetes from the 2009-2010 and 2017-2020 NHANES databases. Procedure/Study Design: Use of nutrition information was quantified based on the subject's use of the Nutrition Facts Label, use of calorie information at restaurants, and use of either the USDA Food Guide Pyramid or My Plate. Glycemic control was established if the subject's hemoglobin A1C concentration was 7.0% or lower. Statistical Analysis: SAS (v. 9.4) was used for all statistical analysis. Differences between prevalences were established using chi-square analysis. Odds-ratios for good glycemic control and the extent of use of nutrition information and other relevant covariables were established using simple and multi-variable logistic regression analysis. Statistically significant differences were established if p-values were <0.05. Results: Using a simple logistic regression model, low users of nutrition information had a 73% greater odds of not achieving their target glycemic control compared to high users ($p = 0.034$). While not statistically significant, after adjusting for age, sex, race/ethnicity, income, and education, low users of nutrition information were still 38% more likely of not achieving their target glycemic goals compared to high users. Conclusion: There is a significant positive association between achieving target glycemic control and the extent of the use of nutrition information that is reduced when considering by other relevant factors. Use of nutrition information by adults with diabetes should be encouraged.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Diabetes, Glycemic Control, NHANES, SAS

An Exploratory Dissection of the Brain and Cranium

Krystin Scribner
Project Mentor(s): Ryan Galindo, Dr. Leonardo D'Acquisto
Dissection of the first human cadavers occurred approximately 250 years ago. Today, human cadavers are a prominent model for teaching anatomy in higher education settings. The current project used a cadaver model for a detailed dissection procedure, with the purpose of removing a human brain from the cranium. The procedure employed dissection techniques from Gray's Clinical Photographic Dissector of the Human Body and Grant's Dissector. A cadaver was procured from a Willed Body Program. The procedure included removal layers of the scalp. A circular line around the cranium was drawn and subsequently cut, thereby exposing the brain and its surrounding meningeal membranes. Cranial nerves were cut, and the brain removed. Upon examination of the brain an anatomical variation was discovered. Tonsillar tissue of the cerebellum had passed from the cranial vault into and through the foramen magnum, compressing the spinal cord. Tonsillar displacement in this fashion is referred to as a Chiari malformation. Several types of Chiari malformations exist, including type 1 and type 2. Paget disease is a known disorder capable of reducing cranial volume. It is hypothesized that the donor lived with a Chiari malformation resulting from Paget's disease. More dissection is needed to determine the type of malformation.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Tonsillar Displacement, Chiari Malformation, Paget Disease

Sex Differences in Running on an Anti-Gravity Treadmill

Megan Sexton, Jacob Cruz, Pedro Amarillas, Carly Huber, Manuel Martinez, Melissa Porter, Ashlea Renschler, Rudy Velasquez

Project Mentor(s): Tim Burnham Eric Foch, Robert Pritchett

The Alter G treadmill is a conventional treadmill enclosed in a flexible chamber that can be inflated with air to reduce runners' bodyweight. Little information is available on male/female differences to running while unweighted. PURPOSE: To investigate the differences between males and females while running on the Alter G treadmill under 3 conditions: 100, 60, and 20% bodyweight. METHODS: Ten participants (5 female), 19-24 years, who ran at least 5 miles a week volunteered for the study. Participants ran at an RPE of 11 "Fairly Light", under 3 conditions for seven minutes in a randomized order: 100%, 60%, and 20% of bodyweight (%BW). Oxygen consumption, heart rate, RPE, energy expenditure and O2 pulse were recorded and averaged over the final minute of each trial. Dependent variables were compared between groups via separate one-factor (sex) analysis of variance with %BW during each condition being the repeated measure (α=0.05). RESULTS: No statistically significant differences between the sexes were found ($p>.05$) in heart rate, oxygen consumption, energy expenditure or O2/pulse. Females, however, had heart rates 14-15 beats higher than males, and lower levels of RPE (11.6 males, 10.4 females at 100%BW) oxygen consumption (2.0 02L/min female, 3.1 02 L/min male at 100%BW), energy expenditure (9.7 kcal/min female, 15.6 kcal/min male at 100%BW), and O2/pulse (11.8 female, 20.4 male mlO2/beat at 100%BW). This same pattern was also seen for 60%BW and 20%BW conditions. CONCLUSION: The magnitude of the male and female differences are interesting, and may become significant if more subjects were included.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Anti-Gravity, Unweighting, Alter G

Tobbaco Users' Perspective on the Impact of Covid-19 Pandemic on Behavioral and Consumption Patterns in a Middle-Income Country: A Qualitative Study

Judah Shirley

Project Mentor(s): Ana Paula Coelho Figueira Freire

Purpose: To qualitatively evaluate tobacco users' perspective on the impact of the COVID-19 pandemic on the behavioral and consumption patterns within a middle-income country. Research Context: Brazil ranked third in the world in terms of total COVID-19 cases and deaths. Prior quantitative data showed discrepancy between consumptive pattern and higher chance of COVID-19 severity. Methodology: Participants involved were over 18 years of either gender and consumed tobacco products for a minimum of 12 months. Participants were recruited as a sub-sample of a survey conducted nationally in Brazil. We conducted a qualitative study using focus groups with semi-structured interviews for data collection. We evaluated types of tobacco as well as health assessments and the use of the Fagerström test for nicotine dependence. The results of the focus group interviews were transcribed verbatim and were 14 days apart from one another. Results: The screening for unit of analysis resulted on two main themes; Theme 1: Behavioral and Psychological Factors Impacting Consumption and Theme 2: Consumption Patterns, Dependence, and Information. Increases in anxiety and stress levels were identified as a potential barrier to quit during the pandemic. Individuals in social isolation reported that the absence of social pressure was a facilitator to keep tobacco use and reduce motivation to quit. This shows the pressures that contribute to nicotine usage during COVID-19. Conclusion: Discrepancies on consumption patterns were observed. Social isolation, awareness of nicotine usage, changes in routine, and absence of social pressure contributed to increase or no change in tobacco usage during COVID-19.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: COVID-19, Smoking, Pandemic

Community Supported Agriculture in Kittitas County, Washington

Lupita Silva

Project Mentor(s): Dr. Nicole Stendell-Hollis, Dr. Tafere Belay

Kittitas County residents experience higher rates of food insecurity, limited access to healthy foods, and are more likely to live in food deserts when compared to other Washington state residents. As a result, Medicaid patients in Kittitas County may be at greater risk of poor health outcomes, including more physical health issues and frequent physical distress. The purpose of this study is to evaluate whether a Produce Rx program in Kittitas County can enhance overall health, decrease healthcare utilization and costs, and improve nutrition self-efficacy for Medicaid patients with diet-related health conditions. In this collaborative three-year project, participants receive weekly boxes of fruits and vegetables (FVs) from Community Supported Agriculture (CSA) partnerships at a local food bank, along with nutrition education such as weekly newsletters, monthly skill sheets regarding the preparation of FVs, quarterly cooking demonstrations, and monthly tastings of FVs. As part of the research project, I collaborate with community partners composed of stakeholders from different areas of the food and healthcare systems to ensure proper analysis and evaluation of the research's ongoing findings. Expected results include improvement in FV consumption and nutrition self-efficacy, ultimately leading to better health outcomes. Results could help inform health providers and policymakers about food and nutrition interventions for the prevention, management, and treatment of disease in rural communities.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Nutrition, Public Health

Body Mass Index is a Poor Prognostic Factor for Function in Individuals with Plantar Fasciopathy: A Longitudinal Observational Study

Rhodes Van Houten, Fernanda Colen Milagres Brandão, Daniel Barreto Rabelo, Sabrina Oliveira Melo, Mario Efraín Recinos Mastahinich, Roberto Zambelli, Thales Souza, Rafael Zambelli

Project Mentor(s): Ana Paula Freire

Plantar fasciopathy (PF) is a condition characterized by pain and tenderness of the calcaneal region. Higher body mass index (BMI) has been observed as a potential risk factor for developing the condition due to increased mechanical load on the plantar fascia. The aims of this study are to investigate if BMI influences the performance of clinical tests and clinical presentation of individuals with PF, and to determine whether BMI and clinical tests predicts the clinical course of PF over a 3-month follow-up period. 52 individuals with PF were grouped according to the median BMI, into low and high BMI. Participants showed a mean age of 49.4 ± 12.0 years, and a mean BMI of 28.1 ± 4.5 kg/m2. At initial assessment, demographic and anthropometric data were collected. Pain intensity and function were measured at baseline and at the 3-month follow-up via Ankle dorsiflexion Range of Motion (ROM), Navicular Drop Test, Heel Rise Test, and Step-Down Test. We found that the low BMI group showed better function (Mean Difference (MD) = 11.8; 95%CI: 1.9; 2.16) and lower pain intensity (MD = -1.5; 95%CI: -2.6; -0.3) than the high BMI group. In the multivariable regression model, higher BMI predicted lower function (Beta coefficient = -1.20; 95%CI: -2.3 to -0.3). Individuals with PF with higher BMI reported higher pain and lower function compared to those with lower BMI. Although BMI was found to influence PF clinical presentation, it was considered a poor prognostic factor for function in individuals with PF.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Plantar Fasciopathy, Body Mass Index, Clinical Function, Clinical Outcomes

Investigation of the Relationship Between Ultrasound-Derived Measure of Liver Composition, Body Composition, and Fuel Utilization During Submaximal Exercise

Rhodes Van Houten
Project Mentor(s): Sarah Oppelt, Jared Dickinson

Metabolic Associated Fatty Liver Disease (MAFLD) refers to liver conditions characterized by increased hepatic steatosis in conjunction with metabolic syndromes such as insulin resistance, obesity, and type II diabetes. The most common treatment for MAFLD is weight loss, diet, and exercise, however little is known about how increased liver fat composition impacts physiological responses to exercise, particularly regarding fat oxidation during fasted exercise. We aim to gather preliminary data analyzing the relationship between liver composition, body composition, and fuel utilization during exercise. Participants were recruited from the Ellensburg community and underwent body composition analysis, liver ultrasound, and a submaximal-graded exercise test. Body composition analyses were performed using a bioelectrical impedance analysis (BIA) device, and total body fat mass and percentage, trunk fat percentage, lean body mass, BMI, height, and weight were recorded. Liver ultrasound images were evaluated for echogenicity obtained using ImageJ software. Elevated echogenicity values indicate abnormal liver composition, including adipose tissue accumulation and scarring. Participants cycled on a stationary cycle ergometer for 5 minutes at intensities corresponding to 55%, 70%, and 85% of their maximal heart rate (220 - age), with 3-minute low-intensity intervals between each stage. Respiratory Exchange Ratio (RER) values were recorded during the exercise test to assess fat oxidation rates. Preliminary data analysis is still in progress, however, initial data show varying results based on several factors, including body composition, training status, sex, and liver echogenicity. This project is ongoing and further data will be collected to continue analyzing this relationship.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Liver, Exercise, Health, Body Composition, Ultrasound, Bike, MAFLD, NAFLD

Impact of Diet Culture Exposure on Disordered Eating Behaviors in College Students

Laura Vanderlinde Padgett
Project Mentor(s): Ethan Bergman, Katy Williams, Timothy Englund

Eating Disorders impact people worldwide at increasing rates and are a contemporary public health issue in the United States. The purpose of this study was to understand if exposure to diet culture impacts disordered eating behaviors in college students. A cross sectional study was conducted of adults aged 18 and older that were currently enrolled in at least one college level course during the period of August 2023 to December 2023. Utilizing the platform Qualtrics, an anonymous survey was created and distributed via online and in-person sources. Researchers created 5 survey questions aimed at collecting data on the familiarity and exposure of diet culture. Along with these questions, the EAT-26 questionnaire was utilized in the survey to determine a participant's disordered eating behaviors and need for referral to a treatment professional. A total of 199 completed responses were recorded and utilized. Of this total, the majority were aged 18-29 (85.4%), Women (71.9%), and White (70.9%). While this is not a representative sample of the general population, it is comparable to many United States colleges. Preliminary analysis showed that 48.7% of respondents meet the EAT-26 qualifications for a referral to eating disorder professionals.

Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Disordered eating, Diet culture, Exposure, Referral, Diet, Eating Disorder

Factors Associated With the Prevalence of Iron Deficiency and Anemia in Women of Reproductive Age in the U.S.: NHANES 2015-2020

Catherine Wise
Project Mentor(s): Tafere Belay, David Gee, Nicole Stendell-Hollis

Iron deficiency is recognized as the most prevalent nutrient insufficiency and a leading cause of anemia, particularly affecting women of reproductive age (WRA), aged 15-49. The heightened iron demands during this life stage contribute to their increased vulnerability to iron deficiency. This study aimed to assess the prevalence of iron deficiency and anemia among WRA in the United States, while also analyzing associated factors. Utilizing data from the 2015-2020 National Health and Nutrition Examination Survey (NHANES), the research employed ferritin as an iron marker for evaluating deficiency and hemoglobin concentration for assessing anemia. The sample, consisting of 5,592 nonpregnant WRA, revealed a prevalence of 13.1% for iron deficiency and 14.3% for anemia, with an average hemoglobin concentration of 13.3 g/dL. Statistical analyses, including multivariate linear and logistic regression models, independent t-tests, and chi-square tests, explored the relationships between anemia and demographic, socioeconomic, and health factors. The study identified significant associations between ferritin, transferrin receptor (TfR), and hemoglobin concentration ($p < 0.0001$). Notably, differences in means for ferritin, TfR, C-reactive protein, serum folate, and serum zinc were observed between those with or without anemia ($p < 0.05$). Chi-square analysis further emphasized significant links between anemia and dietary intake of vitamin B12, zinc, copper, and selenium ($p < 0.05$). These findings underscore the persistent prevalence of iron deficiency and anemia among WRA in the United States, emphasizing the importance of investigating underlying mechanisms and assessing the status of additional micronutrients to inform comprehensive treatment and nutrition counseling strategies.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Iron Deficiency, Anemia, Women of Reproductive Age, NHANES

Bone Stress Injuries, Risk of Low Energy Availability, Disordered Eating, Training Volume and Exercise Dependence in Female Trail Runners

Saleen Zarate, Kelly Pritchett, Keely Henninger, Robert Pritchett, Namrita Kumar Brooke
Project Mentor(s): Kelly Pritchett, Robert Pritchett

INTRODUCTION: Problematic Low Energy Availability (LEA) can lead to Relative Energy Deficiency in Sport (REDs) which results in negative health outcomes such as impaired bone health. Trail runners may engage in a higher volume of training and may be at risk for LEA, MD, DE, and EXD which may further increase the risk for SF. PURPOSE: This study aimed investigated: 1) the prevalence of reported stress fractures (SFs) in competitive and recreational female trail runners, and 2) risk of LEA, exercise dependence (EXD), training volume, menstrual dysfunction (MD), and risk of disordered eating (DE) between female trail runners with a history of ≤ 1 SF and ≥ 2 SF. METHODS: Female competitive and recreational trail runners completed an online survey that included the Exercise Dependence Scale- 21 and Low Energy Availability in Females Questionnaire. RESULTS: 1,410 female trail runners, competitive (n= 603) and recreational (n=807), were grouped by self-reported ≤ 1SF (n=1245) and ≥ 2 (n=165) SF. In this study, 29 % reported a lifetime SF prevalence. Among runners who reported > 2 SF had an increased risk of LEA, EXD, DE, and MD compared to runners who reported ≤ 1 SF. CONCLUSION: Female trail runners with a reported history of > 2 SF were more likely to be at risk for DE and LEA based on the DESA-6 and LEAF-Q. Athletes that scored higher on the EDS-21 scale had a greater likelihood of reporting > 2 SF.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Stress Fracture, Relative Energy Deficiency in Sports

Information Technology and Administrative Management

Space Junk Issue & the Future of Sustainability in Space Operations

Lester Dunn
Project Mentor(s): Hideki Takei

The rapid growth in space exploration, fueled by scientific, commercial, and military ventures, has heightened concerns about space debris and its long-term impacts. With increased rocket launches and satellite deployments, the accumulation of space debris presents challenges for sustainability and safety in space operations. Despite significant investments in space endeavors, there is a lack of consideration for the responsible management and disposal of debris, prompting the need for sustainable practices. Efforts to recycle and reuse assets, along with reevaluating current disposal methods, are essential for mitigating risks and ensuring the viability of future missions. Space debris encompasses discarded spacecraft components, abandoned satellites, and leftover parts, posing environmental and operational hazards. Recognizing the importance of accountability and responsibility in space activities, research is underway to assess existing sustainability practices and identify areas for improvement. By addressing the issue of space debris management, we can work towards a more sustainable and secure future in space exploration.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Space, Sustainability, LCA

futureForm: A Viability Study of Near Field Communication Tag Technology

Dylan Gilbert
Project Mentor(s): Deanna Marshall

This study delves into the potential of Near Field Communication (NFC) tags, specifically through the concept of futureForm, in diverse applications across various industries and mediums. By exploring scenarios such as NFC tags on CD cases linking to digital streaming services or on restaurant tables linking to menus, it aims to merge physical and digital experiences seamlessly. The study's objectives include assessing the current landscape of NFC technology, analyzing existing research to understand consumer preferences and usage patterns, evaluating challenges and opportunities associated with introducing futureForm, identifying successful NFC implementations, and providing a conclusive overview for stakeholders interested in leveraging futureForm. Through a thorough review of industry data and research, this study presents an innovative and forward-thinking approach to interacting with resources in the modern world.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Technological Advancement, Consumer Engagement, Viability Analysis

Ecophone: The Engineering Development and Business Plan to Bring Modular Smartphones to a New Market

Kevin Lomax, Jonah Milnor, Jaap Donker, Charles Pringle, Susan Rivera
Project Mentor(s): Susan Rivera, Charles Pringle

The most popular smartphone manufacturers use adhesives to seal their devices to achieve sufficient Ingress Protection (IP) ratings for dust and water resistance. The adhesive and other repairability concerns contribute to the planned obsolescence strategy prevalent in the smartphone market to drive sales in the US and EU. To combat the damaging nature of the smartphone market, the Ecophone team is working to create a modular smartphone using an aluminum housing sealed with a large rubber o-ring and screws to provide adhesive-free water resistance. A preliminary 3D design model was deemed successful in ensuring water resistance. With this successful test, the team will be using the Ingress Protection rating (IEC 60529) standard to measure water and dust resistance, including total submersion in a freshwater tank for 30 minutes at a depth of 1 meter, removing the model from the water, drying the outside of the device and opening to view any possible water leakage into the designated area to house internal components. We aim to use an intricate business plan targeting international markets such as India to enter the market as one of the first modular, long-lasting, sustainable smartphones. We also aim to be the first business to push a right-to-repair ideology, which is growing in popularity in the US, into these markets.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Business Strategy, Sustainability, Right-to-Repair, Engineering

Simplifying the HECVAT: A Supplier Risk Assessment for Higher Education Institutions

Melissa Lopez-Barbosa
Project Mentor(s): Dr. Robert Lupton, Jarad Schraeder

Imagine you're a vendor like Cybershield Inc. trying to work with CWU. This educational institution must ensure its vendors follow specific security and privacy rules. Ensuring vendor compliance with security and privacy rules is critical for safeguarding student data, legal adherence, risk mitigation, vendor accountability, and maintaining trust within the educational community. So, the educational institution uses a detailed 256 questionnaire called the Higher Education Community Vendor Assessment Toolkit (HECVAT). This study aims to simplify life for vendors and higher education institutions by streamlining this complicated and lengthy assessment process. This research initiative aims to streamline the assessment process, enhance security, and foster collaboration between educational institutions and vendors, ultimately facilitating a more efficient risk assessment process.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Cyber Attack, Cyber Risk, Data, Third Party, Threat, Vendor, Vulnerability

Integrating Agile Methodology Within ITAM Educational Paradigms: A Collaborative Endeavor

Niranjan Malla
Project Mentor(s): Dr. Laura Williams

Commencing on September 15, 2023, our scholarly initiative, spearheaded by Dr. Laura Williamson at Central Washington University, has sought to interweave the principles of Agile Methodology within the Information Technology and Administrative Management (ITAM) curriculum. This endeavor has strategically connected undergraduates with project management professionals, thus grounding theoretical knowledge in empirical, industry-centric practices. In a coordination with the Alumni Relations Coordinator, we embarked on an examination of the professional advancements of ITAM alumni. The insights gleaned from this inquiry laid the groundwork for a sequence of interactive events, designed to foster a dynamic interface between current students and ITAM graduates. These were instrumental in showcasing the practical applications of Agile precepts in the evolution of career trajectories within the technology and management sectors. Through events such as "Alumni Insights" and the "ITAM Project Management Employer Panel," we crafted dialogic stages for alumni to articulate the influential role of Agile Methodology in sculpting their professional landscapes. These dialogues illuminated the criticality of embodying agility and adaptability — core aspects of Agile philosophy — in securing and excelling within the professional realm. This scholastic and industry collaboration has been crucial in cultivating an educational environment that marries the Agile mindset with scholastic rigor. It underscores the imperative of continuous adaptation and iterative enhancement in preparing scholars for the multifaceted challenges of the contemporary workforce. Our commitment through this academic year has been to foster a seamless transition from scholastic pursuit to professional attainment, thus championing a legacy of educational distinction that aligns with the principle of Agile.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Agile Methodology, ITAM (Information Technology and Administrative Management), Educational Paradigms, Collaboration, Project Management, Alumni Engagement, Professional Advancement, Industry-Centric Practices, Dialogic Engagement, Adaptability, Career, Trajectories, Scholastic, Continuous Adaptation, Iterative, Enhancement, Professional Attainment

Empowering Libraries and Educators: Strategies for Effective Community-Based Interventions in Western Washington Communities

Neha Nigam
Project Mentor(s): Hideki Takei

This research explores strategies for empowering libraries and educators to combat misinformation in Western Washington communities. Through qualitative analysis, collaborative efforts among libraries, educational institutions, and community organizations emerge as crucial for effective intervention, despite challenges such as resource constraints, stakeholders demonstrate resilience and adaptability in addressing misinformation. Key strategies include tailored educational programs and promotion of critical information literacy. The findings underscore the importance of sustained collaboration, innovation, and resource allocation to foster community resilience and uphold information integrity. This research contributes valuable insights for researchers and librarians aiming to develop informed strategies for misinformation intervention and community empowerment in Western Washington.

Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Misinformation

Comparative Analysis of Affordability and Practicality: 3D Printing Technology vs. Traditional Methods in Housing Construction in the Greater Seattle Area

Rachana Thorsten
Project Mentor(s): Hideki Takei

In recent years, 3D printing technology has witnessed a remarkable surge in popularity within the housing construction sector, offering unprecedented potential to revolutionize traditional building methods and significantly reduce costs. While 3D printing technology has gained global traction, particularly spearheaded by states like Texas, its potential application in addressing the affordability crisis in the Greater Seattle area, characterized by escalating housing prices, raises pertinent questions regarding its feasibility and effectiveness in providing accessible housing options for residents. In this research, our objective is to evaluate the affordability of housing construction using 3D printing methods in comparison to traditional methods. We will conduct a comparative analysis to determine whether the two approaches have a significant difference in affordability. Our null hypothesis (Ho) posits that there is no substantial disparity in affordability between 3D printing technology and traditional methods in housing construction. Conversely, our alternative hypothesis (Ha) suggests that 3D printing technology offers a more cost-effective solution compared to traditional methods. In addition to conducting a comparative analysis between 3D printing and traditional methods in housing construction, with a focus on affordability, our research will encompass an assessment of criteria impacting the suitability of housing construction methods. Through hypothesis testing, our study aims to shed light on the feasibility of integrating 3D printing technology to mitigate affordability challenges in housing construction, particularly within the Greater Seattle area.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: 3D Printing House Technology, Construction, Affordable Housing, Practicality, Greater Seattle Area

Sport and Movement Studies

Storytelling Through Movement: Using Repetition as a Tool

Emily Evans, Gabrielle Edmonds, Brigid Garrett*, Olivia Krause*, Madi Miller*, Isaac Olson*, Alison Prekeges*, Emma Slowe*, Kieran Smythe*, Emma Tolmich*, Hannah Townley*, Anna Ward*, Aislinn Williamson*, Hope Worth*, Drew Carter (Lighting Designer)*

Project Mentor(s): Gabrielle McNeillie, McKenzie Baird

Dance has a profound way of connecting with an audience without words. Thus, choreographers rely on the emotions subconsciously perceived through specific physical movements to develop a clear narrative for an audience to follow. For this project, the choreography's purpose was to show self-doubt's ability to take over our lives and isolate us, as well as the journey an individual may take to move past their fears and go after what they truly want in life. This dance piece started with the creation of a short movement phrase to represent doubt that travels across the body from the hand down into the leg. This phrase includes sharp, frantic movements contained close to the body that were then modified and repeated throughout the piece, representing the constant place negative self-talk can have in our lives. In contrast, another short phrase was built to represent hope. These movements were much more lifted, with broader motions that take up space, showing that the dancer's character is no longer holding themselves back. The choreography also utilizes diagonal lines to physically represent the push and pull between these zones of comfort and discomfort. This project signifies the importance of storytelling through art, and how both the choreographer and audience members can find personally impactful connections to the piece. This work was presented in the Orchesis Dance Company's spring performance in April.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Dance, Choreography, Performing Arts, Creative Expression

Would You Do It All Again?

Hannah Townley, Sophie Blasingim, Livi Buck*, Emily Evans*, Emma Slowe*, Kieran Smythe*, Emma Tolmich*, Anna Ward*, Hope Worth**

Project Mentor(s): Gabrielle McNeillie

This dance was choreographed in fall 2023 titled, Would You Do It All Again? This piece was performed at the Northwest American College Dance Conference in Ogden, Utah and was chosen to be a part of their gala selections. This work is about how we often live with regret despite trying to move past it. Regret can come in many forms and affects our bodies and how we move. My choreography was created with how each of my dancers moved in mind, and then how to make the movement feel original but powerful. In order to do this, I incorporated several motifs of the dancers looking back and then staring at their hands. This motif is incorporated in order to show the audience that they are thinking about missing something or regretting a decision made. This work was performed in front of a panel of experts in the field of dance who provided individual feedback to each choreographer. Throughout the rehearsal process I worked with the performers to create varied movements and to talk about the theme of the piece. Every rehearsal I had, I made sure to focus on making each movement look clean and clear, while also trying to make sure that everyone knew that they were confident in the piece individually.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Dance

*Performers/Dancers

College of the Sciences

The College of the Sciences has presentations from the following departments and programs:

- Anthropology
- Biological Sciences
- Chemistry
- Computer Science
- Craft Brewing
- Cultural and Environmental Resource Management
- Environmental Studies
- Geography
- Geological Sciences
- Interdisciplinary Studies – Social Sciences
- Law and Justice
- Mathematics
- Physics
- Political Science
- Primate Behavior and Ecology
- Psychology
- Science and Mathematics Education
- Sociology

Anthropology

How does the 'Tourist Gaze' Impact Cultural Landscapes in Roslyn Washington: A Case Study of the Roslyn Café Mural

Elise Bingay

Project Mentor(s): Hope Amason

This research is focused on public art interpretation in touristic contexts, with a specific focus on the Roslyn Café Mural in Roslyn, Washington. Roslyn, a coal-mining town founded in the late 19th century, has become a popular location for tourists, who enjoy recreational activities as well as learning about the community's history and culture. The mural, which was featured on a popular 1990s television show, is part of this tourism landscape and is a key attraction. However, some Roslyn residents express feelings that the tourism industry speaks for—not with—them (Hamblen, 2019). Drawing from the theory of the "tourist gaze," this study uses ethnographic methods to understand how tourists create narratives of place and community through engagement with iconic touristic locations, in this case, the mural (Urry, 2002). In addition to ethnographic work, this study will also use content analysis to consider another critical site of touristic storytelling, the social media landscape. While the mural may be an important site for tourists, it is not clear whether they walk away with an understanding of the history and culture of the community. This study will provide insight into this question and lay the groundwork for future interpretive planning.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Culture, Tourism, Media, Pop Culture, Roslyn

Investigating the Spatial Displacement and Accrued Damage of Modern Ceramic Artifacts: A Trampling Experiment

Kariann Jimenez, Debra Dunning

Project Mentor(s): Pat Lubinski

To better understand how artifacts move and are damaged with trampling in different site sediments, we conducted an experiment with four different sediments: 1 ½" washed river rock, 5/8" chipped gravel, sand, and topsoil. These samples revealed the patterns of movement and damage caused by trampling from different particle sizes, with the idea that more extreme differences in particle sizes may show patterns that might take longer to emerge with finer, more uniform sediments. Each sediment was placed into a 55 x 65 cm tub where twelve 6 x 5.5 x 0.5 cm ceramic tiles, mimicking artifacts, were placed in a 3 x 4 grid at the top of each sediment. The samples were then trampled in random patterns with varying intensity for 60 minutes. After trampling, the horizontal and vertical artifact displacement was mapped, and estimated damage was quantified by counting scratches and noting any chips that occurred on the tiles. We found that sediments with larger particle sizes tended to cause the most overall damage to the artifacts. For example, tiles from the chipped gravel sample averaged 131 scratches, while tiles from the topsoil sample had little to none. The sediments with larger particle sizes also allowed for more horizontal movement but no discernible vertical movement. The most movement was noted in the sand and topsoil samples, which averaged 7.6 cm horizontal and 7.3 cm vertical displacement per tile. These results have implications for how artifacts might move and become damaged in various sedimentary environments.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Trampling, Artifact, Damage, Displacement, Sediments, Experimental Archaeology, Geoarchaeology

Conducting an Undergraduate Ethnography in Collaboration With an American Indian Community

Shane Turntoes-Kuhnhenn
Project Mentor(s): Steven Hackenberger

Collaborative research with American Indian communities creates unique opportunities for two-way education by sharing the different perspectives of researchers and participants. First-time ethnographic researchers may be underequipped in conducting collaborative studies among American Indian communities, and this can lead to unintentional harm by expropriating knowledge. To promote ethical awareness, I critically analyze my experiences and ask, “What variables can be controlled by an outside researcher to minimize risks and maximize the benefits for the participant community?” To understand the perspective of an undergraduate researcher, I critically analyzed my research plan and proposal and compared it to my expectations for my experience and then my results. The research objectives and methods changed as there existed a fundamental divide between what I expected of research as an academic and what the participant community wished to provide. I can now better understand both the insider family perspective as well as my outsider scholar perspective as these changed during three-weeks of field research. During my participation an uncertainty grew regarding my role as an observer and data collector, as part of a family I became more culturally aware of community privacy and confidentiality. My thoughts on this experience will help other new students (especially American Indian students) by encouraging new students to temper their academic interests by approaching a community as an active collaborator/participant rather than as a research subject.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Ethnography, Anthropology, Indigenous, Student Resource

Biological Sciences

Relative Abundance and Movement of Deer Mice and Squirrel Species in a Wildlife Undercrossing Compared With Adjacent Forest Near Snoqualmie Pass

Ivan Beck
Project Mentor(s): Kristina Ernest

Highways are a common sight in the world today, but they cause habitat segmentation for animal species. As shown by numerous studies, road-driven loss of connectivity causes population fragmentation in local species. Wildlife crossing structures have become a common method to mend road driven loss of connectivity. The I-90 Snoqualmie Pass East project in Washington State is a conservation project focused on restoring connectivity between the forest separated by I-90. In the summer of 2023, I helped collect data on small mammal movement at an undercrossing and in the surrounding forest. We used live-trapping to capture animals and recorded GPS coordinates of the trap locations to track animal movement geospatially. The objective of my observational study is to define differences in movement, species richness, and species abundance based on location. Based on preliminary graphical analysis of the data, there was a distinctive difference in relative abundance of squirrel species and deer mice species between the forest, median, and undercrossing. An analysis of these data shows that there is movement between the forest and crossing structure. I assessed wildlife crossing structure use by comparing the number of individuals caught per 100 trap-nights. For deer mice, the undercrossing had the highest number of captures (66 per 100 trap-nights), compared with the forest (42) and median (40). For squirrel species, the data showed a distinctive difference between the forest, median, and undercrossing. These analyses can help provide a better understanding of deer mice and ground squirrel populations and their interactions with crossing structures.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Conservation, I-90 Project, Small Mammals, Deer Mice, Squirrels, Biology, Wildlife Crossing Structures

Genetic Mechanisms of PFAS Tolerance: A Genomic Library Approach

Cindy Y. Castro Murcia, Dharshana Lakshminarayanan, Jill Zeilstra-Ryalls, Gabrielle A. Stryker
Project Mentor(s): Gabrielle Stryker, Jill Zeilstra-Ryalls

Per- and poly-fluoroalkyl substances (PFAS) are fluorinated synthetic chemicals whose properties make them useful in a variety of applications such as fabric treatments that make them stain- and water-resistant, fire-fighting foams, and electronics. PFAS are bio-accumulative and persist in the environment. Multiple studies strongly suggest that these chemicals have adverse effects on both human health and the environment. Our research is directed toward identifying cellular and molecular targets of PFAS toxicity. We have isolated *Salmonella enterica* serovar Typhimurium (Ames strain) mutants that are resistant to PFOA, a PFAS chemical. Our aim is to construct a genomic library to identify which gene or genes are altered in these mutants, and are therefore responsible for increased resistance to PFAS. We have isolated genomic and plasmid DNA towards this goal. I am working to optimize the protocol that will be used to move, or transform the genomic library into *S.* Typhimurium using both chemical and electroporation techniques. Following successful transformation, the bacteria will be screened to identify the mutant gene or genes by plating the cells on media with 1mM PFOA, a concentration of PFOA that the PFAS-resistant mutant bacteria can grow on, the wild type *S.* Typhimurium cannot. Positive clones will be sequenced, and a BLAST search will be used to identify gene or genes that confer resistance.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Genomic Library, PFAS, Gene, Chemical, Toxicity, Electroporation, Plasmid DNA

Abnormal Embryonic Development in Sea Urchins Induced by DAP Exposure

Cindy Y. Castro Murcia, Cassius Long, April Binder
Project Mentor(s): April Binder

Phthalates, also called plasticizers, are a group of chemicals whose properties make them useful in a variety of ways such as providing durability for plastics. This makes phthalates a chemical that are in high demand, with packaging, children's toys, pharmaceuticals, and food products being just a few ways phthalates are utilized. Within the last decade, phthalates have been seen to be bio-accumulative and persistent in the environment through leaching. Phthalates have adverse effects on human health and the environment that were identified in recent studies as endocrine disruptors that may induce abnormal embryonic development. This study focuses on diallyl phthalate (DAP), a phthalate ester, commonly used as a plasticizer. DAP has been shown to be an endocrine disruptor as they reduce the expression of mRNA which results in a decreased expression of steroidogenic genes in model organisms such as rats, dogs, and sea urchins. Our research is directed toward identifying the harmful effects of DAP in embryonic development in sea urchins at different timepoints. Sea urchin fertilization is external and exposure to phthalates can occur before, during, and after fertilization. Our aim was to identify whether the concentration of DAP or exposure periods were contributing factors to abnormal embryonic development. At 22 hours post-fertilization we were able to observe fused pre-oral arms, delayed and abnormal development, and decreased fertilization rates which suggests that exposure to high doses of DAP can lead to detrimental embryonic development.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Exposure, Phthalate, Fertilization, Embryonic Development, DAP, Sea Urchin, Chemicals, Plastics, Abnormal, Environment, Harmful

Freshwater Mussels: Shaping Stream Nutrient Pathways and Food Web Resiliency

Taylor Crews
Project Mentor(s): Clay Arango

Globally freshwater mussels are declining, with over 75% of North American species listed as endangered, threatened, or of special concern. Although freshwater mussels likely exert important stream food web control via nutrient transformations associated with their feeding, they remain under-studied in the Pacific Northwest (PNW), which precludes their consideration during stream restoration activities. In general, mussels filter organic matter and deposit usable biosolids to benthic habitats, enhancing the base of the food web for other consumers. My thesis will use a three-part approach to analyze western freshwater mussel contribution to stream food webs. In part one, I will conduct lab experiments to quantify how size and temperature affect freshwater mussel feeding, nutrient excretion, and biosolid deposition rates using the three species extant in our region. These results will quantify how efficiently mussels clear the water column and contribute nutrients and biosolids to streams that can stimulate stream food web productivity for other species. In part two, I will perform field experiments to quantify whole-stream nutrient uptake at different temperatures and stream flow conditions. Finally, I will compile a numeric model that synthesizes lab and field experiments to estimate how mussels satisfy whole-stream nutrient demand at different temperatures and stream flows. My research is novel in assessing how western species contribute to stream ecosystem function. These data will help quantify the contribution of freshwater mussels to ecosystem processes so we can prioritize a more holistic approach in stream restoration.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Freshwater Mussels, Nutrient Cycling, Food Webs, Stream Ecology, Physiology

Investigating the Effects of Glyphosate on Diabetes: An NHANES Study

Trevor Fingerle
Project Mentor(s): David Gee, PhD

Glyphosate is a widely used herbicide, and concerns have been raised about its potential impact on human health, including its carcinogenic effects and possible association with diabetes. This study aimed to see if an association exists between glyphosate concentrations found in the urine and diabetes using NHANES data from cycle years 2013-2018. 4,448 adults with a urinary glyphosate concentration were included in the analysis. Using SAS, the dataset was divided into quartiles based on the proportion of urinary glyphosate to creatinine concentrations and statistical test were performed. In this study 9.1% of individuals had diabetes, 24.6% had pre-diabetes, and 66.3% did not have diabetes. The analysis revealed that there was a statistically significant association between high glyphosate exposure and diabetes. The simple logistic regression analysis revealed that those in the top quartile glyphosate exposure had double the odds for diabetes when compared to the bottom quartile glyphosate ($p < .001$). The multivariable logistic regression analysis, after adjusting for BMI, race/ethnicity, and age, the odds for diabetes was 1.9 times greater in the top quartile than the bottom quartile of glyphosate exposure ($p < 0.001$). The results of this NHANES-based investigation supported the hypothesis of an association between urinary glyphosate concentrations and diabetes prevalence. While concerns about glyphosate's potential health effects persist, particularly in the context of its widespread use, this study's findings contribute to the growing body of research suggesting that a strong relationship between glyphosate exposure and diabetes may exist.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Diabetes, Glyphosate, Round-Up, Agriculture, Toxicology, Epidemiology

Exposure to High Fructose, but Not High Glucose, Decreases Mitochondrial Function and May Alter Neural Function in the Dopaminergic Neural Cell Line, Neuro2A

Catherine Ghigleri
Project Mentor(s): Sarah Oppelt

Over the last 50 years, the amount of fructose consumed in the Western diet has greatly increased, and in tandem, so have the health complications that come from a high fructose diet, such as insulin resistance, type II diabetes, and systemic inflammation. It is increasingly recognized that insulin resistance and inflammation in the brain lead to cognitive impairment, dysfunction in metabolic pathways, and increase the risk of developing Alzheimer's disease (AD). In AD, dopaminergic neurons of the hippocampus have dysfunctional mitochondria and increased inflammation in the hippocampus. The hippocampus is one of the brain regions that express enzymes that metabolize fructose, however, whether fructose metabolism alone can induce metabolic stress that increases inflammation in dopaminergic neurons is still unknown. Dopamine production, transport, and release are essential for cognitive function and the enzyme TH produces dopamine from tyrosine. This project will use a cell model of dopaminergic cells, N2A cells, to assess the effects of fructose on mitochondria function, energy production, neuron function, and synapse formation by growing N2A cells in media containing differing concentrations of glucose and fructose. Energy production and mitochondrial function will be measured by quantifying ATP concentration and oxygen consumption. Neuron function will be measured by quantifying Tyrosine Hydroxylase expression, and synapse formation will be assessed with fluorescent microscopy to look at cell morphology and the density of neurites. Taken together, these results will help increase understanding of fructose metabolism by neurons and the significance of its role in developing metabolic stress in the hippocampus.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Neuroscience, Metabolism, N2A, Fructose

Evaluation of Synthesized Organic Compounds For Leishmanicidal Activity Against Leishmania Major, The Causative Agent of Cutaneous Leishmaniasis in Humans

Jaci Johnson
Project Mentor(s): Blaise Dondji

Leishmaniasis is a disease caused by single celled protozoan Leishmania. This prevalent parasitic disease is estimated to have 12 million infected individuals across 88 countries. The disease is endemic in Africa, India, the Middle East, Southern Europe and the Americas. There are recent reports of cases in Arizona, Texas and other parts of the US. Of note, many of these cases had not traveled out of the country. The disease is transmitted to the vertebrate host by the female sandfly. High toxicity and cost of the current drugs used for the treatment of leishmaniasis have been reported. Of those, the only FDA approved therapeutic is Amphotericin B which is also known for its negative side effects. Consequently, a better drug is needed. Our project is screening compounds synthesized at CWU Department of Chemistry to evaluate their antileishmanial properties. We will be using a colorimetric assay with Alamar blue to assess activity of our test compounds. The dye turns from red to blue when cells die, so wells with compounds that are active will appear more blue than red after incubation and exhibit higher optical density from a spectrophotometer. All the compounds that will show leishmanicidal activities will further be tested for their toxicity against mammalian cells.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Leishmaniasis, Parasitic Disease, Drug Testing

Genetic Insights into PFAS Toxicity: Unraveling Mechanisms

Dharshana Lakshminarayanan, Cindy Y. Castro Murcia, Jill Zeilstra-Ryalls, Gabrielle A. Stryker
Project Mentor(s): Gabrielle Stryker, Jill Zeilstra-Ryalls

Per- and poly-fluoroalkyl substances (PFAS) are synthetic organic compounds that are essential in many manufacturing processes due to their resistance to oil and water. PFAS chemicals have been used for over 80 years and they persist in the environment; hence, they have been named “forever chemicals.” Epidemiological evidence suggests human exposure to PFAS leads to adverse health outcomes ranging from endocrine dysfunction to carcinogenesis. Despite substantial evidence correlating PFAS exposure with these detrimental health risks, the mechanistic basis of PFAS toxicity remains largely unknown. Understanding the processes of PFAS toxicity is paramount towards developing treatments or safer PFAS alternatives. Our research uses the bacterium *Salmonella enterica* serovar Typhimurium (Ames strain), a strain modified to increase the frequency of occurrence of mutations. We have exposed these bacteria to the PFAS chemical PFOA and isolated two mutants that grow in the presence of high PFAS concentrations. We characterized their ability to grow in the presence of varying concentrations of PFOA, as well as to another PFAS chemical, GenX. Both mutants exhibited growth in high PFAS concentrations that entirely suppressed growth of the wild type strain, with differences in tolerance levels indicating they harbor unique mutations contributing to their resistance. We are working to identify these mutations through creation and screening of genomic libraries. In this way, we aim to identify genes whose products are targets of PFAS toxicity in *S.* Typhimurium. Considering many bacterial gene products have human homologs, our findings hold potential insights of PFAS toxicity observed in other organisms.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: PFAS (Per- and poly-fluoroalkyl substances), Synthetic Organic Compounds, Forever Chemicals, Genomic Libraries, Salmonella, Toxicity

Effects of Wildfires on Pygmy Short-Horned Lizards

Ellie Leatherman
Project Mentor(s): Daniel Beck

Wildfires have been increasing in frequency and severity in Washington state due to climate change and the introduction of invasive weeds. This has impacted the shrub-steppe habitat, reducing the amount of native sagebrush while increasing invasive cheatgrass. Habitat alteration could impact reptiles and other species of ectotherms that rely on the thermal landscape of their environment to regulate their body temperatures. Pygmy Short Horned Lizards use native shrubs to thermoregulate throughout the day, making them sensitive to structural and thermal changes to the shrub steppe. I hypothesized that Pygmy Short-horned Lizard populations will be affected by changes in vegetation composition, microhabitat temperatures, and associated opportunities for thermoregulation.12 pairs of transects, 10 m long, were compared between burned and unburned sites to determine changes in vegetation composition. Temperature data loggers were deployed at 3 different levels to monitor air, surface, and underground temperatures at burned and unburned sites. The Pygmy Short-horned Lizards temperature preference range was recorded in the laboratory using a thermal gradient enclosure, by recording their body temperature every 2 hours between 8am and 8pm. Vegetation composition was significantly different between burned and unburned sites, with more invasive grass and less shrubs being at the burned sites. Lizard abundance was significantly reduced at burned sites as well. The temperatures at burned sites often exceeded the thermal preference range of the lizard. By understanding how fire has altered thermal refugia for Pygmy Short-horned Lizards, conservation efforts cannot only be made for this species, but for the whole shrub steppe habitat.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Ecology, Wildfires, Reptiles, Shrub-Steppe, Pygmy Short-Horned Lizard

Passive Acoustic Monitoring Reveals Avian Distribution Patterns in a Post-Fire Landscape

Jennifer Lewis
Project Mentor(s): Alison Scoville

Coniferous forests of the Pacific Northwest are expected to see an increase in fire intensity and season length due to the compounding effects of climate change and forest management practices. In August 2021, the Schneider Springs fire burned 113,689 acres in the Okanogan-Wenatchee National Forest, Washington. Within the affected area, our study focused on the subalpine ecosystem, which supports species of conservation interest such as the whitebark pine (*Pinus albicaulis*) and its primary seed disperser the Clark's nutcracker (*Nucifraga columbiana*). In September 2022, we deployed autonomous recording units (ARUs) at twelve sites classified as severely burned, moderately burned, or unburned. The resulting recordings were used to compare avian species composition across the post-fire landscape. We manually searched the recordings in Raven Pro 1.6.5 to find and identify bird vocalizations and compared results with BirdNET V2.4. Our results suggest expected patterns: excavating birds like hairy woodpeckers (*Dryobates villosus*) appear most often in severely burned areas, and Clark's nutcrackers were more likely to be detected in unburned forest. This study demonstrates the importance of the habitat mosaic created by fire and highlights the usefulness of passive acoustic monitoring for assessing biodiversity patterns in various habitats.

Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Ecology, Fire, Wildlife Biology, Birds

Characterization of Collagen as a Biological Marker With Progressive Liver Disease in a Mouse Model

Casey Patrick
Project Mentor(s): Sarah Oppelt

Currently, roughly 100 million people in America have the condition Non-Alcoholic Fatty Liver Disease (NAFLD), and the prevalence of NAFLD is increasing. NAFLD is defined by increased fat content within the liver and is often seen in patients that are also increasingly susceptible to cardiovascular disease, type 2 diabetes, and liver cancer. While increased fibrosis is associated with advanced liver disease in human patients, the need to find consistent and viable biological markers to indicate progression of liver disease becomes more every day. NAFLD is caused by the buildup of fat and scar tissue, and normally presents with other metabolic comorbidities, like insulin resistance, type 2 diabetes, hyperlipidemia, or overweight/obesity. Additionally, diagnosis can be difficult due to lack of understanding of what biological factors drive the progression of NAFLD. Present day biological markers are invasive, expensive, and oftentimes are not diagnosed until NAFLD has progressed to irreversible damage. With prior knowledge relating the connection between the liver and the spleen, we aim to investigate the importance of this connection as a biological marker in the progression of NAFLD.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Biology, Liver Disease, Collagen, Scar Tissue

Patterns of Clark's nutcracker (*Nucrifraga columbiana*) Occupancy in a Post-Fire Whitebark pine (*Pinus albicaulis*) Ecosystem

Ashley Sacco, Dr. Alison Scoville, Taza Schaming
Project Mentor(s): Dr. Alison Scoville, Dr. Jason Irwin, Dr. Megan Walsh

Whitebark pine is a foundational subalpine species that provides habitat structure, snowpack retention, and nutrient-rich seeds that are consumed by numerous species. Whitebark pine and Clark's nutcrackers have evolved a mutualistic relationship that sustains the whitebark pine ecosystem. Whitebark pine seeds are a primary food source for nutcrackers and likely critical for successful breeding. In turn, whitebark pine relies nearly exclusively on nutcrackers to disperse its wingless seeds. Whitebark pine is declining throughout most of its range due to multiple interrelated threats, including disease, infestations, climate change, and wildfire. Climate change has influenced the fire regime within subalpine habitats and consequently the frequency and severity of wildfires in these areas have increased. Nutcrackers are crucial in dispersing whitebark pine into post-fire habitats, yet our understanding of their response to fire disturbance remains limited. Preliminary results from a pilot study in Washington's North Cascades suggest that nutcrackers are more likely to be active in unburned stands compared with severely burned stands but are present in both. Furthermore, detection probability varied within each burn category, suggesting the influence of additional, unmeasured habitat variables. If nutcrackers regularly occupy and cache seeds in recent fire footprints, there is potential for natural regeneration to sustain whitebark pine. My thesis will add detailed habitat data within two fire footprints to assess the degree to which habitat variables predict nutcracker occupancy and to which areas require human intervention to recover whitebark pine.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Whitebark Pine, Clark's Nutcracker, Mutualism, Wildfire, Restoration

The Innerworkings of Renal Structures: Fused Supernumerary Kidneys

Hermela Tsegaye
Project Mentor(s): Celine Cortes

The kidney is a bean-shaped organ housed in the abdominal cavity. Its primary functions include filtering blood, maintaining electrolyte balance, and hormone production. Filtration helps carry waste from the body through urine, which is transported to the urinary bladder via a ureter. Abnormalities in kidney anatomy have been shown to impact function. These include the presence of developmentally distinct supernumerary kidneys, which may or may not fuse. Supernumerary kidneys may also be associated with ureteral variations or even duplications. A 71-year-old female cadaver used in university anatomy and physiology courses was analyzed. Cause of death was ovarian cancer, and the donor had a hysterectomy. Additional medical information was limited due to patient privacy. Anterior abdominal muscles were reflected to view the kidneys and ureters within the abdominopelvic cavity. Duplicate ureters were found associated with the left kidney, and this kidney was abnormally shaped and relatively larger. Coronal cuts were made into both kidneys to observe internal structures. This showed abnormalities in the orientation of renal pyramids in the left kidney due to the presence of two distinct renal pelvises. Only one ureter and renal pelvis was observed on the right. Abnormal internal structure and two unconnected ureters on the left side support the presence of fused supernumerary kidneys and complete ureteral duplication. These variations are likely congenital. While sometimes asymptomatic, these variations can have significant implications for renal physiology. Ureteral duplication can alter normal urine flow. Additionally, duplication may be associated with kidney or ureter swelling, and other nephrological issues.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Anatomy

Characterizing the Progression of Fatty Liver Disease, Between the Sexes, in a Fructose Sensitive Mouse Model

Aaron Valdez, Casey Patrick, Madison Wilson, Connor Wiggins
Project Mentor(s): Sarah Oppelt

Metabolic-associated fatty liver disease (MAFLD) affects 1 in 3 people in the United States, resulting in a massive medical burden for the American public. MAFLD affects men and women differently, with men having a 2.5-3x higher risk of developing MAFLD than pre-menopausal women. Unfortunately, it takes years for someone to receive a MAFLD diagnosis since early symptoms like fatigue and general unwellness, are ambiguous. Consequently, while sex differences in MAFLD are known, sex differences in disease progression are not. Interestingly, a human genetic condition, Hereditary Fructose Intolerance (HFI), results in rapid development of fatty liver disease when exposed to low levels of dietary fructose, and HFI and MAFLD patients share similar pathologies including excess liver fat and liver fibrosis. This project uses a mouse model of HFI to investigate the progression of fatty liver towards MAFLD. The HFI mouse develops MAFLD symptoms under a week with normal mouse chow, instead of 3-4 months of feeding a specialty diet to traditional mouse models used in MAFLD studies. To date, HFI mice are recognized as a useful model for MAFLD research, but sex differences in HFI are yet unknown. Here, I use biochemical assays to quantify the amount of liver fat and fibrosis, and histological assays to visualize different pathological markers. Preliminary data shows differences between male and female mice in the amount of fat stored in livers at early MAFLD stages, aiding our understanding of liver disease and helping identify different therapeutic strategies for men vs women.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Liver, Fatty Liver, Sex Differences, Histology, Metabolic Disorder

Prenatal Testosterone Exposure Reduces Ovarian Function

Marlee Weets
Project Mentor(s): April Binder

Polycystic ovary syndrome (PCOS) is the most common reproductive and endocrine disorder as well as the leading cause of infertility in reproductive aged women. PCOS has an environmental component, as prenatal exposure to excess testosterone causes ovarian dysfunction. Prenatal exposure to testosterone causes females to have delayed puberty, irregular estrous cycles, and abnormal ovarian morphology similar to PCOS. To examine the mechanism behind the altered ovarian function I used a PCOS mouse model that induces PCOS-like symptoms using prenatal exposure to testosterone. I also included flutamide (a testosterone blocker) to examine how testosterone acts on the ovary. In my study, there is a significant absence of puberty, reduced oocytes ovulated, and abnormal morphology in the ovaries of mice prenatally exposed to testosterone. These differences were ameliorated with treatment of flutamide, indicating that testosterone acts through the androgen receptor to cause the abnormal ovarian phenotype. To understand how the testosterone causes these differences, I observed different stages of follicular development in the ovary to understand why there may be reduced ovulation. Counting the different types of follicles in the ovaries revealed that there is a significant increase in secondary follicles and cysts in the DHT treatment group. To further understand what may be causing these differences and how these differences impact ovulation I measured gene expression in the genes that control ovulation and follicle development in the ovary. These genes include the receptors for important hormones and genes downstream from hormone receptors that regulate cell movement and death.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Reproductive Biology, Endocrinology, Cell Biology

Chemistry

Surface Chemistry and Binding Interactions of Lignin with Polymer-Encapsulated Gold Nanoparticles Acting as Model Microplastics

Oluwaseun Akinsola
Project Mentor(s): Samuel Lohse
The accumulation of microplastics in the environment has gained significant attention in recent years. Due to the coronavirus pandemic and its aftermath, millions of tons of plastic-based materials have been disposed of into the environment. Consequently, plastics decompose into smaller particles that can easily infiltrate human food, and drinks, thus posing a more deleterious threats to people and the ecosystem. Alternatively, through different microbial processes in the natural environment, significant amounts of organic matter and biomolecules are continuously released which interact with microplastics and form an eco-corona around them. This new layer alters the chemical properties and physical features of the microplastic. While natural organic matter has been suggested as a potential mitigator of the impacts of microplastics, their exact mechanisms of interaction still require further investigation. Therefore, this research explores the surface chemistry and molecular interactions of lignin and polymer-coated gold nanoparticles, by investigating their binding affinities. Specifically, the investigation employs a nanoscale polymer surface prepared via layer-by-layer polyelectrolyte immobilization atop 86 ± 5 nm gold nanoparticles (AuNPs). The binding of lignin to nanoscale polymer surfaces was investigated using UV-vis absorbance spectroscopy, fluorescence spectroscopy, and dynamic light scattering. UV-visible absorbance spectroscopy proved inadequate for determining lignin's binding affinities with most of the polymer-wrapped AuNPs. However, fluorescence quenching titration studies revealed distinct binding interactions for Polyallyl amine hydrochloride (PAH) and poly(diallyldimethylammonium chloride) (PDADMAC), with Ka values of 106.6 ± 1 nM-1 and 235.3 ± 1 nM-1 respectively. Meanwhile, polyacrylate (PAA) introduced a strong repulsive force, thus influencing the AuNP-Lignin interaction.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Gold Nanoparticles, Microplastics, Polyelectrolyte, Eco-corona, Pollution

Leveraging the 1,3-Azadiene-Anhydride Reaction For the Stereocontrolled Synthesis of Lactam-Fused Tetrahydropyrans as Potential Antidiabetic Agents

Ifeyinwa Anosike
Project Mentor(s): Timothy Beng

Diabetes mellitus is a disorder characterized by elevated levels of sugar in the blood. It affects about 29 million Americans and 462 million individuals globally. DM is a chronic disease and is a leading cause of damage to the eyes, kidneys, and the heart. Patients with type 2 diabetes have a higher level of hyperglycemia and are associated with an increasing risk of vascular events, which is a major cause of disability and death. In the last two decades, the use of synthetic agents has played a major role in drug discovery and development, especially for difficult-to-cure diseases. Notably, the incorporation of tetrahydropyrans scaffolds in small molecule drugs such as empagliflozin as a therapeutic for type 2 diabetes has also caught the interest of organic and medicinal chemists since it can improve the drug's binding affinity and bioavailability. In these studies, a diverse library of lactam-tethered alkenols were prepared using the Castagnoli-Cushman Reaction (CCR) as the key step. Suitable reaction conditions for the conversion of the alkenols to lactam-fused tetrahydropyrans were explored. Following successful regioselective and stereocontrolled bromocyclization, the requisite bromoethers were interrogated in a dehydrobromination protocol, leading to the synthesis of highly coveted 3-methylenetetrahydropyrans. The structures of the products were confirmed by nuclear magnetic resonance (NMR). Through a collaborative effort, the lactam-fused tetrahydropyrans and 3-methylenetetrahydropyrans are being evaluated for their efficacy in combating DM and the results will be disclosed in due course.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Organic Synthesis

Experience Forensics: The AAFS Conference

Tasha Barnard
Project Mentor(s): Nicole Jastremski

The American Academy of Forensic Sciences, AAFS, is an international organization that spans over 71 countries, including federal, state, and private laboratories, encompassing branching forensic science fields. I attended their yearly, week-long convention in late February 2024, in Denver, Colorado. Over 3,000 people were there to meet with old and new colleagues, sit in on workshops and presentations about breakthroughs in forensic science and update laws and regulations in the forensic community, as well as showcase new inventions for labs, promote their own lab, and recruit new scientists. There were many respectable speakers present and the most notable were during the day-long Young Forensic Scientists Forum (YFSF), which included those currently studying for a forensic career and professionals with less than five years of experience. They talked about their own experiences, especially how they entered forensics, including tips and general advice. In this presentation, I will discuss the background of AAFS, its branches, specific fields of forensic science, as well as highlights from different speakers during the orientation session, specifically career tips, professional advice, resume building, niche studies of interest, and basic life advice. I hope that this presentation will spark an interest in others to explore more of the AAFS and a career in forensic science, since the number of professionals is slowly diminishing in multiple areas.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Forensics, Career, Convention, AAFS

Dissecting the Protein-Protein interactions between Emx2, Cnot6L, and QKI

Téa Beaulieu

Project Mentor(s): Todd Kroll

The neocortex is a structure in the mammalian brain that allows for conscious decision-making. The neocortex is divided into distinct functional areas. The mechanisms through which these areas form remain obscure. However, one identified component of this mechanism is the graded production of the protein Emx2 within the developing embryonic neocortex. Emx2 physically interacts with the proteins Cnot6L and three versions of quaking (QKI-5, QKI-6, and QKI-7), all of which are found within the developing mouse brain and are involved in regulating the fate of mRNA. Because of the identified interactions with Emx2 and the roles Cnot6L and the quaking proteins play in the fate of mRNA, they possess the potential to be involved in the mechanisms behind neocortical area formation. To further investigate the fundamentals of how these proteins interact, I am working to identify the parts of the quaking proteins that facilitate these interactions. This objective is achieved by isolating DNA encoding regions for the quaking proteins and evaluating whether these regions interact with Emx2 and Cnot6L. At present, the regions form amino acids 1 to 205 and 250 to the end of each of the three quakings have been shown not to mediate the interactions with Emx2 and Cnot6L. Eight new regions of the quaking proteins have been constructed and are in the process of being evaluated for protein-protein interactions using Yeast Two-Hybrid and GST-pulldown assays.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Biochemistry, Neural development, Protein-Protein Interactions

Extraction and Analysis of *Dalea candida* Metabolites Flavonoids of *Dalea candida* Against Multidrug Resistant Fungi

Ericka DuBore

Project Mentor(s): Gil Belofsky

The genus *Dalea* includes many flowering species with proven antimicrobial activities. *Dalea candida* has not yet been extracted and studied. The objective is to explore novel compounds and their properties sourced from the plant *Dalea candida*, aiming to identify potential treatments for resistant microbes and possible effects as an opioid antagonist. The roots and aerial parts will be studied separately and will be extracted with chromatography techniques such as vacuum liquid chromatography (VLC), Sephadex columns, and gradient columns. Along with the extraction and purification, compound structures will also be determined using nuclear magnetic resonance spectroscopy (NMR). For the complete proof of the determined structures, compounds will be sent to the University of Iowa to be analyzed with mass spectrometry. Once compounds have been purified and structurally determined, they will be sent to a collaborator at the University of Minnesota for biological testing. Over the summer, it is planned that several isolated compounds, with their proven structures, will be sent for bioassay and mass spectrometry.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Chemistry, Natural Products

Colorimetric Sensor Array: Rapid and Sensitive Approach for Detecting and Identifying Emerging Nanomaterial Contaminants

Ifunanya Ede
Project Mentor(s): Samuel Lohse

Emerging contaminants such as nanomaterials and micro-plastics pose significant environmental risks due to their elusive nature and the limitations of current detection methods. Conventional techniques like UV-Vis spectroscopy and electron microscopy, though effective, are costly, low-throughput, and non-portable, particularly impacting populations in remote areas and less developed countries with increased vulnerability to materials contamination in natural and drinking water. To address this challenge, this study aims to develop a simple, portable, and rapid colorimetric sensor tailored for detecting materials contaminants in drinking water. The proposed sensor design features an array utilizing chemo-responsive (pH indicator) dyes. The collective color-change response of the array serves as a distinctive "colorimetric fingerprint," enabling the identification of specific materials contaminants. This research focuses on evaluating the sensor array's capability to differentiate nanomaterials contaminants based on their surface charge. Specifically, the efficacy of the array in detecting and quantifying poly electrolyte-coated gold nanoparticles has been systematically evaluated through experimentation. By leveraging chemo-responsive dyes in a portable sensor design, this study aims to provide a cost-effective and accessible solution for identifying emerging contaminants in drinking water, thereby addressing critical environmental and public health concerns.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Emerging Contaminants, Nanomaterials, Microplastics, Portable Sensor, Colorimetric Sensor, Chemo-Responsive Dyes, Poly Electrolyte-Coated Nanoparticles, Detection Techniques, UV-Vis Spectroscopy, Environmental Threats

Phytochemistry of *Dalea candida* var. *oligophylla*, a Source of New Metabolites with the Potential for Opioid Receptor Affinity

Ryan Galperin
Project Mentor(s): Gil Belofsky

The focus of this project was the plant *Dalea candida* and its phytochemistry. The plant compounds were isolated and purified by an array of chromatographic techniques. The structures of the pure compounds were determined by ^{1}H and ^{13}C NMR spectroscopy, supported by infrared and ultraviolet spectroscopy, circular dichroism spectroscopy, and mass spectrometry. Plant parts were worked on separately since they typically differ in content. One student worked on the root extracts while another worked on the extracts of the aerial portions. Purified compounds will be tested for biological activities. The structures of several compounds isolated in the early stages of the project were presented at the M.J. Murdock College Science Research Conference (Nov. 2023). More findings will be presented at a future conference and will likely result in a peer-reviewed publication. Based on our preliminary results, it is possible that one of more of the compounds will be candidates for additional neuropharmacological testing, specifically for opioid-binding activity. The new compound pawhuskin D was isolated in the early stages of this project and is similar to the known compound pawhuskin A, a k-opioid antagonist of some importance.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Phytochemistry, Nuclear Magnetic Resonance (NMR) Spectroscopy, Column Chromatography

Introducing TMO as a Sustainable Solvent for the Synthesis of Lactams as Potential Anti-Skin Cancer Agents

Jasleen Kaur
Project Mentor(s): Timothy Beng

Skin cancers (SC) affect 9,500 people daily in the U.S. and they impose an annual financial burden of $8.1 billion. The standard treatments for cutaneous melanoma skin cancers (CMSC) and non-melanoma skin cancers (NMSC) are limited by low bioavailability, side effects, and drug resistance. Meanwhile, global climate change continues to wreak havoc. If more sustainable methods of living are not adopted, the damage to our planet could become irreversible. The Environmental Protection Agency (EPA) has stated that the use of green chemistry techniques eliminates 826 million pounds of hazardous chemicals and solvents and saves 21 billion gallons of water on an annual basis. We recently discovered that one lactam (a compound in a cycle that contains a carbon-oxygen double bond and a carbon-nitrogen single bond) is potent against CMSC in vitro. In these studies, TMO (an environmentally friendly solvent that does not form peroxides), will be utilized to achieve a sustainable and cost-effective synthesis of a diverse library of lactams. It is anticipated that this novel discovery would facilitate the treatment of skin cancers and endear our methodology to the organic and medicinal communities.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Lactams, Green Synthesis, Sustainable, Anti-Skin Cancer, Agents

Construction of Three QKI Deletion Mutants For Use in Investigating Protein-Protein Interaction of Interest in Neural Development

Jenna Moe, Ainsley McGregor, Tea Beaulieu
Project Mentor(s): Todd Kroll, Tea Beaulieu

The neocortex is the largest part of the mammalian cerebral cortex and is divided into distinct areas, each with a unique function. The protein Emx2 is involved in the partitioning of the neocortex. However, the specific mechanisms through which Emx2 establishes these boundaries remain unclear. The Kroll laboratory has identified that Cnot6L and the QKI proteins interact with Emx2 and thus may be involved in these mechanisms. The Kroll lab is working to determine the regions of the QKI proteins that interact with Emx2 and Cnot6L to begin to understand how Emx2 enacts control over the division of the neocortex during development. This research project is working towards this goal by cloning segments of the QKI gene encoding for the regions spanning amino acids 82-180, 82-205, and 1-205 into the pGEX plasmid. These clonings allow the QKI regions to be evaluated for interactions with Emx2 and Cnot6L via GST-pulldown assays. Currently, these clonings are being constructed. The eventual result from this project will facilitate further investigation of the protein interaction of interest.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Neural Development, Protein-Protein Interaction, Amino Acids, Neocortex, PCR

Identifying Early Cellular Changes Related to Fructose-Induced Mitochondrial Dysfunction in A Liver Cell Model

Jake Ohara, Sarah Oppelt
Project Mentor(s): Sarah Oppelt

Roughly one third of the world's adult population is affected by metabolic-associated fatty liver disease (MAFLD). MAFLD is caused by excess fat and inflammation in the liver, though the underlying metabolic causes are diverse and incompletely understood. There is increasing evidence that fructose overconsumption is a key factor driving the current global MAFLD epidemic. Excess fructose causes the liver to produce too much fat and provokes an inflammatory immune response. Fructose also increases oxidative stress, and decreases the ability of mitochondria to burn fat to produce cellular energy. Both the increase in fat production and decrease in fat break-down contribute to the development of fatty liver disease. Previous results from our group found that fructose-fed liver cells have reduced mitochondria function compared to glucose-fed cells, but did not have increased fat accumulation. This points to metabolic changes that accompany, but are distinct from, fat accumulation are responsible for the development of liver disease. Fructose metabolism is also associated with increased uric acid production but it is not known if this change occurs at the same time as, or after mitochondrial dysfunction and fat accumulation. Here, we identify fructose-induced changes using a liver cell model, HepG2. We quantified gene expression and protein levels of inflammatory markers of liver cells exposed to fructose. We quantified and compared fructose-induced uric acid production, fat accumulation, and mitochondrial dysfunction over time. We aim to identify whether mitochondrial function can be restored in fructose-treated cells through antioxidant treatment.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Biology, Biochemistry, Cell Biology, Physiology, Nutrition, Metabolism

Validation of Protein-Protein Interaction Between Transcription Factor PAX6 and RPS20 (Ribosomal Protein S20)

MODUPE OLADAYO
Project Mentor(s): Todd Kroll

The neocortex is the largest region of mammalian brains and is responsible for our complex cognitive perceptions and behaviors. The mature neocortex is divided into distinct areas, which analyze and process sensory input from eyes, ears, touch receptors, and regulate conscious body movement. The graded expression of several transcription factors across the neocortical ventricular zone controls the size and location of these functional areas in the mature neocortex. Although significant progress has been made in understanding how transcription factors affect neocortical structure, additional research is required to fully understand the underlying molecular mechanism(s). Elucidation of these mechanisms will contribute to a better understanding of brain development and function and will have implications for the study of neurodevelopmental and neuropsychiatric disorders. It is becoming clear that transcription factors do not function alone, but rather through interactions with other proteins, which improves the specificity of their regulatory functions. The focus of our work is to identify novel proteins that interact with the transcription factors involved in neocortical arealization and contribute to this process. The goal of the current project is to validate the potential protein-protein interaction between the transcription factor PAX6 and RPS20 (ribosomal protein S20). The positive protein-protein interaction was confirmed using yeast two-hybrid assays, and the specific region of PAX6 that facilitated this interaction was identified using the same method. The results of these interactions will be presented, while GST (glutathione S-transferase) pull-down assays will be used to provide additional validation.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Protein-Protein interaction between PAX6 and RPS20

Leveraging the 1,3-Azadiene-Anhydride Reaction for the Green Synthesis of Pharmaceutically Pertinent Azadiquinanes

Benjamin Rentfro, Shae Newgard

Project Mentor(s): Timothy Beng

The synthesis of nitrogen-containing cyclic compounds (commonly known as azaheterocycles or *N*-heterocycles) remains of importance to pharmaceutical companies given that they are biologically active. A specific type of *N*-heterocycle contains two fused 5-membered rings bearing one nitrogen atom, called azadiquinane. A cost-effective method for synthesizing azadiquinanes has been explored, using a simple starting precursor. An alkene and alcohol within the same molecule has been united through a process called intramolecular cross-coupling. Our method is potentially inexpensive (doesn't use costly metals), stereoselective, and sustainable, thus, making it more appealing to medicinal and environmental chemists.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Green Synthesis, Synthesis, Azadiquinanes, N-heterocycle, 1,3-Azadiene-Anhydride Reaction

Discovery of Novel Boronates: Structural Building Blocks of Potential Aspartic Protease Enzyme Inhibitors

*Christopher Williams, Rose Montano, Jackson Tieber, Kayden Stiner, Alma Wanguba, Charles Eriksson, Katie Snyder, Brett Vagt, Michael Frank, Levente Fabry-Asztalos**

Project Mentor(s): Levente Fabry-Asztalos

As the prevalence of multidrug-resistant bacteria and viruses continues to rise, the urgent development of novel therapeutic agents becomes critical. Boron-containing compounds have emerged as promising candidates in this fight, showing considerable potential as antibiotics and antivirals. The unique chemical properties of boron, including its dynamic coordinate system, enable these compounds to bind more effectively to target sites than their carbon analogues, thereby enhancing their efficacy as protease inhibitors. The Fabry Research group has particularly focused on boron-modified inhibitors of HIV-1 aspartic protease, which act as dual-mode inhibitors—both inhibiting the enzyme's active site and preventing the dimerization of its monomers. Such inhibitors have been developed by the Fabry research group, employing a synthetic pathway that starts with the synthesis of α-chloroalkylboronic pinacol ester, followed by its reaction with various R-groups. To further enhance the diversity and efficacy of these boronates, the use of a chiral director will be also explored to achieve enantiomerically pure compounds. This approach not only addresses the synthetic challenges often encountered with boron-containing precursors but also contributes to the ongoing development of a robust library of novel boronates. These are intended for future incorporation into peptide and non-peptide structures, potentially offering an effective solution to combat the ever-evolving drug-resistant pathogens.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Chemistry, Medicinal Chemistry, Organic Chemistry, Virology

Computer Science

The Gap in Research of Corporately Produced Operating Systems

Alexander Anderson
Project Mentor(s): Paula Collucci
This paper is the final project for ENG111. This paper exposes the large gap in research in regards to the development and deployment of operating systems on PC's other than Microsoft's Windows Operating system. This paper introduces the need for research into this field providing some hypothesized benefits that would come following more research. Six sources are analyzed and discussed as to more enlighten the reader of the current discussions in the operating system field. The six sources are also used to highlight the lack of research done on the home operating system field.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Operating System (OS), Corporately Developed Home Operating System, Open Source, Linux

Modeling Particle Production During Cosmological Expansion Using a High-Performance Finite-Difference Scheme

Nathan Chapman
Project Mentor(s): Andy Piacsek
Our current model of physics suggests particles were spontaneously produced at the beginning of the universe during a period of rapid expansion. The mathematical model of this production exactly matches that of quantum systems able to be realized experimentally. In order to guide and support both theoretical investigations in quantum cosmology, and experimental research in ultra-cold quantum gases, a computational model is needed. While traditional computing methods have been previously applied on approximate physical models, high-performance computing methods need to be used when considering a more accurate physical model. These new methods have reproduced traditionally-found results considering a de Sitter expansion. As the implementation supports an arbitrary expansion, preliminary results have been found for notable cosmologies.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: High-Performance Computing, Finite Differences, Physics, Cosmology, Quantum

Particle Simulation via Cellular Automata

Sean Gallaway
Project Mentor(s): Donald Davendra
A cellular automata is section of cells whose state is dependent on the states of nearby cells. This can be expanded to a particle simulation where we can define behavior via rules to each cell dependent on the particle residing inside it. This approach can be hardware accelerated using the GPU and CUDA.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Cellular Automata, Particle Simulation, GPU, Graphic

Racism Detection in Tweets

Ndjeuha Gihane
Project Mentor(s): Razvan Andonie

Social media has impacted the online community in many aspects and one of them is on communication and relationship. It is constantly evolving and has gained an important place in our daily lives. Thank to social media, people can communicate with friends and family from the comfort of their home. Businesses can be promoted using social media platforms like Facebook, Instagram, Twitter, and LinkedIn. Although social media has brought tremendous openings and benefits to the online community, it has also generated some issues like the propagation of racism online. Racism has exponentially increased on social media and it is not possible to remove all the racist content manually. Twitter is one of the platform where racism is slow to be removed fortunately, there exists a computational linguistic—rule-based modeling of human language and machine learning models in Natural language processing (NLP) that allows computers to recognize and classify texts and speeches into different categories. The NLP is always in perpetual improvement and the goal of this study is to optimize the bidirectional Long Short Term Memory (Bilstm) model that we trained so it can be used to predict racism in tweets with highest accuracy possible. Many models were trained among which we have Support Vector Machine (SVM), K Neighrest Neighbor (kNN), Random Forest (RF), Logistic Regression (LR), Decision Trees (DT), Convolutional Neural Networks (CNN), Tranformers (i.e., BERT), etc. The model that reached the highest accuracy is the BILSTM model with 82%.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Racism, Social Media, Natural Language Processing, Model, Bilstm, Tweets

Explanation of Machine Learning Models with Monotone Functions

Harlow Huber
Project Mentor(s): Boris Kovalerchuk

Machine learning (ML) methods have demonstrated significant achievements in recent years. However, there are significant difficulties for acceptance of ML models by the subject matter experts (SMEs). They may not trust ML models that are black boxes for the SME. A promising way to solve this problem is by building a trustable, qualitative, interpretable model for the task based on SME knowledge, using the model to help to understand, interpret, trust, and/or improve the machine learning model built from real data. Qualitative models operate with ordinal attributes, which can be Boolean or multiple-valued attributes with some upper limit. It is typically easier for humans to understand and reason with them than with numeric attributes. Sometimes problems, which may need qualitative ML models, do not have sufficient datasets. Building qualitative models with an SME, called an “expert model”, is a way to complete this task solely with an SME’s knowledge. The proposed Monotone Ordinal Expert Knowledge Acquisition (MOEKA) process assumes monotonicity of attributes relative to the target attribute, which is verified by the SME for some domain. The learning process is done through interview phases with the SME. The MOEKA method works with ordinal data as well as ordinal classes. MOEKA greatly reduces the number of operations than the brute-force restoration for the target function. The MOEKA method can be used as a sanity check for ML methods by comparing the results. Knowledge can be acquired through this comparison and by visualizing the output.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Machine Learning, Data Mining, Monotone Boolean Functions, Ordinal Data, Monotone Ordinal Functions, Monotonicity, Subject Matter Expert, Interview, Optimization, Knowledge Discovery, Visualization

Multiplayer Explanation of Machine Learning Models with Visual Knowledge Discovery

Lincoln Huber
Project Mentor(s): Boris Kovalerchuk

Interpretable machine learning is important for increasing the confidence of domain experts in a given model. However, simply using interpretable methods is not enough. Interpretable methods such as Decision Trees and Rule-Based models can be insufficient for certain datasets to provide satisfactory models. To solve this problem, Visual Knowledge Discovery (VKD) offers a solution through interpretable, interactive, reversible lossless n-D visualizations using General Line Coordinates (GLC). Nevertheless, VKD and other visual methods suffer from occlusion when visualizing large amounts of data. This project presents methods for both removing visual occlusion and limiting rule complexity and overfitting through the use of hyperblocks at several levels. Hyperblocks can create intrinsically interpretable rules using meaningful numeric attributes. Areas where data are similar can be found and generalized, limiting the occlusion in each hyperblock while creating less complex and more general rules. Major benefits from higher level hyperblocks include increased generalization, less complex rules, and increased user confidence in each classification.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Visual Knowledge Discovery, Interpretable Machine Learning, General Line Coordinates, Machine Learning, Visualization, Classification

Learning Abstract Data Structures Through Interactive Visualization

Kiyrah Keith
Project Mentor(s): Dmytro Dovhalets

Computer Science is a discipline that involves many complex, abstract problems. Due to this abstract nature, data structures and algorithms can often be challenging to visualize. Researchers have aimed to study how interactive visualizations can enhance learning and reduce cognitive load for students. From the conception to the final program, many design decisions must be made to ensure that visualization tools are effective in learning. Various tools in this field were researched and reviewed for their merits and weaknesses. As an extension of this analysis, a new software program was developed in Java to act as an interactive learning utility for computer science students at Central Washington University. The content focused on making straightforward, informative graphics to accompany students taking the CS301 Data Structures course. This program aims to differentiate and improve upon the currently available software by focusing on creating engaging student interactions. It also provides definitions and reference information that directly correlates to the data structure content presented in CS301. This research project aims to contribute to the ongoing efforts to improve computer science education by providing a more tailored and accessible learning tool. The findings hold implications for educators and students, highlighting the importance of incorporating effective visualization tools to enhance student engagement and learning outcomes in computer science courses.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Learning, Visualization, Data Structures, Computer Science

Parallel Ant Colony Optimization to Solve the Traveling Salesman Problem Using CUDA

Hunter Lawrence, Andrew Struthers
Project Mentor(s): Donald Davendra

The objective of this research explores the potential of Ant Colony Optimization (ACO), a metaheuristic optimization algorithm inspired by the foraging behavior of ants, in solving the Traveling Salesman Problem (TSP) when accelerated by Compute Unified Device Architecture (CUDA). ACO offers an adaptive approach for solving combinatorial optimization problems by harnessing the collective intelligence of swarms. TSP is one of the most extensively studied combinatorial optimization problems in computer science and logistics operations research and has applications in transportation planning, network design, and civil infrastructure planning. CUDA is a parallel computing application programming interface (API) model created by NVIDIA to allow software developers to use CUDA-enabled Graphics Processing Units (GPUs) for general purpose processing. Using CUDA, programmers can offload computationally intensive tasks from the CPU to the GPU, exploiting the massive parallelism inherent in GPU architectures to accelerate the execution of algorithms.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Ant Colony Optimization, Traveling Salesman Problem, CUDA, Ant System, Metaheuristic Optimization, Logistics, Graphics Processing Unit, GPGPU

Semantic Manipulation of Music

Jared Osborne, Adel Abdalla
Project Mentor(s): Razvan Andonie

Music evokes emotion in many people. We introduce a novel way to manipulate the emotional content of a song using AI tools. Our goal is to achieve the desired emotion while leaving the original melody as intact as possible. For this, we create an interactive pipeline capable of shifting an input song into a diametrically opposed emotion and visualize this result through Russel's Circumplex model. Our approach is a proof-of-concept for Semantic Manipulation of Music, a novel field aimed at modifying the emotional content of existing music. We design a deep learning model able to assess the accuracy of our modifications to key, SoundFont instrumentation, and other musical features. The accuracy of our model is in-line with the current state of the art techniques on the 4Q Emotion dataset. With further refinement, this research may contribute to on-demand custom music generation, the automated remixing of existing work, and music playlists tuned for emotional progression.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Music Emotion Recognition, Music Information Retrieval, Semantic Manipulation, Explainable AI, Deep Learning, Audio Analysis

Adaptive NEH with Constrained Nearest Neighbor Subtours for the Electric Vehicle Routing Problem with Time Windows

Andrew Struthers

Project Mentor(s): Donald Davendra

The development of electric vehicles is currently considered one of the most innovative areas in manufacturing. Largely driven by the desire of reducing greenhouse emissions, electric vehicles are seen as a viable alternative to internal combustion engine cars. Starting from consumer cars, a dedicated effort is being made to translate this into commercial vehicles for freight and delivery. This research introduces a novel adaptive Nawaz, Enscore, Ham (NEH) algorithm with constrained nearest neighbor subtour (NEH-NN). This algorithm is tested on the standard benchmark problems in literature and used as a seed solution for the Genetic Algorithm (GA). From the experiments, the NEH seeded GA significantly improves on the GA, especially for the large sized problem instances.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Electric Vehicles, Adaptive Nawaz Enscore Ham (NEH), Charging Stations, Transportation, Time Window, Genetic Algorithm, Nearest Neighbor

Quant Workflow: A Scientific Method for Finance

Mathew Thiel

Project Mentor(s): Dominic Klyve, Donald Davendra, José Riera

Quantitative Finance, or Quant Finance, is a type of investment management that uses math to predict financial markets. Practitioners are called “Quants” and may specialize in other areas of the field such as derivatives pricing, portfolio optimization, or equities. Quantitative Finance encompasses three main fields: Computer Science, Statistics, and Finance. The goal of any Quant is to generate alpha, which is the excess performance of a financial strategy over a benchmark, Machine Learning (ML) is becoming more prevalent as practitioners develop models and methodologies to improve predictions and generate more alpha. Although ML has found more use in the field, it is generally misused, producing overfit models with inflated in-sample performance. Financial data is riddled with issues that challenge generic ML techniques, continuous discourse over the efficacy of various methods creates a divide between practitioners and academics, and pseudo-discoveries derived from a lack of scientific practice skew results. This project proposes “a scientific method for quantitative finance”; a complete, in-depth workflow that covers the entire strategy creation process and accommodates these finance-specific issues. This workflow aims to promote proper testing of strategy ideas and demystifies the strategy creation process to make the field more accessible for entry-level Quants.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Quantitative Finance, Machine Learning, Algorithmic Trading

A Transformer-Based Approach for Generative Drug Design for the Inhibition of HIV-1 Protease

Kollin Trujillo, Levente Fabry-Asztalos
Project Mentor(s): Razvan Andonie, Levente Fabry-Asztalos

Drug design is an expensive and time-consuming process. Recent estimates in the realm of 10-15 years and over a billion USD to bring a drug to market. This can be due in fact to the large chemical space of 10^{60} with a much smaller known drug space of 10^{6} estimate as of 2012. What this means is that there is a pressing need for efficient exploration of the drug space to aid in finding therapeutics. From that end, we propose adapting a Large Language Model of BART to perform generative auto-regressive prediction of molecules from a chemical space known to inhibit HIV-1 protease. By utilizing a more robust chemical grammar, such as SELFIES, there should be a greater interpolation of the chemical space to produce more grammatically correct and hopefully potential novel leads for HIV-1 inhibition. Deep learning in drug design is an often-difficult task to do due to smaller amounts of publicly available data, so to combat this transfer learning will be used to aid in training and domain adaptation.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Generative Drug Design, AI, Drug Discovery, Drug Design, HIV-1 Protease, Inhibition, Transformer, Chemistry, Deep Learning, Computer Science

Advancing Brain Tumor Diagnosis: A Hybrid Approach Using Edge Detection and Deep Learning

Ha Anh Vu
Project Mentor(s): Szilard Vajda

Brain tumor classification from MRI scans demands precise image analysis, a challenge compounded by the variable morphology and location of tumors. Addressing this, our study presents an innovative approach that combines edge detection with a hierarchical deep learning framework to classify brain tumors accurately. This method enhances edge clarity, facilitating the deep learning model's ability to distinguish between meningioma, glioma, and pituitary tumors. By deploying a two-stage model, initially segregating a meta-tumor class and pituitary and subsequently refining the meta-tumor class into glioma and meningioma with a binary classifier, we capitalize on the strengths of both traditional image processing and advanced neural networks. The already proven ResNet50 architecture, our model's backbone, benefits from transfer learning, enabling efficient feature extraction from the edge image tailored to brain tumor recognition. Our results, evidenced by a remarkable over 96% overall accuracy rate obtained on a large benchmark brain tumor dataset, underscore the potential of integrating edge detection processing with deep learning. This integrative strategy advances medical imaging analysis and promises to streamline the diagnostic process, offering a reliable, cost-effective solution that could reduce the need for expensive human specialist intervention.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Brain Tumor, MRI, Canny Edge Detector, Machine Learning, MRI Image Analysis

Synthetic Data Generation with General Line Coordinates for Machine Learning

Alice Williams

Project Mentor(s): Boris Kovalerchuk

The lack of sufficient training data is a significant barrier in both the development and deployment of machine learning (ML) and artificial intelligence (AI) models, particularly concerning tabular data. To overcome this challenge, we introduce a novel algorithm for unified synthetic data generation (SDG) and automated labeling (ADL), utilizing multidimensional representations of data iterating upon data provided to generate and label data supplemented with synthetic cases. This data is visualized losslessly and interchangeably within multidimensional space through a selection of General Line Coordinate (GLC) methods. Each GLC highlights unique data properties such as outliers, distributions, and clusters. Demonstrating our work with newly developed GLCs of Circular Coordinates, formerly defined in both Static and Dynamic forms, alongside the optimized use of traditional GLCs like Parallel Coordinates and Shifted Paired Coordinates. This methodology has been operationalized within our Dynamic Coordinate Visualization software, which supports the development of associative classification rules derived from hyper-regions of multidimensional space. This feature allows us to refine single data label regions effectively, navigating complex decision boundaries to generate accurately labeled synthetic data. After merging this data with original datasets, we further analyze it using a suite of twelve standard classifiers, including Random Forest, Support Vector Machine, and K-Nearest Neighbors. Our analysis employs a Monte-Carlo method in an independent parallel train-cross-validate-evaluate cycle, yielding improvements in mean accuracies, standard deviations, and confidence intervals. Case studies conducted on real datasets demonstrate a simplification of classification processes and illustrate effective strategies for synthetic data generation, showcasing significant advancements over conventional techniques.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Synthetic Data Generation, Data Classification, Tabular Data, Machine Learning, General Line Coordinates, Multidimensional Data Visualization, Visual Knowledge Discovery

Craft Brewing

Effect of Baked vs. Unbaked Honey in Session Mead

Wyatt Alford
Project Mentor(s): Geoffrey Sasaki, Brian LaBore

Honey is the key ingredient in making mead. Honey is what the yeast ferments into ethanol, and part of what gives the drink its taste and aroma. In my experiment we tested what would happen to a session mead if we made a batch using unbaked honey and a batch using baked honey. We hypothesized that the unbaked honey batch would contain more volatile aromatics that would not be present in the baked batch. In addition, any glucose oxidase present would denature when baked, resulting in a lower production of hydrogen peroxide levels and thus lower bitterness levels. Finally, heating the honey to 160°F would activate β-glucosidase, leading to higher sweetness and ABV in the final baked batch. To test our hypothesis, we made two batches of session honey mead using 3lbs of honey and 25lbs of water per batch. The first batch used the unbaked honey and the second batch used honey that had been baked at 160°F for three hours. Both were combined with warm water and 600mL of Lida Kveik ale yeast that fermented for two weeks. We found that the unbaked honey mead had more floral and yeast imparted aromatics, whereas the baked honey batch had more alcohol content, was sweeter and tart post fermentation. Overall, the experiment showed there is a notable difference between using unbaked honey versus baked honey in mead.

Presentation Type: Brewery Session & Poster (May 15, 3:00pm–3:50pm)

Key Words: Fermentation, Craft Brewing

Oak Barrel-Aged Perry Cider

Cody Barthels
Project Mentor(s): Geoffrey Sasaki, Brian LaBore

In the pursuit of honoring tradition and innovation within the craft brewing industry, this study explores the art of oak barrel-aging in cider production. As a craft brewing major, the project focused on creating a unique cider blend using locally sourced ingredients and aging it in an oak barrel at Wheelline Cider, located here in Ellensburg. This abstract details the process of crafting the cider, from selecting the pear varieties to the meticulous aging process in the oak barrel, which imparts complex flavors and aromas to the final product. The study evaluates the impact of oak barrel aging on the sensory characteristics of the cider, including its color, aroma, flavor profile, clarity and mouthfeel. While having tested the ciders sensory analysis throughout production, it describes the different smell and taste levels of oak and bourbon. The final sensory analysis includes the specific and detailed flavors picked up from the cider to be chosen as the description. Additionally, it examines the significance of terroir and regional influences on the cider's overall character. Through sensory analysis and feedback from myself and my boss, Nate, the cider's quality, uniqueness, and market potential are assessed. This project serves as a testament to the new possibilities and innovation in the craft brewing industry.

Presentation Type: Brewery Session & Poster (May 15, 3:00pm–3:50pm)

Key Words: Fermentation, Craft Brewing

Field to Ferment: Why Brewhouse Efficiency Matters

Tyler Benedict
Project Mentor(s): Geoffrey Sasaki, Brian LaBore

Brewhouse efficiency is crucial in the brewing industry, influencing both the economic viability and quality of beer production. This efficiency metric encompasses the effectiveness with which a brewer converts raw materials, primarily malted barley, into fermentable sugars during the mashing process. Achieving optimal brewhouse efficiency is paramount for brewers aiming to maximize yields while minimizing costs. Efficient extraction of fermentable sugars from malt not only enhances production volume but also ensures consistency in beer quality and flavor profiles. Furthermore, brewhouse efficiency directly impacts the sustainability of brewing operations by reducing waste and resource consumption. Several variables directly influence brewhouse efficiency, including the types of malts used, malt producers, adjuncts, utilization of rakes, sparge temperatures, overall volume, and more. Implementation of new processes, such as employing the mash tun rake during runoff, has led to an average efficiency increase of 2%. After achieving a new brewhouse efficiency level of 89%, we initiated experiments with different malt producers. Following the brewing and analysis of five batches, each utilizing malts from different maltsters, we identified one producer's malts that enhanced mash efficiency by an additional 3%. In addition to malt selection, the integration of hop oil extracts has provided an increased yield of one beer barrel per batch (equivalent to two kegs) while simultaneously minimizing waste. Sensory analysis revealed no significant deviation from the original recipes. These substantial efficiency improvements have empowered us to adjust recipes, reducing grain and hop usage by over 100 pounds in several recipes while maintaining a desired gravity.

Presentation Type: Brewery Session & Poster (May 15, 3:00pm–3:50pm)

Key Words: Brewing, Efficiency, Fermentation, Sensory Analysis, Resource Management

How Reliable is The Mead Calculator?

DJ Johnson
Project Mentor(s): Geoffrey Sasaki, Brian LaBore

The purpose of this practicum was to analyze the accuracy of "The Mead Calculator" from the website Gotmead.com which claims to be able to calculate (among other things) how much additional sugars need to be added to achieve certain gravities (a measurement of how much of a different substance is in another substance, in this case, how much sugar in water). I also noticed that the website had a wide variety of additional sugar sources including but not limited to: tomato, cashews, carrots, and celery. Because of the wide variety of sugar sources, I wanted to see just how accurate it could be with such a wide bank of data. I made four different meads, three of which had an additional sugar (apple, mango, and tomato) and one of which was just with honey. The plan was to achieve a certain initial gravity (1.070), then use the calculator to determine how much of the different sugar would need to be added to reach a gravity of 1.100. Ultimately, the calculations were off by an average of 0.012 (mostly due to an outlier potentially due to a miscalculation with the tomato). I would say that this makes the calculator a useful tool to get a good ballpark estimate when using additional sugars, but it should be understood that the calculations aren't to be solely relied upon.

Presentation Type: Brewery Session & Poster (May 15, 3:00pm–3:50pm)

Key Words: Fermentation, Craft Brewing, Mead, Biochemistry, Organic Chemistry

Brewing a Bale Breaker Beer Without Statistical Sensory Differences

Miles Koons
Project Mentor(s): Geoffrey Sasaki, Brian Labore

Bale Breaker's Field 41 Pale Ale is the beer that sparked my interest in PNW craft beer. It has been my dad's favorite beer for years, and over a few pints we've had some of the most important bonding experiences in my adult life, so with that sentimentality towards one of Washington's best Pale Ales, I wanted to see if I could brew a replica at home. I wondered what the challenges would be in achieving the balance of flavor this beer has considering my equipment and access to ingredients. With the guidance of Production and Quality Manager of Bale Breaker Brewing Company, Brian Logan, and the recipe for their Field 41 Pale Ale that they use in their industrial brewery, it was possible to brew a small batch version of this beer in the CWU Craft Brewing lab that was indistinguishable to participants in a triangle test. Despite minor changes being made to the recipe based on ingredient availability, and despite using drastically different brewing and fermentation equipment, 4 of 12 sensory participants were able to identify the "odd beer out" in the triangle test, which is statistically insignificant, making it clearly possible to brew this beer on small batch equipment. Although in reality there were many differences between the two beers, to our sensory panel the differences were not drastic enough to easily identify.

Presentation Type: Brewery Session & Poster (May 15, 3:00pm–3:50pm)

Key Words: Fermentation, Craft Brewing

Sensory Impact of Varying Dry Hop Additions in an IPA

Cameron Nelson
Project Mentor(s): Geoffrey Sasaki, Cole Provence, Brian LaBore

A traditionally dry hopped beer introduces hops after fermentation. The potential issues surrounding this are increased off flavors and refermentation. Mid-fermentation dry hopping was introduced to combat the refermentation and off flavor faults of traditional dry hopping. The issue with mid-fermentation dry hopping is you lose 90% of the hop aromatics throughout fermentation. Understanding the potential issues with these dry hopping methods, I decided to use a method known as step dry hopping to increase hop aromatics and flavor profile of the beer. To test this theory, I created a simple IPA recipe using Citra and Mosaic pellets as my hop varietals and Barbarian yeast strain. I split the wort into three ½ barrel fermenters, giving each fermenter a dry hopping technique. After the beer finished, I set up a sensory panel with a hedonic test and asked panelists to rate the intensity of hoppiness among the three beers to determine the sensory impact of these varying dry hopping methods. Six panelists completed the sensory test. Two panelists liked the mid-fermentation dry hopped beer the most and rated the traditional the traditional dry hopped beer as the most aromatic. One participant liked the traditional dry hopped beer the most and rated it as aromatic. Lastly three participants liked the most and rated it the most aromatic. After reviewing the data, I found the step dry hopping method had the highest favoritism and was rated to have the highest hop aromatics.

Presentation Type: Brewery Session & Poster (May 15, 3:00pm–3:50pm)

Key Words: Dry Hopping, IPA, Mid-Fermentation

Prime Yeast Fermentation Environment

Eve Rice

Project Mentor(s): Geoffrey Sasaki, Brian LaBore

This project was an idea that came to me during an incident at work. The glycol cooling units in our tanks went out during fermentation. I then came up with the question if this were to occur, would you rather ferment your beer at warmer or colder temperatures? My hypothesis was "If temperature control systems were to fail, then you would want to ferment at temperatures no warmer than 70 degrees Fahrenheit." The way that I designed my study is I set up three fermentation vessels. A control that was fermented at 60 degrees, a warm fermentation vessel at 70 degrees, and a cold fermentation vessel set at 50 degrees. The results were interesting in the fact that many variables contributed. We also did a blind sensory analysis with some students and teachers to see what beers and different fermented temperatures tasted like and if they could tell what beer was fermented at what temperature. Majority of our blind tasters like the colder fermented beer because we did have a contamination in our warm fermented beer, which is to be expected for faster fermentation times. We learned it is better to ferment at colder temperatures because you can control the yeast fermentation processes when the environment is cooler and makes the yeast "dormant" in a sense versus speeding up the process which is what we saw in the warmer kept vessel. Colder temperatures also help keep yeast viable longer and can be used for re-pitching in other beers.

Presentation Type: Brewery Session & Poster (May 15, 3:00pm–3:50pm)

Key Words: Fermentation, Craft Brewing

Cultural and Environmental Resource Management

How Do You Even Measure That? A Guide to Photographing Objects for Increased Measurement Precision and Repeatability with Digital Measurements

Gavin Crain, Victoria Linder, Nik Simurdak

Project Mentor(s): Dr. Hope Amason, Dr. Patrick McCutcheon

One of the primary tools for artifact documentation and analysis is measurement, but many objects and artifact features are precluded from precise measurement by their fragility or scale. While digital calipers offer an ideal level of precision, the handling necessary to take measurements poses a risk to objects that are delicate. Some measurements are too small or indistinct to reliably and consistently make with calipers or other measurement tools. A solution may be found in a photo processing software (such as ImageJ), which has tools to take a variety of measurements digitally. After identifying the impacts of image quality on digital measurements, we produced a prototype photographic kit to record objects for digital measurements. We tested this prototype using lithic and faunal artifacts for the purpose of comparing the accuracy and precision of caliper and digital measurements. We find that digital measurements taken using ImageJ are more accurate and more precise than caliper measurements, while significantly reducing potential risk to an object. The lighting and camera angle of the photos used for digital measurements can severely impact accuracy, but achieving an appropriate level of control over the photographic quality is easy with an affordable home-made kit. Finally, we find that our approach increases the repeatability of the measurements, creating a better research record for future analysis. This study explores the challenges and concerns of caliper and digital measurements while providing obtainable suggestions for future artifact documentation.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Morphometrics, Digital Measurements, Collections Management, Open-Source Software, Research Accessibility

A Comparison of Sediment Accumulation Effectiveness Behind Beaver Dam Analogues, One Rock Dams, and Post-Assisted Log Structures on East Foster Creek, Douglas County, WA

Griffin Hansen
Project Mentor(s): Karl Lillquist

Waterways are valuable resources for communities and habitats. These resources are subject to degradation from a type of erosion called incision. Specialized small dams have been designed and implemented on rivers and streams to prevent incision and downstream sediment flow. On East Foster Creek in Douglas County, WA this study examined the effectiveness of beaver dam analogues (BDAs), rock dams (ORDs), and post-assisted log structures (PALS) at preventing erosion. These three types of dams were installed in 2021 and 2022 to capture sediment after a wildfire removed much of the vegetation in the area. Sediment deposition was quantified as the mean sediment volume in the pond created by each dam to show sediment accumulation over time. Further, the different dam types captured sediment, preventing it from flowing downstream. It was found that the type of dam did not significantly affect the amount of sediment captured. However, factors other than dam type did influence sediment capture. These factors include dam design, channel topography, substrate type, vegetation, and land use. Comparing these factors suggests that dam placement and design adjustment to location is important when considering sediment capture effectiveness. Specifically, placing larger dams near erosive features, such as major roads, captured more sediment. Because of the lack of differences in dam performance, future dam installation may consider the price of dam installation as a key decision-making variable.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Dams, Beaver Dam Analogues, One Rock Dams, Post-Assisted Log Structures

Assessing High-Speed Rail (HSR) Policy and Politics in Washington State: Avoiding the Mistakes of the Past

Landen Kaya Hashimura
Project Mentor(s): John Bowen

Following many years of stagnation, the United States is currently experiencing a revolution in its transportation policy, with High-Speed Rail (HSR) being a popular point of discussion in legislative circles. HSR offers a slew of benefits, due to its smaller environmental footprint, high travel speeds, and utility as an economic stimulus. HSR lines can foster the development of “megaregions”, which are regions of interconnected cities that form one greater economic area. One of these potential megaregions is the Cascadia megaregion, consisting of Oregon, Washington, and the British Columbia. This thesis aims to assess policies and politics of HSR in Washington State and the surrounding Cascadia megaregion. The methods for this assessment range from analysis of HSR policies through methods such as multiple-criteria decision analysis and political regression analysis. County-level voting data from the 2008 California election will be used for regression modeling; during this election, California voters voted in favor of proposition 1A, a measure which approved funding for the construction of the California HSR project. Utilizing this data, I can create a regression model to evaluate the significant political variables that play into projecting voter support for a statewide HSR project. Using 2020 Washington election data, election results can be inputted by county into the model to create a map of projected voter support for HSR in Washington. Currently, there is limited existing research on the politics of HSR in the United States. By focusing on a political and policy perspective, this thesis aims to address shortcomings in previous attempts to research and build HSR in the U.S., and to provide a model that can be used in preliminary analysis to assess the political viability of HSR in a state.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: High-Speed Rail, Politics, Transportation, Policy, Railways, Political Projections

Environmental Studies

Analysis of Floodplain Restoration at Mercer Creek

Kira Pinkerton, Mike Bosko (Mid-Columbia Fisheries), David Cordner
Project Mentor(s): Clay Arango

Habitat restoration is a vital tool in aiding threatened and endangered species such as Pacific Salmon, yet many are not monitored after implementation, leaving land managers with limited data to evaluate effectiveness. In 2020 Mid-Columbia Fisheries Enhancement Group performed a restoration at Mercer Creek including the removal of crack willows, replanting with native species, re-channelization of the creek, and addition of floodwater retention features. I measured stream bed change in 2021 and 2023 using 1) Wolman pebble counts to measure median particle size in the upstream and downstream parts of the project, 2) sediment cores to understand the composition of the upper 10 cm of the stream bed, and 3) organic matter analysis of stream sediment. I found an increase in downstream median pebble size, and a shift toward larger particles in sediment cores from 2021 to 2023 suggesting stream sediments were sorted by hydraulic removal of fine particles after restoration. I also measured a significant increase in organic matter content ($p=0.017$), which might indicate contributions from upstream organic matter sources moving through the restoration reach. Despite these changes, the overall course of Mercer Creek remains unchanged, indicating relatively minor post-restoration channel changes.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Habitat Restoration, Stream Bed Composition, Environmental Processes, Impact on Local Species

Geography

Carolina Maria De Jesus' Life In São Paulo, Brazil

Katie Lender-Aberle
Project Mentor(s): Sterling Quinn

Constructing maps of previous time periods can help us to better understand the lives and experiences of important historical figures. This project aims to digitally reconstruct the landscape of São Paulo, Brazil as it would have been seen by Carolina Maria De Jesus. Her diary Child of the Dark, spanning the years 1955–1959, gave many Brazilians their first view of the life of a Black woman from the “favela” neighborhoods. Using many historical research and geospatial analysis resources, the project started by collecting air photos from 1958, around the time the diary was written. Then, we georeferenced the imagery so it could be overlaid with modern day map layers in geographic information (GIS) software. The next step was getting current road map data, meticulously comparing it to the imagery, and deleting any roads that did not exist in 1958. This process was followed by digitizing the roads that were different from the current road data and adding missing road segments. The project continued by referencing other maps from the time period to digitize the locations of railroads, parks, cemeteries, rivers, and other water bodies at the time of the diary. This historical basemap of São Paulo will be used to support future research attempting to locate and map all locations mentioned in Child of the Dark.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Geography, GIS, Maps, Air Photo, Historical

Walkability by Amenity Density: Bellingham, WA vs Dundee, Scotland

Benjamin Lombardi
Project Mentor(s): John Bowen

The way we choose to get around our cities controls how much of the city is accessible, utilized, and comfortable. The positive characteristics of walking has made it a more popular mode of transportation, although many American cities are designed to be car dependent. In 2021, only about 2 percent of US workers walked to their jobs while nearly 8 percent drove at least an hour each way. Walkable cities have lower carbon emissions, save time and space while simultaneously increasing face-to-face interactions, strengthening community and enjoyment of the city. Europe has often been viewed positively when it comes to walkability, and in this research the city of Bellingham, Washington is compared to the similar sized college city of Dundee, Scotland. This research uses data from OpenStreetMap and several geographic information systems to analyze the availability of walking to amenities such as daily and occasional errands, entertainment/arts/culture, public transportation, education and "third places" (e.g., pubs, coffee shops, churches). Neighborhoods in each city with good access on foot to multiple amenities are identified. The areas with more overlap means more types of amenities are available within walking distance. Not just walking but being able to bike, take public transportation, drive, or simply having options in how we live in cities is healthy. Having all amenities within a fifteen-minute walk provides citizens with these freedoms.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Walkability, Third Place, Open Street Map, ArcGIS, Car Dependent, 15 Minute City

ENSO Impacts on Snow Water Equivalent in the Eastern Cascades, Washington State

Alex Moreno
Project Mentor(s): Karl Lillquist, John Bowen

El Niño Southern Oscillation (ENSO) has been shown to have a significant impact on snow water equivalence (SWE) in the western United States. Previous studies have not looked at the ENSO impacts of SWE on smaller scales. Eastern Washington is a region of Washington State that heavily relies on snowmelt for supplying baseflow for streams outside of the winter months. This study looks at the impacts of ENSO on the Eastern Cascades. A matched-paired t-test shows that ENSO has significant differences in SWE between each of its phases. Linear regression models show that SWE is significantly influenced by ENSO throughout the Eastern Cascades. An El Niño phase reduces SWE while a La Niña phase increases SWE. SWE is significantly influenced by ENSO at lower elevations (2000-6000 feet) likely due to the warmer conditions associated with El Niño phases. At all elevations, El Niño reduces SWE while La Niña increases SWE, but the influence of ENSO is less pronounced at elevations over 5000 feet because of colder conditions at higher elevations. The models also show that SWE is significantly influenced by ENSO at different distances from the Cascade crest. ENSO significantly impacts SWE with distances over 250,000 feet (47 miles) from the Cascade crest, but the models did not show a pattern of influence with distance. The current study may be utilized by water resource managers in Eastern Washington to better understand ENSO and develop water management strategies.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: ENSO, El Nino, La Nina, Snow water equivalent, Eastern Cascades, Washington State

Fire-Vegetation-Climate Interactions: An 8,000-Year-Long Paleoecological Reconstruction From Round Lake, Idaho (USA)

Audrey Scott

Project Mentor(s): Megan Walsh

Lake sediment-based paleoecological reconstructions provide detailed information on fire history and vegetation change through time and indicate how those histories responded to past climate variability and human activities. The Idaho Transportation Department recently contracted archeologists from Eastern Washington University (EWU) to assess potential impacts to cultural resources near McArthur Lake in Bonner County, Idaho, as the result of rerouting U.S. Route 95. The goal of this research is to aid EWU archeologists in their interpretation of the artifacts recovered from the McArthur Lake site by providing them with a local paleoecological reconstruction. In summer 2022, we extracted a 13-meter-long sediment core from Round Lake, which is located in Round Lake State Park, approximately 7 km south of Sandpoint, ID, and 46 km south of the McArthur Lake site. This thesis will provide information on how climate variability influenced fire and vegetation patterns in northern Idaho and add to our understanding of how these trends compare to sites in the western portion of the PNW. This research will also enhance the interpretation of cultural resources and human activity during the Holocene and how this changed post-EuroAmerican contact.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Fire, Paleoecology, Resource Management

Modeling Recreational Risk on the Landscape: A GIS Analysis of Recreation Accident Response in the Vicinity of the I-90 Corridor, Washington

Naomi van Roon

Project Mentor(s): Mike Pease, Sterling Quinn

Search and Rescue teams across Washington respond to over 900 missions to assist someone in need each year. Many of these incidents result from outdoor recreational activities on public lands near Interstate 90 in the western Cascades of Washington. Increased understanding of areas vulnerable to recreator injuries could inform land managing agencies of risk zones on the landscape, while potentially decreasing response times from rescue organizations. Mount Si and Middle Fork Snoqualmie Natural Resources Conservation Areas are among the most popular recreational lands in Washington with up to 100,000 recreationalists using these trails each year. This thesis aims to: 1) analyze historical incident data to create a list of risk factors on the landscape that influence SAR accident response, 2) use GIS to model risk and visualize vulnerability on a map, and 3) use the model to create a decision support system for land managers of recreational lands. An informed approach to recreation emergency management is important because it could mean the difference between life, death, severity of injury and hours or days before someone is found and/or assisted.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Search And Rescue, Outdoor Recreation, Risk, GIS, Accident Response, Washington State

Geological Sciences

Image Analysis for Improved Mineral Separation Efficiency

Lynn Bauer
Project Mentor(s): Chris Mattinson

Initial tests are performed by photographing a mineral grain sample and adjusting exposure, light levels, color values, and thresholds. Each sample is characterized using four photo pairs at 5x magnification, where each area is captured first under plain light and then under shortwave ultraviolet (UV) light. The UV photos detect presence of florescent zircon, while visible light photos allow for a full grain count. These two images are then compared to calculate zircon abundances. After adjustment of program details, it is possible to gain a reasonably accurate grain count using threshold definition and Region of Interest (ROI) counting. The accuracy of the grain count is determined by visual examination of clustered grains. This image analysis approach allows for detailed quantification including grain number, grain size, and area percent occupied by zircon crystals. Future work will apply this imaging and analysis method to quantify the impacts of mineral separation conditions in order to improve the time and yield efficiency of the mineral separation method. Image analysis combining UV and visible light photos can be adapted to other applications requiring quantification of florescent minerals, and it is beneficial to improving mineral separation methods.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Geology, Mineralogy, Mineral Separation, Image Analysis

Mastersizer Calibration Project

Aimee Dugger
Project Mentor(s): Breanyn MacInnes

The Malvern Mastersizer 3000 is an instrument used to determine grainsize distribution in soil samples. Geology graduate student Emily Polizzi noticed in 2022 that the data coming from samples would have a hitch in the beginning of the graph of grainsize distribution at 1 micron, when it should be a smooth line. In other people's samples over the last few years, the issue existed at both 0.5 and 0.1 microns. The goal of this project is to run soil samples through the Mastersizer set to three different absorption indexes (1, 0.1, and 0.01) in an attempt to remedy this issue. Changing the absorption index affects the amount of energy that is absorbed by the particle, and the higher the absorption rate, the more energy that will be absorbed by the particle, which directly affects the grainsize curve. Soil samples were run through the Mastersizer three times, twice at each absorption index. Each absorption index value was set for both a stirrer speed of 3,370 rpm, which is the ideal stirrer speed, and at 1,000 rpm, which is a stirrer speed that can drastically alter results. Each run will produce six different grainsize plots, two for each absorption index. So far, only samples ran through the machine with a 0.01 absorption index do not have the hitch. Testing the absorption indexes using the Mastersizer and comparing the new data to previous tests with the older data of the same soil samples has allowed me to determine whether changing the absorption index affects the rest of the grainsizes for a specific soil sample. By analyzing and comparing the data, I can determine how the absorption index affects the soil samples entirely, or whether the issue still lies with the Mastersizer.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Geology, Soil, Grainsize

Investigation of Increased Winter Coat Color Mismatch in Snowshoe Hare Due to Earlier Snowmelt Timing in Post-Fire Forests

Hunter Golat
Project Mentor(s): Susan Kaspari, Marketa Zimova
In the western US, climate change has driven a reduction of mountain snowpack as well as a marked increase in abnormally large wildfires, with massive implications for ecosystems and communities across the region. Snowshoe hare (Lepus americanus), a fire-dependent keystone species, face a visually striking consequence of climate-driven snowpack change in the form of coat color mismatch which increases predation and heat stress-related mortality, threatening long-term hare population stability and prey availability across boreal ecosystems. Large wildfires perpetuate snowpack change by decreasing canopy shading and darkening the snow surface through the deposition of charred wood, both of which can result in earlier snowmelt timing for over 15 years post-fire across wide areas of burnt forest. Using trail cameras and snow telemetry (SNOTEL) stations, snowshoe hare coat color mismatch and snowmelt timing is being monitored at high severity burn and unburned sites within the 2012 Table Mountain fire perimeter in central Washington. This work seeks to determine whether post-fire earlier snowmelt timing increases the likelihood of coat color mismatch for snowshoe hare, with the goal of providing land managers with greater context of the ecological impacts of abnormally large wildfires in snow-adapted ecosystems.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Snow, Wildfire, Wildlife, Ecology, Climate Change, Snowshoe Hare

Developing a Portable X-Ray Fluorescence Analysis Method to Support Mapping and Geologic Hazard Assessment in the Kittitas Valley

Brice Liedtke
Project Mentor(s): Chris Mattinson, Marie Takach, Andrew Sadowski
The portable X-ray Fluorescence analyzer (pXRF) has been commonly used for examining major and trace elements in many materials across a wide range of professional and academic disciplines. This study is focused on developing a pXRF method to differentiate between separate flows of the Columbia River Basalts (CRBs) thereby enabling the mapping of faults that contribute to earthquake hazards. An in-house calibration must be established for the key elements needed to distinguish different flows (TiO2, MgO, P2O5, Cr, Nb, Zr, and V). We selected a set of five basalt samples with known compositions to establish this calibration. Analyses are conducted by placing basalt powders in XRF cups that include a thin film allowing the x-rays pass through. X-ray spectra are collected for 180-240 seconds each to ensure low-abundance elements are detected. Our ongoing work is quantifying the reproducibility and detection limits of this method. Depending on the results of this study, future work may include obtaining certified reference materials to improve the calibration and validating the method using a broader array of CRB flows. A validated pXRF technique will allow faster and cheaper geochemical analysis compared to traditional methods, thereby enabling more efficient and more accurate geologic mapping and associated hazard assessment.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Geology, Basalt, Hazards, X-ray Fluorescence, Method

Investigating LAP Deposition and Composition on Svalbard Using a 2021 Holtedahlfonna Shallow Ice Core

Oscar Orme
Project Mentor(s): Susan Kaspari, Elisabeth Isaksson, JC Gallet, Jack Kohler
The Arctic is warming at 4x the global rate, with warming particularly pronounced in Svalbard, Norway, where warming is 5-7x greater than global rates. A consequence of this warming is glacier retreat. In addition to rising temperatures, light-absorbing particles (LAP; i.e. black carbon (BC), dust, organics) can also contribute to glacial melt through snow albedo reductions causing an increase in energy absorption and melt. Previous LAP research on Svalbard has largely focused on BC from the incomplete combustion of fossil and biofuels. Dust as a LAP has been understudied in Svalbard causing a knowledge gap including the source, deposition and composition of dust. To address this knowledge gap, an 8.15m ice core from the Holtedahlfonna glacier on Svalbard (79°08'23.9"N 13°23'41.4"E) will be analyzed on the Single Particle Soot Photometer for BC concentrations, the Scanning Electron Microscope for grain morphology, and the Inductively Coupled Mass Spectrometer for trace elements. The core will be further studied through gravimetric filtration, which will reveal total particle concentration. Albedo reduction will be modeled in Snow, Ice, and Aerosol Radiation (SNICAR). Measuring these features will allow for a better understanding of LAP depositional trends, including where LAP are sourced from and how LAP interact in the cryosphere. I hypothesize that dust is the dominant LAP causing albedo reduction on the Holtedahlfonna glacier due to abundant local and long-range sources.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Dust, Norway, Glaciers, Climate Change

Analyzing Eruption Initiation Timescales of the Lava Creek Tuff Eruption at the Yellowstone Caldera Using Diffusion Chronometry

Laura Taylor
Project Mentor(s): Hannah Shamloo
Understanding eruption timescales allows us to not only understand the geological history of our planet, but also to better prepare for future eruptive events. While not expected to erupt any time soon, the Yellowstone volcano is best known for having produced multiple super eruptions in the past, with the most recent being the Lava Creek Tuff eruption approximately 600,000 years ago. This project aims to gain insight into the eruption initiation timescales for the Lava Creek Tuff eruption by analyzing samples from the ash fallout produced during the eruption. Crystals can develop chemical zoning patterns which record information about the environment they were formed in, including the conditions as well as duration of magmatic processes. Analyzing this chemical zoning allows for the estimation of the timescales of the pre-eruptive magmatic processes, known as diffusion chronometry. Such analysis was done with cathodoluminescence imaging of individual quartz crystals from the LCT using scanning electron microscopy. From there, grayscale analyses and modeling with a python script was used to determine the best fit timescale for each crystal chemical gradient. Consistent with prior research done on the Lava Creek Tuff, eruption timescales were on the order of decades, with the average number of years between the final magmatic event and eruption being approximately 47 years. This has implications for eruption forecasting in the event of a future eruption.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Geology, Volcanology, Volcano

Dobbs Cleaver Mt. Baker: Clinopyroxene Mg-Fe Diffusion & Eruptive Timescales

Mikyla Weiher, Hannah Shamloo, Emily Yoder
Project Mentor(s): Hannah Shamloo

Eruptive timescales are critical to understanding hazard threats and the danger associated with very high-threat volcanoes like Mount Baker in Washington state. This volcano is part of the Cascade volcanic arc and is located near the highly populated city of Bellingham and smaller Indigenous communities. The pre-eruptive timescales (or the timing between volcanic unrest and eruption) would serve to improve forecasting models, including hazard mitigation in the event of a future eruption. Overall, we lack the data on Mount Baker's pre-eruptive timescales. This study focuses on the Dobbs Cleaver lava flow of Mount Baker (~119 ka) by examining the zoning patterns preserved in clinopyroxene crystals. Utilizing Backscattered Electron Images collected on a Scanning Electron Microscope, greyscale zoning illustrates the pre-eruptive process and the changes in the magma system throughout its lifetime. Grayscale profiles were collected from the rim to the crystal's core using ImageJ software, representing a proxy for the Mg/Fe ratio. This chemical gradient is then modeled using diffusion chronometry at 1120 ÂºC to 1150 ÂºC (+/- 45ÂºC), which was determined using clinopyroxene-liquid thermometers. A Python script determined the best-fit time represented by each grayscale gradient. Diffusion chronometry results in a short pre-eruptive timeline of days to weeks, suggesting that Mount Baker can switch from quiescence to eruption in a short period.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Mt. Baker, Dobbs Cleaver Lava Flow, Pre-Eruptive Timescales, Clinopyroxene, Diffusion Chronometry

Interdisciplinary Studies – Social Sciences

Exploring the Bilingual Advantage: A Comparative Analysis of Executive Control in Bilingual and Monolingual Individuals

Malcolm Jasmin
Project Mentor(s): Tonya Buchanan

The Stroop Task is a widely used method for studying executive control. It helps to understand cognitive processes like inhibition and attentional regulation to examine how reading text and naming colors can interfere with each other. The study intends to use the Stroop Task to explore the executive control abilities of both bilingual and monolingual individuals. Previous research has shown that bilingual individuals perform better in the Stroop test compared to those who only speak one language (Bialystok et al., 2010). The impact of this advantage is believed to be due to the need to switch between languages and prevent interference from non-target languages, which strengthens executive control. This study aims to replicate these findings, with a specific focus on undergraduate students from Central Washington University as the sample population. The study aims to enroll 60 participants and expects bilingual individuals to demonstrate enhanced cognitive control due to their extensive experience suppressing the non-target language.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Stroop Task, Executive Control, Bilingualism, Monolingualism, Cognitive Control, Inhibition, Attentional Control, Interference, Language Switching, Cognitive Advantage

Law and Justice

The Current Situation of Gender Wage Gap

Shinhae Hwang
Project Mentor(s): Rodrigo Murataya
The gender wage gap has now been intensively investigated for a number of decades, but also remains an area of active and innovative research. (Francine et al, 2016, p1) As a measure of gender inequality, the gender wage gap has come to play an important role both in academic research and the public debate. (Bach et al, 2023, p.209) Over the last twenty years, increases in women's accumulated labor market experience and their movement into higher-paying occupations have played a major role in increasing women's wages relative to men's. (Explaining Trends in The Gender Wage Gap, 1998) This paper will attempt to analyze the current situation of gender wage gap.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Gender Pay Gap, US

Human Sexual Servitude in the United States

Tony Perez, Rodrigo Murataya
Project Mentor(s): Rodrigo Murataya
In the United States, the issue of human sexual slavery is still widespread and covert, with strong roots in social, cultural, and economic institutions. By exploring the complex aspects of this phenomenon with the goal of shedding light on its existence, underlying causes, and ramifications we can send a message to this growing industry. Based on an extensive analysis of academic literature, legal frameworks, and empirical data, this research clarifies the different types of exploitation and coercion that victims of sexual servitude encounter. Examining how gender, race, and socioeconomic status intersect and emphasizes how marginalized communities, especially women are particularly impacted. The study goes into the complicated structure of supply and demand by examining the network of traffickers, facilitators, and consumers that sustain this exploitation. This abstract illuminates the psychological and emotional trauma experienced by survivors by diving into the difficult dynamics of power and control inherent in human sexual captivity. This study highlights the critical need for comprehensive legislative reforms and victim-centered approaches by elucidating the systemic failures in prevention, identification, and prosecution. In the end, this abstract supports increased awareness, proactive action, and teamwork in the fight against human sexual servitude and in defense of everyone's basic rights and dignity.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Sex Trafficking, United States, Coercion, Exploitation, Human Rights

A Comparative Analysis of Bail Funds

Dakota Red Bow

Project Mentor(s): Teresa Divine, Cody Stoddard

The aim of this research project was to gather qualitative data about bail funds regarding what led to their creation, how they operate, any impediments they face, and their overarching goal(s). Bail funds from across the country were randomly selected and divided into "waves" A, B, C, and D. Each wave consisted of roughly 16 bail funds that were contacted via e-mail to see if they would be willing to do an interview. Attached to the e-mail was a consent form detailing that their responses would be recorded, transcribed, and coded (in an effort to maintain confidentiality). The consent form also described the purpose and process of the study. All of the members of waves A and B were contacted, but due to some unforeseen complications, the study stopped before waves C and D could be contacted. Of the 32 contacted bail funds, only four were responsive and willing to do an interview. The interview took place on Zoom, where it was recorded (only for the purposes of transcription) and later coded to remove any identifying information. The interviews all followed the same script comprised of 11 questions (with some sub-questions) in order to determine commonalities and differences among bail funds as well as the demographics they serve.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Bail Fund, Pre-Trial Detention, Jail, Cash Bail

Mathematics

Flood Insurance Claim Severity Prediction

Nicolas Brown, Roy Thomas

Project Mentor(s): Yvonne Chueh

Predicting claim severity is an important aspect for insurance companies when determining premiums and calculating reserves. One area of the insurance market where this is particularly important is the realm of flood insurance. This project aimed to create a predictive model that adequately predicts claim severity, in the event that a property is flooded. This was done using the different features of the property, as well as data on roughly 3900 instances of flooding claims from the open-access data from The Houston Chronicles. The most relevant features were determined to be the total number of losses recorded at the property, the flood zone the property is located in, the property value, the total number of claim payments for building damage over the life of the property, the total number of claim payments for contents over the life of the property, and the binary determination of whether or not the property was built after the first flood insurance rate maps for the area took effect. Multiple different machine learning models were produced using multiple regressions, general linear models, principal components, and tree based methods. Comparing these, it was determined that the 4-component partial least squares (PLS) regression was the most optimal model, with an approximately 1.3% underprediction, on average. It was further noted that to avoid underestimates, the 3-component PLS model should also be considered, as it overvalued the expected claim amount by 8%.

Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Insurance, Flood, Statistics, Prediction, Data, Analytics

Central Washington University Undergraduate Retention Study

Jace Gonzales, Ian Seibel
Project Mentor(s): Yvonne Chueh

In this project, we investigate what happened with the enrolled students at Central Washington University by analyzing possible factors that might cause or lead students to leave their chosen program before graduation. We plan to observe student finances (e.g., financial aid, scholarships, work-study, on-campus employment, the purchasing power of student dollar, etc.), credit hours (part-time vs. full-time), gender, ethnicity, to find out how they might have changed over past years to see how they might affect or correlate with whether a student would graduate from the university versus leave prematurely revealed by the enrollment shifts and target graduation dates. We used datasets from Central Washington University resources to analyze the overall changes in student retention extensively. We hope this project contributes to the best course of action for the university to invest in the future.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Undergraduate, Enrollment, Finances, Tuition, Ellensburg, Retention

Optimizing Kidney Allocation: A Hopeful Solution

Alexandria Kitchpanich, Indiah Cosgrove
Project Mentor(s): Jean Marie Linhart

The Kidney Exchange program, devised by Alvin E. Roth, Tayfun Sönmez, and M. Utku Ünver, addresses the pressing challenge of organ scarcity by optimizing the allocation of living donor kidneys to patients afflicted by Chronic Kidney Disease (CKD). This program was developed due to the discrepancy between the number of patients who are added to the kidney transplant list and the number of available donor kidneys, both from living donors and cadavers. Central to the program is an algorithm meticulously crafted to match donors with recipients in a manner that maximizes compatibility and preference alignment, thereby enhancing the efficacy of kidney transplantation. Through quantitative analysis of this algorithm and its outcomes, we aim to clarify the multifaceted implications of this initiative within the medical landscape. Through qualitative narratives, we aim to discuss a nuanced understanding of the program's ability to alleviate the burden on transplant lists and provide hope to those awaiting life-saving procedures.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Kidney Donation, Medicine, Graph Theory, Algorithm, Biology

U.S Economic and Crime Rate Relationship by States

MinChieh Lee
Project Mentor(s): Yvonne Chueh

The crime rate in the U.S. has recently increased significantly. Crime rates are closely related to overall economic health. When choosing a location for business activities, the two main factors to consider are the area's economic conditions and the safety of doing business in the area. As major international companies plan to enter the U.S. market, I will examine the economic conditions and their respective crime rate relationships per state across the United States.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Economics, Statistics, Crime Rate

Physics

Evaluating the Uncertainty of the Lifetime of a Muon

Colton Bishop
Project Mentor(s): Michael Braunstein
An apparatus displayed on the second floor of Discovery Hall is used for detecting cosmic ray generated muons. The data from the apparatus consists of the distribution of values for the decay time for a large number of muon events which can be analyzed to evaluate the lifetime of muons. This project consists of analyzing the uncertainty of the lifetime measurement obtained from this data. When analyzing the data, the distribution can be binned in a myriad of ways, allowing variable choices of binning schemes. By using the Monte Carlo technique in Mathematica, we can evaluate the uncertainty of the fit values of the muon lifetime. The results of this analysis currently support our hypothesis of a relationship between the uncertainty of the muon lifetime and the choice of the binning scheme. Developing an understanding of how uncertainty varies with bin scheme will allow a better evaluation of the muon lifetime using this apparatus.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Muons, Muon Lifetime, Uncertainty, Data Analysis

Design, Construction, and Characterization of a Low-Energy Electron Accelerator.

Nic Boyles, Bobby Campbell, Christian Laurent, Chakrit Saha, Peter Zencak, Addison Wenger, Dr. Mehran Zaini
Project Mentor(s): Dr. Mehran Zaini
This research project presents the design, construction, and characterization of a low-energy electron accelerator tailored towards undergraduate physics research. This apparatus will allow for future research into fundamental aspects of medical physics, radiation mechanics, and electrodynamics. The accelerator's compact size, affordability, and ease of operation make it a readily available resource for undergraduate laboratories. Additionally, the modular nature of its construction allows for rapid experimentation and the addition of future components. To evaluate the quality of the accelerator, beam characterization was conducted by varying two independent variables: beam length and applied voltage, while measuring dependent variables such as input current, Faraday cup current, and time delay. A comprehensive analysis was performed, examining four beam lengths across ten applied voltage levels each. Results demonstrated a non-linear relationship between applied voltage and output current, indicating the correct operation of the device. This is an important step towards future research using this device. The promising outcomes of this low-energy electron accelerator establish it as a reliable platform for investigating electron beam characteristics. Moreover, the collaboration with professional entities such as Northwest Medical Physics Center (NMPC) strengthens the project's significance by establishing a direct link to advancements in medical physics. This research project not only advances student understanding of electron beam behavior, but also enriches undergraduate education in physics while fostering connections with the broader scientific community.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Physics, Medical Physics, Linear Accelerator, Experimental

Biophysical Mechanisms Underlying Neural Degeneration and Disease: A Computational Study

Stephanie L. Denton, Calvin T. Sprouse
Project Mentor(s): Erin M. Craig, Christopher W. Manry, Bridie D. Eckel, Peter W. Baas
Brain neurons contain filaments called microtubules (MTs) which provide structure for the cell, and serve as pathways for molecular cargo transport. These filaments have a growing end, known as the plus-end, and a stable end, known as the minus end. Neurons have a long fiber that extends from their cell body, called axons, which allows for electrical communication with other neurons. Disruption of axonal MT arrays is a key factor in nerve degeneration associated with neurodegenerative diseases such as Alzheimers. In healthy developing axons, nearly all MTs are oriented with their plus ends away from the cell body, referred to as a "plus-end-out" polarity pattern. This structure is under threat of corruption by the generation of "minus-end-out" MTs through nucleation, flipping, mechanical bending and breaking, and severing induced flipping. We use agent-based simulations of molecular motors to investigate emergent self-organization of the cytoskeleton through the removal of minus-end-out MTs. This mechanism is driven primarily by motor proteins sliding maloriented MTs towards the cell body, removing them from the array. We investigate the limit to this "polarity sorting" mechanism where the axon accumulates a polarity flaw and fails to recover. Specifically, we investigate how the MT length distribution impacts the effectiveness of polarity sorting, and we discuss the relevance of these results in the context of published experiments for different types of neurons.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Brain, Neurons, Axons, MTs, Microtubules, Proteins, Molecular, Motors, Molecular Motor, Computational, Disease, Motor, Microtubule, Protein, Neuron, Axon

Shifting Rails: Neuron Microtubule Polarity Pattern Formation

Rafe Habedank
Project Mentor(s): Erin Craig

Disruption of the microtubule (MT) array in axons is associated with neurodegeneration, with numerous studies demonstrating a link between neurodegenerative diseases and loss of microtubule mass or changes in microtubule stability. Several recent studies have presented evidence that the polarity of axonal microtubules is also essential to healthy neuronal function. In axons, microtubules are predominantly oriented with their plus ends away from the cell body, referred to as “plus-end-out” polarity, with a few MTs oriented oppositely with “minus-end-out” polarity. To investigate the physical mechanisms by which the axon establishes and maintains this polarity pattern, our group previously developed computational simulations of the evolving microtubule array in a short segment of axon (approximately 10-50um). These simulations demonstrated that molecular motor-based sliding of anti-parallel MTs can account for the maintenance of a predominantly plus-end-out polarity pattern in short axons, through a polarity sorting mechanism in which short minus-end-out MTs slide toward the cell body and are ‘cleared’ from the axon. Here, we extend this investigation to consider longer axons, on the order of a meter, to determine if the same sliding-based polarity sorting mechanism can account for polarity pattern maintenance in physiological contexts such as the sciatic nerve in the human body. We use a combination of computational simulations and analytical models to predict the evolution of the spatial distribution of plus-end-out and minus-end-out MTs along the axon. Our models demonstrate that sliding of anti-parallel MTs produces spatially separated domains with minus-end-out MTs aggregating close to the cell body and plus-end-out MTs distributed evenly along the rest of the axon, regardless of axon length. However, the time required for most minus-end-out MTs to be ‘cleared’ from the axon through motor-based sliding increases with axonal length, suggesting that longer axons are likely to rely on additional mechanisms for preventing accumulation of minus-end-out MTs.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Biophysics, Physics, Biology

Testing a Novel 3D-Printed Microscope Slide For Live-Cell Imaging

Gabrielle Johnson, Nathan Kuwada, Rafe Habedank
Project Mentor(s): Nathan Kuwada

Observing how bacteria react to changes in their environment in real time can provide important dynamic information, but current technology to exchange metabolites or antibiotics on microscope slides is expensive and difficult to access. We created a prototype 3D-printable microscopic slide that allows fluids, such as antibiotics, to be introduced to bacteria through diffusion while under observation in a microscope in order to observe effects in real time. Here we present the design, prototyping, and testing process to verify the slide design will function.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Biophysics, Microscopy

Investigating Suitable Test Wavefunctions To Study Different Quantum Systems Using Variational Methods

Christian Laurent
Project Mentor(s): Benjamin White

When seeking to understand quantum systems such as ensemble of particles, atoms and/or molecules, one basic characteristic to determine is the system's ground state energy, E_0. E_0 is the lowest possible energy for a particular system and knowing it allows you to understand the system and its behavior at or near zero temperature. Unfortunately, exact values for E_0 cannot be calculated for most quantum systems. Therefore, scientists use approximation methods such as the variational method to determine approximate values for E_0. In the variational method, the minimum expectation value for total energy, $\langle H \rangle_{min}$, is calculated using a parameterized test wavefunction. The result will be an upper limit for the exact E_0 value. In this project, we developed some rules of thumb for selecting suitable test wavefunction to use in variational methods calculations. We selected several distinct test wavefunctions to calculate $\langle H \rangle_{min}$ for different quantum systems. The test wavefunction giving the lowest value of $\langle H \rangle_{min}$ is the most accurate approximation for E_0 for a given quantum system. We compared each $\langle H \rangle_{min}$ result for different quantum systems and developed strategies for how to select a test wavefunction that will provide the most accurate approximation of E_0 when applying the variational method. These results will be beneficial to undergraduate and graduate students applying variational methods in their quantum mechanics coursework and/or research.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Variational Methods, Ground State Energy, Quantum Mechanics, Potential Energy Wells, Approximation Methods

Experimental Evaluation of the Fourier Series on a Physical System

Lance Nicholson
Project Mentor(s): Michael Braunstein

The Fourier Series is a way of expressing a periodic function as an infinite sum of trigonometric functions; sines and cosines. The purpose of this project is to provide upper-division physics students with the opportunity to experimentally evaluate the Fourier Series and its associated harmonic components by performing a series of measurements on a physical system. The approach developed in this project requires an RLC bandpass filter circuit, an oscilloscope, and a function generator producing sawtooth waves as input. The exercise has students tune the input frequency of the system so that the frequency of a selected harmonic is equal to the resonant frequency of the filter. The amplitudes of several harmonics are then measured and the ratio of each harmonic's amplitude to every other harmonic's amplitude is calculated. This is compared to the theoretical ratios of the harmonic values. The typical results allow the validity of the Fourier Series to be evaluated.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Fourier, Fourier Series, Harmonics, Waves, Circuit, Bandpass, Frequency, Physics

How Does a Solar Eclipse Affect Earth's Atmosphere?

Eli Pugsley, Elizabeth Tanner
Project Mentor(s): Darci Snowden
This project collaborated with the Nationwide Eclipse Ballooning Project (NEBP) to deploy sensors up to 110,000 feet into the Earth's atmosphere via weather balloons before, during, and after two solar eclipses. The data collected has been and will continue to be analyzed to determine the height of the planetary boundary layer and the presence of gravity waves following the eclipse. Partnering with NEBP provided the necessary supplies for balloon launches and access to a much larger dataset collected by teams nationwide, allowing for more comprehensive analysis.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Eclipse

Measuring the Infrared and Ultraviolet Radiation and Re-Radiation Response During a Total Solar Eclipse

Matt Ryan, Alexander Hardiman, Joseph Gabriel Burke
Project Mentor(s): Darci Snowden
The 8 April 2024 total solar eclipse, which traversed the southeastern United States, allowed for the examination of atmospheric responses through weather ballooning. As part of Central Washington University’s High-Altitude Science Lab (HASL), the team launched a scientific payload in Lake Tawakoni, Texas to measure how the eclipse affects the electromagnetic radiation and re-radiation within the atmosphere. The payload carried sensors measuring near-infrared (IR) as well as Ultraviolet A and B (UVA and UVB). Two sets of sensors are attached to the payload, one set facing up to obtain the IR and UV radiation from the corona and background stars, and one set facing down to pick up radiation reflected and re-radiated off of Earth and dispersed in the atmosphere. The response of the electromagnetic spectrum during the eclipse will shine a light on how the atmosphere interacts with UV and IR radiation. This information could help atmospheric and climate scientists improve how climate change is handled.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Atmosphere, Eclipse, Solar Radiation

Wildcat Rocketry's Vehicle Design and Build for the 2024 NASA University Student Launch Initiative

Elizabeth Tanner, Alexander Hardiman, Jacob Rogers, Makaila Puhrmann, Brycen Geck, Harrison Fishburn, Trevor Finnern, Nathan Kanz, Mel Steeples, Joseph Gabriel Burke
Project Mentor(s): Darci Snowden

The NASA University Student Launch Initiative (USLI) is an annual project where university teams research, design, build, and launch a high-powered competition rocket. In addition, teams must also design a unique scientific payload. Teams must closely follow a handbook of rules and requirements for the design and construction of their rocket and payloads. Throughout the nine month project, teams are required to submit large technical documentation and present it to a NASA panel, following the engineering design lifecycle. Teams are required to submit a proposal for entry, Preliminary Design Review (PDR), Critical Design Review (CDR), Flight Readiness Review (FRR), and a Post Launch Assessment Review (PLAR). The 2023-2024 Central Washington University team Wildcat Rocketry submitted a proposal in August 2023 and were accepted into the competition. This year, our vehicle is designed to carry a large payload to an altitude of five thousand feet. The vehicle was designed from scratch using simulation software and then built after design changes. A subscale of the vehicle was built and flown, and the full-scale vehicle was tested and flown before the final competition flight. The payload is designed to eject from the rocket on descent and land passively without assistance from parachutes or streamers. The payload must conform to predetermined "human survivability metrics", as the payload challenge is inspired by the future Artemis missions. The final competition flight takes place in Huntsville, Alabama, where all 53 teams will launch their rockets.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: NASA, Rocket, Payload, Engineering, Competition

Political Science

The First Amendment in the Supreme Court: Selected Cases 2023-24

JJ Hodgins
Project Mentor(s): Todd Mildon

When questions arise about whether First Amendment rights have been violated, the Supreme Court is the final authority. This project focuses on issues involving Free Speech rights of individual citizens and the government: explored and examined through the lens of selected cases arising in the Federal Courts in 2023-2024.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Supreme Court, First Amendment, Freedom of Speech, Law

Crazy Train: Politics of High-Speed Rail in the United States

Stephen Martin
Project Mentor(s): John Bowen

This project examines the impact of political and geographic polarization on high-speed rail projects in the United States. Drawing from scholarly articles, opinion polls, newspaper articles, and election results, this paper demonstrates that suburbanization and the construction of interstate highways have created a geographically polarized political climate that serves as a barrier to the implementation of HSR in the US. In examining these factors, this project contributes a more comprehensive look at how the US' built environment has impacted its political discourse and Americans' attitude towards intercity rail. This analysis is particularly necessary as prior research on HSR in the US has primarily focused on economic or practical arguments, and discussions of its politics have been focused on projects in specific states.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Transportation, Politics, Geography

Predicting Taiwan's State of Sovereignty in the Next Decade

Barrett Stengele
Project Mentor(s): Bernadette Jungblut, Shawn Reichert

Over the course of the last decade, the People's Republic of China's (PRC) increasingly aggressive posturing towards the Republic of China (more commonly known as Taiwan), both politically and militarily, has left Taiwan's future as a country in a state of uncertainty. Further complicating matters, Chinese President Xi Jinping's recent calls to have the Chinese military prepared for an invasion of Taiwan by 2027 have left many onlookers worried about the possibility of a potential military conflict in the Pacific Ocean. Taiwan is of both economic and strategic value to the United States and China alike, which may prompt U.S. intervention in the case of an invasion. This research examines four prospective hypotheses: First, other countries recognize Taiwan's state sovereignty, strengthening its claim to independence from the PRC. Second, Taiwan willingly integrates with China – becoming part of the People's Republic of China. Third, the PRC invades Taiwan. Fourth, no major developments happen outside of the status quo. This research generates a predictive model for Taiwan's sovereignty across the next decade. Ideally, this model will help other scholars better comprehend future political interactions among the PRC, Taiwan, and the United States.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Chinese Communist Party (CCP), Chinese Nationalist Party (KMT), Democratic Progressive Party (DPP), Geopolitics, International Relations, People's Republic of China (PRC), Power, Sovereignty, Taiwan

Primate Behavior and Ecology

Human Impacts on the Needs of the Bonobo (*Pan paniscus*)

Em Bradford-Brann; Lori Sheeran, PhD; Karisa Terry, PhD
Project Mentor(s): Jessica Mayhew, PhD; Lori Sheeran, PhD; Karisa Terry, PhD
My research project investigated the effectiveness of arts-based educational interventions in enhancing conservation awareness for the endangered bonobo (*Pan paniscus*). This ape species is endemic to the Democratic Republic of Congo and relies solely on the ecology of the Congo River Basin to survive. Traditional methods of education can have limitations in conveying the complexity of conservation topics. Arts-based educational methods offer a different approach to address these challenges by utilizing creative expression, through which a deeper connection to this species might be fostered. I compared the use of traditional educational methods and an arts-based intervention, including a website and comprehensive lesson plan, to help college students enhance awareness and understanding of bonobo conservation issues and test the efficacy of an arts-based educational method compared to traditional methods. Both study groups were supplied with a lesson plan to research specific aspects of bonobo behavior and ecology. The arts-group created their own arts-based project, whereas the non-intervention group received traditional teaching methods to create a written project. Students completed a pre- and post-assessment to gauge their knowledge and perceptions of the materials. Data collection and analysis will be completed using Qualtrics software. By integrating visual arts into the curriculum of 100-level anthropology courses, this research project aims to evaluate the effectiveness of arts-based strategies in the university classroom.
Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Art, Biodiversity, Bonobo, Conservation, Education, Outreach

Primate Culture and Learned Behavior Research Gap

Taylor Churchel
Project Mentor(s): Paula Collucci
A large portion of primate behavior research is based a lot on the physical behavior of a singular primate. This focus can cause a lot of problems for future primate research and for the primate troops by causing a lot of misinformation and the clarity of how different behaviors arise. This literature review addresses the research gap to potentially help future researchers and primate troops gain clear and correct information. The literature review addresses the gaps within the research: very little research has been conducted on entire primate troops. This kind of research leads to a better understanding of learned behaviors and potential of culture development within these groups.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Research Gap, Literature Review, Primate Behavior, Culture of Troop, Physical Behavior, Primate

Behavior and Enrichment Use in Rhesus (*Macaca mulatta*) and Japanese Macaques (*M. fuscata*)

Jessica Oscavich
Project Mentor(s): April Binder

To improve the well-being of captive nonhuman primates, it's important to understand their behavior. Rhesus (*Macaca mulatta*) and Japanese macaques (*M. fuscata*) are two closely related species that are utilized in behavioral and biomedical research. In this study, I compared the frequency of stereotypic behaviors, which are repetitive, non-functional, abnormal behaviors, and enrichment use between four groups of each species at the Oregon National Primate Research Center. Stereotypic behaviors were divided into motor, which the animal performs while active, and self-directed stereotypies, which the animal performs towards themselves. Rhesus macaques performed significantly more motor stereotypies, than Japanese macaques did. There was no significant difference in the frequency of self-directed stereotypies performed between the species. Regarding enrichment use, rhesus macaque groups received pools during hot days (≥ 85°F), while the Japanese macaques did not because they didn't utilize them. The results show that the rhesus macaques utilized their pools when present, as their enrichment use significantly increased and they were more likely to be visible in their outdoor enclosures. Japanese macaques were more likely to do activities other than interacting with enrichment items, such as resting. The results of this study demonstrate that there are behavioral differences between closely related macaque species housed at the same facility. Facilities should utilize these differences, as well as individual differences, to provide the best behavioral management to all nonhuman primates in captivity.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Nonhuman Primates, Animal Welfare, Primatology, Anthropology, Primate Behavior

Psychology

Immigrant Population Growth: Regional Variability in Threat Perceptions and Attitudes

Madison Barnes; Aysiah Hwande; Cate Wassell; Patrizia Chirco, PhD; Tonya M. Buchanan, PhD
Project Mentor(s): Tonya M. Buchanan, PhD; Patrizia Chirco, PhD
The "great replacement theory" is a conspiracy theory alleging that White individuals are systematically being replaced by non-White immigrants (Rose, 2022), fueling violence and prejudice against marginalized groups (Obaidi et al., 2021). However, it remains unclear if these effects extend to immigrants broadly and how beliefs vary by geographic region. Studying attitudes towards immigrant population growth is vital given shifting migration patterns due to climate change and conflict. Our research explores attitudes towards immigrants from diverse backgrounds and the interplay between threats, racial competition, and demographic changes. In Study 1 (N = 231), participants read reports highlighting population growth of Asian, European, African, or Latin American immigrants (randomly assigned). Participants exhibited increased negativity and perceived threats in European or Asian immigrant growth conditions. Study 2 (pre-registered, data collection ongoing) explores potential psychological mechanisms. We replicate Study 1's methodology and incorporate attitude-based, race-status, and racial competition measures (adapted from Gordils et al., 2021) and race-status associations concerning wealth, education, competitiveness, and submissiveness (Dupree et al., 2021). We anticipate that exposure to messages about Asian and European (vs. Latin American and African) immigrant population growth will heighten negativity and threat perception. Furthermore, we predict participants will attribute higher social status to Asian and European immigrants and associate them with greater wealth, education, and competitiveness. Lastly, we expect participants to perceive increased racial competition towards Asian and European immigrants. This research provides insights into attitudes towards immigrants amidst demographic shifts and has implications for understanding and addressing prejudice and intergroup relations.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Immigrants, Threat Perception, Attitudes

Beyond Binary: Highlighting Complex Identities/Interests Promotes Acceptance of Gender Non-Conformity

Jasmine Borland ; Zaire Preston; Tonya Buchanan, PhD
Project Mentor(s): Tonya Buchanan

Research suggests that emphasizing multiple facets of an out-group's identity promotes individuation and subsequent re-humanization. Considering the prevalent stigma and discrimination faced by transgender and gender non-conforming (GNC) communities, our study combines and applies Multiple Categorization and Social Identity Complexity theories to promote positive attitudes toward gender non-conformity. By prompting participants to reflect on their own gender non-conforming hobbies, thereby fostering a nuanced self-perception and potential similarities, we hope to mitigate anticipated interaction anxiety and reduce adherence to gender norms. Participants will imagine a classroom project scenario where their partner is said to be (based on random assignment): a man, a woman, or a GNC individual. As part of their introduction, participants will share their hobbies, selecting from a list that includes (based on random assignment) traditionally masculine and feminine hobbies, or more gender-neutral hobbies. A control group will skip the hobby task. Participants will then reflect on their anticipated interactions with their classmate and complete the Heteronormative Attitudes and Beliefs Scale. When paired with a classmate who identifies as GNC, we predict that participants in the gender-neutral hobbies condition will report lower levels of anticipated interaction anxiety compared to those in the gender binary reinforcing hobby conditions (traditionally masculine/feminine). We expect that participants who consider their gender-neutral hobbies will demonstrate reduced levels of heteronormative attitudes and beliefs. We will also explore whether demographic factors and selected hobbies influence these outcomes and whether decreases in anticipated interaction anxiety mediate differences in heteronormative attitudes between hobby conditions.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Social Identity Complexity, Multiple Categorization Theory, Gender Non-Conformity, Heteronormative Attitudes and Beliefs Scale, Social Psychology, Gender

Intimate Partner Violence During the COVID-19 Pandemic

Sara Elston
Project Mentor(s): Sara Toto

Intimate partner violence (IPV) is a crucial topic that has become a widespread issue occurring all around the world. Talking about IPV, sharing victims' stories, and raising awareness about this topic in general is vital for creating a safer and more supportive environment for victims and survivors. This can also help reduce the stigma surrounding IPV and the shameful feelings accompanying abuse. Due to the recent pandemic that struck the world in 2020, many individuals have questioned whether social distancing and isolation caused an inflation in IPV rates across the globe. This systematic review uncovers whether the circumstances of the COVID-19 pandemic influenced IPV rates and how other factors such as pregnancy, rural/urban location, and minority status affected those statistics. Seventy-four articles were included and organized based on risk factors (pregnancy, geographical location, and minority status). All articles were then evaluated and compared, and the lockdown procedures placed at the start of COVID-19 for that location were analyzed. Recommendations for intervention and limitations were presented for further risk factor research.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Intimate Partner Violence, IPV, Covid-19, Pandemic

Mobile Mental Health Applications: Knowledge and Usage Among Undergraduate Students

Ariel Folsom, Claire Burianek, Elliotte Wood
Project Mentor(s): Cristina Bistricean

With an increase in mental health awareness, higher education institutions have experienced an increase in undergraduate students seeking mental health support. This increase has put a strain on university counseling resources. The growing need for mental health support has individuals using online resources, including mental health mobile applications. Previous research suggests individuals may benefit from these online resources because of the accessibility and engagement of the technology being used. Even with these benefits, several limitations have been identified including relevance to the user and concerns with the sharing of personal information. Relevant questions address privacy and data security, application features and preferences, specific needs, and cost. By using a descriptive survey method, this study aims to explore undergraduate understanding of and use of mental health applications. Outcomes will also identify knowledge held by undergraduates regarding privacy and security of mental health app use. This study will attempt to address some of the gaps from previous studies including accessibility and use of the mental health apps by different demographic groups. The findings will allow for future research to address the gaps in mental health applications and measure their effectiveness in the treatment of mental health in undergraduate students and relieve some of the strain on counseling availability.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Digital Mental Health Technology, Self-Tracking, Mental Health Apps, Mental Health Monitoring, Undergraduates

Inference Differences Caused by Different Negative Facial Expressions

Ariel Folsom
Project Mentor(s): Anthony Stahelski, Mary Radeke

Facial inferences have primarily been used in research based on the six different expressions identified by Paul Eckman when expanding on the research and ideas created by Charles Darwin. Out of these six expressions, four are representative of negative facial expressions: anger, sadness, fear, and disgust. The current research study aims to answer the question of whether the facial expressions of anger and fear will yield similar results in negative social perceptions. Based on previous research, it's hypothesized that there will be significant difference in social perceptions not only between anger and fear, but also depending on the gender of the person performing the facial expression. It's expected that anger for both genders of the facial expression will present higher on the negative inference scale compared to both the male and female facial expression. Using the Karolinska Facial Database, participants looked at a randomly assigned face and answered questions about the given face. The set of questions were also randomized for each participant. The dependent variables asked participants to choose one emotion that would identify the expression being shown and were then asked a series of social perception questions. The results of this study provide support for the presented hypothesis that anger shows the highest level of negative inference when compared to the fear facial expression across both gendered facial expressions. From these results, the implications of stereotyping based on negative facial expression adds to the current knowledge on the subject.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Facial Inferencing, Negative Expressions, Social Perceptions, Stereotyping

Exploring Well-being: A PERMA Model Analysis of Undergraduate Experiences

Quaid Hunt, Kara Cook, AJ Mcauliffe
Project Mentor(s): Cristina Bistricean

Positive psychology studies conditions and processes that contribute to positive emotions and positive character traits. It is important for people to live their best life. When applied in education, positive psychology approaches supports cultivating positive emotions in schools to enhance students' wellbeing and promoting behaviors necessary to overcome current and future difficulties. Wellbeing has become a focus in education, especially with the increase of anxiety and depression. Universities that foster a campus culture of well-being provide opportunities for students to thrive academically and promote overall well-being, such as higher quality of life. The PERMA model encapsulates well-being by looking at five measurable aspects: Positive emotions, Engagement, Relationships, Meaning, and Accomplishment. The goal of this study is to utilize the PERMA model and questions about current undergraduate experiences such as friendships, social interactions, work status, and academic goals and achievement, to assess undergraduate experiences and their impact on well-being. The participants of this study included undergraduate students from a local university. Correlational methods and group comparisons will be used to understanding the factors that impact undergraduate well-being. Outcomes could identify the need for student support systems, in particular, faculties such as Housing, Resident Assistants, Wellness Centers, Counseling Services, Learning Commons, Academics i.e. University 101, and Disability Services. This could also encourage universities to improve existing modalities of support systems for undergraduates.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Well-Being, Positive Psychology, Positive Education, Positive Emotions, Undergraduates, PERMA Model

Investigating the Role of School Psychologists in Behavioral Assessment and Intervention in the Schools

Avery Kelley, Richard Marsicano

Project Mentor(s): Richard Marsicano

Best practices and federal legislation dictate that schools conduct a functional behavioral assessment (FBA) and implement a behavior intervention plan (BIP) whenever a student engages in a pattern of challenging behavior that interferes with their learning or the learning of others. Yet, continued calls from legislation, research, and general concerns among educators suggest that this is not occurring in many schools. While the exact practices of FBAs and BIPs in schools remain largely unknown, school psychologists are often regarded as having the training and expertise to fulfil this role and to coach others within the school. To better understand the practices of school psychologists within the state of Washington, interviews with five school psychologists regarding their role in behavioral assessment and intervention within their schools were conducted. Thematic Analysis was used to analyze the qualitative data from semi-structured interviews. Participants indicated that FBAs and BIPs are completed by multi-disciplinary teams within their schools; describing their individual contributions to these teams as well as the barriers and challenges faced to conducting FBAs and implementing BIPs that are consistent with best practice recommendations while utilizing a team-based approach. School psychologists in this study identified their role as facilitators to the behavioral problem-solving process, serving in a primarily indirect or procedural capacity rather than in a coaching capacity due to competing demands and priorities of the organization. These findings should inform future efforts to close the research-to-practice gap in this area by understanding the ways in which school psychologists are currently utilized.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: School Psychology, Challenging Behavior, Functional Behavioral Assessment, Behavior Intervention Plan, Problem-Solving Teams

Online Reading Intervention With the Mount Adams School District

Samuel Losee, Juli Gainer, Lanae Pope

Project Mentor(s): Heath Marrs

The CWU Reading Intervention Center in the Psychology Department serves K-4th-grade students needing support for beginning reading skills. The Reading Intervention Center is staffed by graduate students in School Psychology and CWU undergraduates. Starting in January 2024, School Psychology graduate students partnered with the Mount Adams School District to provide virtual synchronous one-on-one reading tutoring using the Sound Partners program. Sound Partners is an evidence-based intervention focused on early reading skills, including phonics, isolated decoding skills, and meaning-based learning (Vadasy et al., 2004). The Mount Adams School district is in White Swan, Washington, in the Yakama Nation. The student population is approximately 900 and is diverse, with students from various backgrounds (U.S. Census, 2020). Students helped include 5th graders identified as at-risk in reading. The partnership is part of the practicum experience for first-year school psychology students. The sessions are conducted three times a week for 30 minutes via Microsoft Teams. Moving forward, we hope to continue to expand this partnership to support students in rural communities. This poster will summarize the current project and introduce issues in delivering online interventions. Vadasy, P. (2005). Sound partners: A tutoring program in phonics-based early reading. Sopris West. U.S. Census Beureau. (2020). 2020 Census - School District Reference Map; Yakima County WA.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Reading Intervention, Online Intervention, 1:1 Online Tutoring, Mount Adams School District

Student Perceptions and Usage of Electronic Devices in College Classrooms

Mason Low, Harmony Lee, Angie Rios, Ryan Brookman
Project Mentor(s): Ralf Greenwald

Technology is increasingly becoming integrated into our everyday lives, especially in the classroom. Teachers and students alike rely on electronic devices such as computers and tablets to take notes, complete homework, and facilitate communication. With electronic usage increasing since the recent pandemic, negative effects from electronic devices on academic performance are on the rise. Devices such as cell phones can be distracting to the user and other peers. Electronic usage can vary depending on perceived difficulty level, mode of instruction, and length of lectures. This research study established an 11-13 question Qualtrics survey asking CWU students to self-report their perceptions on non-class related electronic usage in online or in-person classroom settings. Based on a previous pilot study and the effects of the pandemic, we hypothesize that self-reports on perception will show that non-class-related electronic usage in online settings is more likely to occur. Moreover, we predict that non-related electronic usage is higher in online students. Overall, the current study hopes to provide a better understanding of how instructors can design their lectures to be more engaging and avoid boredom as well as the temptation to use electronic devices in the classroom.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Student Engagement, Psychology, Classrooms, Technology

An Investigation of Working Memory Capabilities in Dancers

Mason Low, Harmony Lee, Angie Rios, Ryan Brookman
Project Mentor(s): Ralf Greenwald

The effect of dance has been linked to improved working memory, primarily in non-dancers in the older adult and adolescent populations. However, there is little research examining if dancers possess greater cognitive abilities, specifically in working memory. Furthermore, the existing research has not yet examined this relationship between working memory and dance in young adults. The current study aimed to bridge the gap in the literature by examining working memory in young adult dancers and non-dancers. For this study, behavioral data was collected using a Dance History questionnaire and the phonological and visuospatial subtests from the Test of Memory and Learning – II (TOMAL–II). It was hypothesized that dancers would perform better on working memory tests than non-dancers. Additionally, it was hypothesized that dancers with more dance experience would perform better on the working memory tests than dancers with less dance experience. Results showed that dancers outperformed non-dancers on working memory tests, particularly on the visuospatial tests. Although there was no difference between dancers based on dance experience, dancers did seem to have greater visuospatial memory compared to non-dancers. These results are encouraging because they provide a better understanding of how dance affects cognition and how dance may be used in the prevention and treatment of cognitive disorders and decline.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Cognition, Dance, Memory, Psychology

The Dynamics of Disclosure: Examining Variations in Inclusive Introduction Practices

Leah M. McKinney, Dr. Tonya Buchanan

Project Mentor(s): Tonya Buchanan

The inclusive practice of including pronouns during introductions allows individuals to express and affirm how they identify. Past research suggests that proper use of one's pronouns has positive outcomes, including but not limited to increased feelings of safety (e.g., Kramer et al., 2022; Lauscher et al., 2022; Palanica et al., 2022). However, requiring public presentation of pronouns during introductions could unintentionally undermine the inclusive intentions of the practice by singling out those who do not feel comfortable, confident, or safe and may increase psychological reactance (Brehm, 1966). We examined the effect of requiring vs. encouraging pronoun disclosure during introductions anxiety experienced. In addition to gender identity, we also explore the effect of providing the option to include a broader range of personal choice identifiers. Specifically, participants were randomly assigned to read a vignette of a classroom introduction scenario; (1) *requiring* pronouns, (2) providing the *option* of pronouns, or (3) a prompt to include *any identifiers*. Afterward, participants wrote their own open-ended introduction, then completed a measure of their current levels of anxiety (STAI; Marteau & Bekker, 1992). We anticipate that empowering individuals to choose to announce all, some, or no identifiers during introductions will reduce anxiety. Specifically, we expect that: 1) the *required* pronouns group will report higher anxiety than the *optional* pronouns group; 2) the *required* pronouns group will report higher anxiety than the *any identifiers* group. Although data collection is ongoing [N=139], the potential implications of this work will be discussed.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Pronouns, Gender Identity, Personal Choice Identifiers, Inclusion

What's Beneath the Mask? Recognizing Occluded Facial Expressions and Where People Look at the Face

Jaque Ramirez, Otshumba Okonda, Mary Radeke

Project Mentor(s): Mary Radeke

Face masks and sunglasses can be a great way to safeguard an individual's physical health from various harmful environmental factors. However, covering or occluding the face can be detrimental during face-to-face interactions. Due to limited facial information, facial occlusion could have an impact on the ability to read the facial expressions and emotions of others. This study focused on facial expression recognition under partial occlusion (sunglasses), full occlusion (mask and sunglasses), and no occlusion conditions. Using eye tracking methodology, the dependent variables measured were dwell time on a particular area of the face and number of gaze fixations as well as emotion recognition. Using a repeated measures design, participants were presented with models representing fear, anger, sadness, and neutral facial expressions and were instructed to identify the emotion being displayed. Previous research suggests that the eye and center eye region of the face are focused on the most when participants viewed models with limited facial information. Our study explored whether facial occlusion, which encompasses masks and sunglasses, prompts participants to look at the eye and the center of the eyebrow region of the face to determine emotion. The results showed that participants tended to focus most on the eyebrow/eye area when the face was fully occluded to determine facial expressions and emotions.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Facial Expressions, Facial Occlusion, Emotion Recognition

The Role of Self-complexity in Intergroup Interactions

Homa Sheibani Asl; Tonya Buchanan, PhD
Project Mentor(s): Tonya Buchanan

This study examines the role of self-complexity in mitigating negative emotions during intergroup interactions among members of marginalized groups. McConnell et al. (2009) explained that low self-complexity allows experiences in one area of the self to impact related aspects, causing a larger spillover effect on the self-concept and more robust emotional responses. In contrast, high self-complexity can buffer against negative emotions and maintain self-evaluation during stress (Linville, 1985). In the current research, we combined intergroup and self-concept research to examine the role of self-complexity as a tool for reducing intergroup anxiety and fear of discrimination among marginalized individuals. Using the CWU SONA system, 155 undergraduate students with at least one marginalized identity were randomly assigned to either the "Identity Prime" or "No Identity Prime" conditions (Wojcieszak & Garrett, 2018), reflecting on their experiences as a member of a marginalized group or their surroundings. Participants were then randomly assigned to High or Low self-complexity manipulation groups (Setterlund, 1994) and chose attributes describing either seven (high) or three (low) self-aspects. Finally, they completed the Intersectional Discrimination Index (Scheim & Bauer, 2019) and Intergroup Anxiety Scale (Stephan & Stephan, 1985) to assess their intergroup emotions, followed by demographic questions. While results did not support the initial hypotheses (i.e., no significant main effects and interactions), findings underline the potential impact of self-complexity on intergroup anxiety, particularly among the gender identity group. However, the sample sizes for specific identity groups are currently insufficient for interpretations, emphasizing the need for further research in this area.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Social Psychology, Intergroup Relations, Marginalized Identities

Western Parenting Impacts on Human Development and Behavior

Isha Sarah Snow
Project Mentor(s): Hideki Takei

Using punitive discipline methods results in lower levels of cognitive complexity, which is how well people perceive things. Low cognitive complexity results in difficulties with self-control and emotional self-regulation, which show up in adulthood as deviant behavior, such as impulsivity and aggression. Deviance is any behavior or reaction that lies outside of social norms. This research project focuses on socio-emotional deviant behaviors which fail to conform to society's norms and expectations, such as aggression and low impulse control. This research compiled qualitative data from five interview subjects who represent a range of ages, genders, and races, and analyzed the information, concluding that experiencing supportive correction in the form of connection, empathy and understanding alongside clear and direct communication during childhood mitigated potential difficulties with emotional regulation in adulthood. This research project connects attachment theory with situational control theory, providing a valuable link between the fields of psychology and sociology, and its findings offer a potential solution to mitigating and preventing deviant behaviors resulting from difficulties with emotional regulation, which can be seen in society today. The literature review contains the topics of parent imprinting and role modeling, attachment and communication theories (or a lack of imprinting and positive role models), the role emotion plays in development and how it is stifled by insecure attachment, ways that fear can impact learning and development, Adverse Childhood Experiences, social and moral integration, and the prefrontal cortex of the brain.

Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Attachment, Discipline, Behavior, Communication, Parenting, Prefrontal Cortex, Cognitive Complexity

Contagious Coverage: Investigating Covid-19 Media Effects on Generalized Risk Perception

Caitlin Wassell; Tonya Buchanan, PhD
Project Mentor(s): Tonya Buchanan

How do current events and media affect interpretation of risk? In the current study, we aim to determine if priming participants with varied news coverage on the recent Covid-19 pandemic impacts their average risk perception. Risk research suggests that people overestimate/underestimate the prevalence of risks based on how readily accessible information about those risks is. Priming participants with media about risky situations (e.g., articles on tragedies) increases their perceptions of risk for a range of unrelated situations (Johnson & Tversky, 1983). Researchers have applied the concept of risk overgeneralization to myriad scenarios, including pandemics. During the swine flu pandemic, participants rated various risks higher after being exposed to a sneezing passerby (Lee et al., 2010). However, no studies have investigated the effect of Covid-19-related media on risk perception – a gap this study aims to bridge. After interpreting media in a randomly assigned condition (control, increased risk of Covid-19, or decreased risk) participants will assess the risk of a variety of situations on the Adolescent Risk-Taking Questionnaire using a 7-point scale ranging from “Not at all Risky” to “Very Risky” (Gullone et al., 2000). Participants will also assess the risk of exploratory, pandemic-related questions, and answer demographics about their personal experiences with Covid-19. We expect that, in line with previous studies, media about Covid-19 (especially media depicting elevated risk) will increase the perceived riskiness of a variety of situations. Better understanding media’s effect on perceptions/behavior helps us create policies ensuring that citizens assess risks appropriately, something vital to optimizing overall health.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Risk, Media, Psychology, Covid-19

404 Error – Gender Not Found: Lived Experiences of Genderqueer Autistics Assigned Female at Birth

Christina-Marie (CM) Wright
Project Mentor(s): Pamela Nevar

While autism research has historically focused on males, increasing attention is being paid to the expression of autism spectrum disorder in cisgender girls and women. However, a significant percentage of the autistic population assigned female at birth experiences gender outside the male-female binary, and the expression of autistic traits in this population remains largely unexplored. Understanding the expression of autism in diverse populations is important for diagnostic access and support. The purpose of this study was to identify which behaviors and interests commonly ascribed to autistic individuals were demonstrated by autistic genderqueer individuals assigned female at birth. The study also asked participants about their experiences of gender. Following Human Subjects Review Council approval, I conducted semi-structured interviews with four genderqueer autistic individuals assigned female at birth. Interviews focused on the autistic experience of gender and included self-ratings of items included on the Adult Repetitive Behaviours Questionnaire-2 (RBQ-2A), which measures repetitive behaviors and restricted interests in adults. Participants described their genders individually as agender, non-binary, gendervague and genderqueer, suggesting diversity in autistic gender experience outside the binary, but all reported that being autistic influences the way they experience gender. When reporting repetitive behaviors and special interests, all participants endorsed fidgeting with items, pacing, a preference for routine and limited preferred interests but diverged on topics like spinning, visual and olfactory stimulation, and creation of repetitive sounds. These common threads may help shape future diagnostic considerations for clinicians who provide autism assessments for genderqueer individuals assigned female at birth.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Autism, Gender, Neurodiversity, Gender Diversity, Genderqueer, Nonbinary, Autistic Experience

The Hidden Struggle: Peer Perceptions of Imposter Phenomenon

Elizabeth C. Yanes
Project Mentor(s): Tonya Buchanan

Imposter Phenomenon (IP) affects about 82% of people and can have detrimental effects on the mental health and achievement of sufferers (Bravata et al., 2020). Given the previous literature on IP and research on bias in interpersonal judgments based on gender, in the current work, we explore how the expression of imposter feelings impacts interpersonal perceptions of competence, and how gender moderates this relationship. To our knowledge, there is currently no literature examining IP and interpersonal perceptions; there is only literature on IP and self-perceptions. Participants will read one of four vignettes and indicate how competent they viewed the individual in the vignette. In our 2 (Gender: Male vs. Female) x 2 (IP: Imposter vs. Not Imposter) study, we expect to find a main effect of gender (women being rated as less competent), a main effect of IP (those expressing imposter feelings rated as less competent), and an interaction effect between the two variables such that men take a larger hit for expressing imposter feelings than do women. Given the combined findings demonstrating how women are perceived as less competent in various situations (Dorrough et al., 2022), emotional displays in men are considered more feminine (Oransky & Marecek, 2009), and men are expected to fill their gender role of competency and agency (Ellemers, 2018), it is reasonable to expect that men displaying feelings of imposter phenomenon will be judged more harshly.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Social Psychology, Interpersonal Perceptions, Imposter Syndrome, Gender

The Power of Words: Unpacking Language's Role in Educational Inequities

Zara Yokoyama, Liz Beccari, Malcolm Jasmin, Tonya Buchanan
Mentor(s): Tonya Buchanan

The language used to describe racial disparities in education may inadvertently influence how we address them. Framing such disparities as "achievement gap" rather than as "inequality in educational outcomes" assumes a deficit thinking mindset, shifting focus from the structural injustices contributing to education disparities to individuals, resulting in decreased prioritization of racial equity (Quinn & Desruisseaux, 2022). We aim to replicate this prioritization effect, specify the language driving the effect, and examine the impact of frames on perceptions of how to achieve racial equity. Participants were randomly assigned to conditions framing racial equity concerns as: a racial achievement gap, racial inequality in educational outcomes, or racial differences in educational outcomes (S1). The additional condition allows us better understanding of whether "achievement gaps" are perceived as less important, "inequality" as more important, or both. In Study 2, we explore the effects of framing racial equity concerns as an educational debt (S2). Participants rated priority levels towards the issue (Quinn & Desruisseaux, 2022) and the importance of individual vs institution level interventions. Replicating previous findings, participants prioritized the issue more when framed as "racial inequality" compared to an "achievement gap," $t(271)=-2.51$, $p<.04$, with "racial differences" falling between. Using "educational debt" language increased prioritization similarly to the "inequality" frame, $F(2,126)=27.41$, $p<.001$ and increased acknowledgement of the need for institutional change $F(2,125)=6.71$, $p<.01$. Framing of racial disparities in education influences priorities and solutions. Shifting language from "achievement gap" to "inequality/educational debt" may enhance efforts toward achieving racial equity by focusing attention on structural issues.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key words: Framing, Equity, Psychology, Language, Education

Science and Mathematics Education

Expanding Project-Based Learning Opportunities for Pre-Service STEM Teachers

Sydney Cater, Cris Galvan Zamora, Caiden Ibach
Project Mentor(s): Emilie Hancock, Bruce Palmquist

Project Based Learning (PBL) has been found to be a powerful pedagogy for promoting equitable student learning outcomes. In this High Impact Practice (HIP) funded project, the CWU Science and Mathematics Education Department established a mutually beneficial partnership with Vanguard Academy, a new PBL high school in Moses Lake, WA. By partnering with a PBL high school, we are able to (a) provide near-peer mentorship to Vanguard Academy high school students as they complete PBL activities, and (b) provide opportunities for Teach STEM undergraduate teacher candidates to observe and use PBL pedagogical practices. This poster describes one aspect of our multifaceted partnership with Vanguard. Teach STEM undergraduates collaborated with Vanguard High School teachers to design and teach a half-day design challenge for the entire high school. Each of the four Teach STEM teacher candidates led one Vanguard house to address the driving question: How can we develop a rover prototype to efficiently collect rock samples and send them to be tested for the purpose of determining viability for sustaining life? Two of the four houses competed to see which team could lift the most rocks the highest distance from the ground, while the other two houses competed to see which team could carry the most rocks the farthest distance. We share key features of the lesson planning process, the final lesson design, and student-generated prototypes. We further reflect on this experience as it relates to our future careers as STEM teachers.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Community Partnership, Integrated STEM, Project Based Learning, Design Challenge, Near-Peer Mentorship

Social Network Analysis of Fellows in the WA-STELLAR Noyce Network

Katherine Miller
Project Mentor(s): Emilie Hancock

The WA-STELLAR STEM Stakeholder conference consisting of educators from across Washington state seeks to develop a network of professionals working together to establish STEM best practices in their respective districts. Research into networks of educators has found success where there is an exchange of resources and expertise. Our research sought to visualize these trends through data mapping using social network analytics (SNA), operationalizing Activity Theory as a lens to view the network. Six conversations between WA-STELLAR participants and facilitators were analyzed using SNA tools with a focus on the discussions between educators as they developed strategies for culturally responsive teaching. Multiple iterations of analysis were used, dividing conversations into pre-Network vision, network vision, and post-network vision to signify the importance of the development of a shared vision to the efficacy of the network conversations. A final network map was created with nodes representing solutions or challenges the group faced; connections between nodes represented turns of dialogue regarding solutions and challenges. In this poster, we share our conclusions drawn from this mapping, including comparisons of pre-post network conversations, relationships between solutions and challenges, and participant leveraging of resources. Our findings not only establish how invaluable a network of educators is in developing best practice strategies, but also provide an in-depth look at how network participants work together toward a shared goal and develop practical solutions.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Social Network Analysis, STEM Education, Equity, Shared Vision

Pathways for Computer Science: K-12 Educators

Violeta Olvera Govea
Project Mentor(s): Emilie Hancock

With programming languages and technological innovations on the rise, Computer Science (CS) has become one of the most popular majors to pursue in higher level education, granting students unlimited pathways to demonstrate their skills in the field or in academia. One of the pathways that is not talked about enough is preparing qualified Computer Science students for teacher candidacy in K-12 education. In 2016, Washington State fulfilled the legislative request to adopt and implement Computer Science standards in K-12, which aim to teach students about the influences of technology in our world, its importance in the workplace, and helping them becoming proficient critical thinkers and problem solvers. Despite these goals, only 48% of Washington's high schools teach foundational CS courses, often times with underqualified educators, resulting in ineffective instruction. With the lack of qualified CS teacher candidates in Washington State, there is a need to understand why undergraduate and graduate students choose Computer Science as an industry pathway versus a teaching pathway. Adapting Lo and Lawler's (2021) previous survey, this poster will discuss preliminary findings on CWU's Computer Science majors and minors' views on what factors play a role in their career decisions, including around choosing a CS teaching career. We further consider how these views might help improve the quality of STEM teacher training in Washington State.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Computer Science, STEM Teaching, Career Pathways

Sociology

Appropriate Blackness & The Gender Strategy of Jack Johnson

Olene Togiailua
Project Mentor(s): Pam Nevar

Black people of the Progressive era were concerned with how to regulate their behavior to better their position in society. This research will examine the gender strategy aspect of Appropriate Blackness and how those prescriptions, of being a sporting man, relate to the premier black celebrity of the era Jack Johnson in how best to assimilate into a Jim Crow society. To compare the different perspectives on Jack Johnson's behavior and gender strategy within the Black community of the Progressive Era. What was the definition of Appropriate Blackness for the different social classes within the Black community of the Progressive Era? The study's results found depictions of Johnson's actions in some publications as a disgraceful, spotlight-desperate celebrity whose relevance has waned since he lost the title in 1915. Other publications acknowledge this characterization to some degree but accept that his former relevance was important for paving the way for current-era fighters in their cultural acceptance. The political career of Johnson is front and center in publications during the 20s and 30s, this allowed for greater insight into the changes in the discourse around "racial uplift", the reading that I did into the 1930s provided me with material on the social construction of race and masculinity within the purview of White acceptance. The implications of the results indicate the need for more scholarship on the dialectical relationship between Blackness and Whiteness as both identities are in stark opposition to one another. There is also a need to correlate the results with how racial identity has developed into the 21st century.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Race, Gender Performance, Social Class Differences

Community and Student Groups

In addition to the presentations from CWU academics, there are presentations from the following groups and organizations:

- CWU Sustainability
  - CWU Sustainability Council
  - ENST 480: Campus Sustainability
  - MFA Exhibition
  - Learning Commons
- Douglas Honors College (DHC)
- Ellensburg School District
- Kurume Institute of Technology
- Mt. Stuart Robotics
- Registered Student Organizations
  - Graduate Student Association (GSA)
  - Students With A Purpose (SWAP)
- Wenatchee Valley College

Central Washington University

CWU Sustainability Council

Inspiring Action: Revealing CWU's Climate Change Action Plan

The CWU Sustainability Council

CWU's Sustainability Officer, Jeff Bousson, will be revealing the final design of CWU's first-official, Climate Change Action Plan (CAP). CWU's institutional goal to develop a comprehensive, campus-wide CAP was achieved in April 2024, which outlines climate and decarbonization strategies across university operations, infrastructure, and academic programs in collaboration with the local community. As a result of engaging over 500 students, staff, faculty, and local community members, CWU finalized key pillars as well as measurable objectives and strategies across 11 focus areas that will accelerate emission-free infrastructure and integrate sustainability within campus-wide curriculum. Attendees will learn more about the CAP development process, CWU's approach to implementing CAP strategies, and the innovative initiatives underway that will enable CWU to serve as a living laboratory for a diverse range of sustainability solutions.

Presentation Type: Performance (May 15, 9:00am–4:00pm)

Key Words: Sustainability, Environmental Policy, Climate Change Solutions, Community Engagement, Campus Collaboration, Strategic Development, Decarbonization, Renewable Energy, Waste Diversion

ENST 480: Campus Sustainability

Introducing a Plan to Implement 30 EV Chargers Over the Next Seven Years at CWU (Central Washington University) to Promote Clean Energy

Zachary Benton, Jeff Bousson

Project Mentor(s): Susan Kaspari

Climate change is a major issue today, and the biggest contributor to climate change is carbon dioxide emissions. One of the major contributors to carbon emissions is gas powered cars, with about 30% carbon dioxide emissions in the US coming from transportation including cars, public buses and other vehicles. To reduce emissions many people are turning to electric vehicles (EVs). The number of EVs on the road has increased from 4% in 2020 to 14% in 2022 (Lea, 2023). The increase in EV use is increasing demand for EV chargers. Currently CWU has a total of 10 EV chargers on campus. The purpose of this project is to plan where to install an additional 30 EV chargers over the next 7 years at CWU.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: EV Chargers, Electirc Vehicles, EVs

Increasing the Number of All-Gender Restrooms and Signage Reducing Restroom Inequality

Liz Burt
Project Mentor(s): Susan Kaspari

Many individuals struggle when they are faced with using a gendered restroom; they feel uncomfortable, and some transgender/non-binary individuals get harassed. CWU has taken steps in making these individuals more comfortable. They have included all-gender restrooms around campus, both single and multi-stall, however they are difficult to find. The all-gender restrooms are often located at the back of buildings, and some buildings don't have all-gender restrooms at all. To help improve the ability of people to locate the all-gender restrooms, signs indicating the location of the all-gender within that building, were placed by the gendered restrooms. A QR code to the campus map was also placed by the gendered restrooms to help people better locate the all-gender restrooms across campus. The map updates will make it a much smoother process to locate each restroom. In the SURC there has been work to add an additional all-gender restroom in a more accessible location. These changes create a safer and more comfortable environment for our students, faculty, and visitors and helps foster a more diverse community.

Presentation Type: Poster Presentation (May 16, 10:30am–2:30pm)

Key Words: Equity, All-Gender Restrooms

Expanding CWU Sustainable Education Through the Student Sustainability Ambassadors Program

Hannah Campbell
Project Mentor(s): Susan Kaspari

Sustainable education, especially on university campuses, is crucial in the 21st century as sustainable issues worsen with climate change, war, and consumer consumption. Higher education builds the foundation for younger generations to passionately carry on sustainable practices into the future, thus highlighting the importance of wider spread information revolving around sustainable concepts involving the environment, society, and the economy. A solution to address these contentious sustainable issues includes the creation of a peer-to-peer education program at Central Washington University called the Student Sustainability Ambassadors Program. This program, to be launched in Fall 2024, operates through 3 passionate student 'specialists' who educate students and make advancements in specific sustainable topics on campus. These topics may include transportation emissions, energy conservation, pre and post-consumer waste, and others. In developing the groundwork for the Student Ambassadors, preparatory research was conducted involving AASHE STARS statistics on university peer-to-peer education programs, examining student interaction on campus and in residence halls, as well as collaborating and reaching out to numerous stakeholders on the scope of this program's operation and success. The preliminary steps taken to implement this program included creating job roles and setting up training for student ambassadors to become experts in their specific field of sustainable interest. Additionally, the work leading up to the beginning of the program in Fall 2024 will focus on promoting this program to students and assessing student engagement with the program as it launches and progresses into the academic year.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Sustainability, Education

Enhancing Sustainability Awareness at CWU with a Series of Interview Videos

Sarah Christopherson
Project Mentor(s): Susan Kaspari

Historically, there have been issues with awareness surrounding sustainability. Although sustainability awareness has increased substantially over the past few decades, there are still gaps in understanding and acknowledgment of the severity of these issues, as well as what can be done to address them. At CWU, more students on campus should be made aware of and involved in how to be more sustainable and the resources that CWU offers. Publicizing information about sustainability that is digestible for students and that is easily accessible will help to bridge the gap in student awareness of sustainability at CWU. A series of interview videos with several faculty, staff, and students about sustainability programs were created that demonstrate CWU's commitment to sustainability. The interviews were put on the CWU website, and a combined video of all the interviews was created that can be shown in classrooms and for staff and faculty training. A video with CWU Sustainability Officer Jeff Bousson highlighting the importance of sustainability and CWU's actions to reach the goals in the Climate Action Plan will be shown at orientation. These videos were made with the idea of being timeless so they can be shown for many years down the line.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Sustainability, Awareness, Interviews, Environmentalism

Developing a Pollinator Garden at the Wildcat Farm

Emma Estrada, Kaitlyn Flesher
Project Mentor(s): Susan Kaspari

Pollinators are crucial to life on Earth. They play a vital role in the food web helping to feed larger predators and facilitating healthy plant communities. Along with the environment, pollinators supply humans with a large percentage of our food supply. Native pollinators in Washington state include several species of bees, moths, butterflies, beetles, and birds. Unfortunately, native pollinator populations are decreasing due to decreasing habitat, disease, and pesticides. In response to the problem of declining pollinator populations, a garden was developed and implemented to support local pollinators at the Wildcat Farm. The garden incorporates a wide variety of plants with different bloom times and colors ensuring that it is "in season" for the maximum amount of time. The garden also prioritizes the use of native plants over ornamental flowers. This garden provides resources for pollinators to flourish while also practicing sustainable gardening. It involves plants that naturally repel pests instead of chemical pesticides and native plants that do not require lots of irrigation or maintenance.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Pollinators, Native Plants, Pollinator Garden, Sustainable Gardening

Tackling Fast Fashion and Promoting Textile and Cloth Diversion in CWU

Donovan Hodges
Project Mentor(s): Susan Kaspari

This project was formed to combat wasteful use and disposal of clothing. Fast fashion and overproduction of clothes causes an excess of clothing on the open market, of which almost none is recycled. Fast fashion also contributes to global warming due to the overproduction of clothing. By creating a project on CWU campus to divert cloth and textiles away from landfills, the campus can move forward with being more sustainable and educating students on the harm of fast fashion. This project consists of placing large plastic bins in various areas of the campus and using them to collect donated clothes. These clothes would then be taken to local recyclers such as surplus and wildcat pantry. The project while experiencing mild success has not seen as many donations as wished. By using flyers and public advertising the project can garner more attention and in turn get more students to donate clothing to the bins. The project will continue to expand in hopes of increasing both the amount of donations and the amount of bin locations.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Fashion, Clothing, Waste, Recycling, Donation

Reducing Energy Use on CWU's Campus by Increasing Roof Reflectivity

Daniel Hogue, Jeff Bousson
Project Mentor(s): Susan Kaspari

Often our cities experience temperature increases that are not experienced by surrounding rural areas. This is referred to as a heat island, where cities can be 2-5 degrees Celsius hotter than the more rural areas around them (BL: Cool Roofs and Walls). Large buildings often have flat open roofs that are made with dark materials such as asphalt sheets. Heat islands are created when air passes over hot solar absorbent surfaces such as pavement or dark roofs and absorbs the heat from these surfaces. Many cities across the US have historical housing policies that put persons most at risk in areas where the heat island effect can be felt the strongest (Hoffman et al, 2020). Extreme heat is the leading cause of summertime morbidity and has been the most hazardous weather in the US for decades (Hoffman et al, 2020). The easiest way to reduce the effect of heat islands caused by solar radiation absorption is to replace dark surfaces with lighter more reflective surfaces (BL: Cool Roofs and walls). There are 12 buildings on CWU's campus that have been identified with flat dark roofs that could contribute to the heat island effect. The buildings with the highest priority for cool roofing are buildings with a high Energy Use Index like Science, and that have full time university staff in them all year like Jongward, Naneum, and Mitchell. Changes to CWU building and maintenance policy are being pursued to require old roofing to be replaced with new cool roofing.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Sustainability, Cool Roof, Heat Island, Reflectivity

Support for the Development of a Heritage Garden at Wildcat Farm

Helana Priestley, Kaitlyn Flesher, Wendy Mee
Project Mentor(s): Susan Kaspari

CWU's Wildcat Farm supports an increasingly sustainable campus by growing fresh produce for the campus, and by supporting projects around food and farming. Wildcat Farm is partnering with the Kittitas County Conservation District to create a heritage garden, which is for conserving and celebrating the native plants of Eastern Washington, and as a source of education sharing the historical and cultural ways these plants have been and still are utilized. The garden will have trees, shrubs, and wildflowers native to Eastern Washington's shrub steppe ecosystem, and will also serve as a natural wind break to protect plants and provide a more comfortable environment for farm employees and volunteers to work in. Work on the heritage garden this quarter focused on site preparation: removing noxious weeds, seeding ground covers, transplanting parts of the groundcover using a provided plant guide, and cleaning up around the existing garden plants, Additional site preparation included planning an irrigation framework and designing educational signs to be put in the garden. Hopefully, this project will attract more people to the Wildcat Farm, provide an accessible walkway where people can learn about the importance of heritage gardens and culture, and shield plants and workers from heavy winds.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Heritage, Garden, Wildcat, Farm, Development

Promoting Sustainable Transportation: Exploring Electric Scooters vs. Electric Bikes for Campus

Dallas Sink
Project Mentor(s): Jeff Bousson

The growing concern over carbon emissions and the need for sustainable transportation solutions on university campuses have prompted many universities to adopt scooter or bike-share programs. In this project, comprehensive research was conducted into the viability of introducing electric scooters (e-scooters) or electric bikes (e-bikes) as alternative modes of transportation at Central Washington University. Through research including data collection from other universities, scooter and bike share companies, and surveys distributed to the campus community, the project has identified the potential benefits and drawbacks of both e-scooters and e-bikes. Stakeholder engagement with campus administration, transportation services, Ellensburg city government, and sustainability groups has facilitated discussions and decision-making regarding the implementation of sustainable transportation options. The outcomes of this project include a detailed report outlining the pros and cons of e-scooters versus e-bikes, as well as recommendations for future action. This project aims to contribute to Sustainable Development Goals 11 (Sustainable Cities and Communities) and 13 (Climate Action) by promoting sustainable transportation and reducing carbon emissions on campus.
Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Sustainability, Scooter vs Bike-Share Programs, Sustainable Development Goals, Climate Action

Reducing Waste: Central Washington University Regalia Reuse Program

Ally Thoms

Project Mentor(s): Susan Kaspari, Lily De Young

Each year, hundreds of thousands of institutions across America host commencement ceremonies for graduating students, however, this time for widespread celebration also promotes increased consumption and waste of single-use garments. Caps and gowns are used most commonly only once for the duration of the event, meaning that after the fact, regalia is rehomed to either the garbage can or the closet to collect dust for years and later meet the same fate as many other caps and gowns that were mass-produced simultaneously: in landfills outliving their original buyers. To reduce this waste, a Regalia Reuse Program was developed. On Commencement Day, June 8, 2024, and the week following, there will be bins to collect donated caps and gowns to be reused by future graduating students, both at the two different ceremonies and various locations around campus including inside the SURC and in the library. In the future, donated caps and gowns will be rented out for free, with priority toward students with financial need or personal emergencies that may cause difficulty for purchasing regalia. Nobody should be left out from being included in the ceremony simply because they can't afford the nearly $80 commencement package! The CWU Regalia Reuse Program will reduce consumption and waste, and promote inclusion.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Sustainability, Inclusion, Consumption, Waste

Striving for Sustainability at CWU by Divesting From Fossil Fuels

Aulin Walker, Toni Sipic

Project Mentor(s): Susan Kaspari

Climate change is happening at a record pace due to human activities. The biggest contributor is the use of fossil fuels. Fossil fuels account for over 75% of global greenhouse gas emissions, and almost 90% of carbon dioxide emissions. People and corporations invest money into these fossil fuel companies, with a hope for them to succeed to receive interest or dividends. Withdrawing those investments reduces financial support of the fossil fuel companies and can encourage a move to renewables. Fossil fuel divestment movements are at numerous universities including New York University, Brown University, Columbia University, Harvard, Oregon State, Princeton, and many others. CWU Foundation investments have not been made public, but the endowment fund is currently invested in multiple fossil fuel companies, such as Chevron, British Petroleum, and Berkshire Hathaway. There is $60.8 million in CWU's investment pool, with $8.6 million of it invested in sustainable industries. This project aims to get CWU to divest from fossil fuels, and to increase investment transparency. A petition and survey collecting student signatures have been collected in support and presented to the heads of the endowment fund and foundation fund. With this, hopefully the investment portfolio would be reevaluated and redistributed away from fossil fuels with increased transparency.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Sustainability, Fossil Fuels, Renewable Energy, Investments

CWU Water Conservation Plan Recommendations

Selena Wellenstein
Project Mentor(s): Susan Kaspari, Jeff Bousson

Most universities in the United States have published climate action plans in the last five to ten years which outline their commitment to reducing the effects of climate change. These plans usually include a section which addresses water concerns, including how the university plans to reduce their water use and how they will use water responsibly. As of 2024, Central Washington University does not have a Water Conservation Plan as part of its Climate Action Plan. This project collected information from other universities with developed water plans, especially those in dry and arid climates, in order to inform CWU on the best practices for building its own Water Conservation Plan. The project summarizes the water plans of several universities and makes recommendations for which practices CWU should adopt in its own water plan. The project found that landscaping, particularly irrigation of lawn areas, is one of the greatest areas of water loss on university campuses. CWU's Ellensburg campus heavily utilizes lawn space in its landscaping, but much of this space is not being utilized for leisure or recreation. The project suggests other types of landscaping that would reduce water loss, including xeriscaping and the use of turf in place of natural grass. The project also addresses water loss as part of infrastructure and makes recommendations for monitoring and updating water infrastructure on campus. The hope is that this information will be used in future discussions and planning of an official CWU Water Conservation Plan.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Water Conservation, Sustainability, Research, Landscaping

Always Open: Enhancing Campus Life With 24/7 Building Access

Edward Werner
Project Mentor(s): Susan Kaspari

Limited access to key university facilities beyond normal hours of operation creates a sustainability issue on campus that not only affects the overall health and academic performance of university students, but the surrounding environment as well. Students with a busy work schedule and a heavy class load sometimes can't use buildings during their open hours, and they need a place to study after hours. In order to solve this problem, a building will be made available for student use 24 hours a day. Also, this project will reduce the need for students to commute late at night or early in the morning, especially for students who live off campus leading to reduced vehicle emissions, and lowering the carbon footprint of the campus. We will evaluate the operational, security, and economic aspects of expanding access in cooperation with university stakeholders. An effortless shift to 24-hour access will be ensured by detailed preparations for the distribution of resources, building adaptations, and security procedures. Our approach seeks to encourage students to have an inclusive, creative, and productive culture. We encourage more flexibility for students to use resources based on their schedules by expanding the availability of campus facilities, which improves student satisfaction, academic achievement, and involvement with the University as a whole.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Sustainability, Open Access, Work-Life Balance

Reducing Food Waste Within CWU Catering by Performing a Waste Audit and Developing a Framework for the Implementation of Large-Scale Composting

Dylan Zintz

Project Mentor(s): Susan Kaspari

Food waste is a huge problem in the United States; 133 billion pounds of food was wasted in 2010. The improper disposal of this waste can be very damaging to the environment. A majority of the food that goes uneaten is sent to landfills, where it decomposes into methane gas due to a lack of oxygen present in compressed stacks of garbage. When composting, the mixture of waste incorporates oxygen allowing it to decompose into a nutrient-rich black soil. CWU is a large contributor to the waste made in Kittitas County. The campus kitchens produce thousands of pounds of pre-consumer food waste every month. This project audited the total amount of food waste that is created by CWU Catering. For the audit, pre-consumer waste such as fruit and vegetable scraps, meat trimmings, and expired foods were collected and weighed before disposal. Post-consumer waste, or uneaten food returning from events, was also recorded. The project allowed staff to understand the scale of the food waste produced and the importance of reducing unnecessary waste. The knowledge gained by staff will help us reduce our future waste streams, and lessen our environmental impact. A framework for how the kitchen will handle the implementation of composting has also been developed. If the university successfully purchases an industrial composter, the data collected will inform the development of logistics needed to transport food waste to the Wildcat Farm.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Dining, Food Waste, Sustainability, Management

MFA Exhibition: Art & Design

Anemoia: MFA Thesis Exhibition

Matthew Potter, Charlie Tadlock

Central Washington Art and Design MFA students Matthew Potter and Charlie Tadlock will hold a thesis exhibition of their works in the Sarah Spurgeon Gallery on the CWU campus.

Matthew Potter's large-scale works on paper investigate memory through the viewpoint of abstraction. The surfaces develop a history within themselves as a result of repeated marks and densely-layered applications of media.

Charlie Tadlock's lens-based media and installation work centers on the road through the rural American West. The regional identity of rugged independence has created a culture that centers around transience, and that positions prosperity and people as temporary.

The Sarah Spurgeon Gallery, located in Randall Hall is open weekdays 10 a.m. - 3 p.m. and Saturdays 1 - 5 p.m. Admission to the exhibition is free and open to the public, as are the opening events – including artist talks (4 p.m. Randall 117), and a reception (5 p.m. Randall 141, Sarah Spurgeon Gallery) on Tuesday, May 14.

Exhibit on View: May 14—June 1, 2024; Opening events on May 14, 2024

The Learning Commons

Vision Board Engagement

CWU Peer Mentors, PALs, Tutors

Does being at SOURCE inspire you to think about your future? Come join the peer mentors in creating a vision board! Either swing through the SURC hallway to pick up supplies on May 15, and create on your own time in your own space or join the mentors in the Learning Commons from 2-3 on May 16 for a guided experience and the chance to make new friends. Supplies include stickers, paper, magazine clippings, introspective prompts.

Presentation Type: Tabling & Engagement (May 15, 9:00am–4:00pm), Panel (May 15, 3:00–3:50pm)

Douglas Honors College (DHC)

Taking Root: The Story of Marmot Inc. and its Lessons on the Dynamics of Worker Cooperatives

Carey Stokes

Project Mentor(s): Bernadette Jungblut, Kevin Archer

This research project explores the dynamics of worker cooperatives, specifically focusing on the factors that contribute to their formation, success, resilience, and potential pitfalls and/or failure. Employing a case study approach, it investigates the history and experiences of Marmot Inc (referred to as Marmot); a trails and forestry worker cooperative that operated from 1976 to 1983. This investigation involves analyzing company documents provided to the Harry Bridges Center for Labor Studies at the University of Washington, along with conducting personal interviews with former members. The project contextualizes Marmot by drawing comparisons and contrasts with existing studies and literature on worker cooperatives. The ultimate goal of the project is to synthesize lessons for future worker cooperatives and researchers in the field, while also documenting the story of Marmot and its former members.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Worker Coops

Psychology of Satan: Religious Syncretism and the Question of Evil in Avatar: The Last Air Bender

Shale Tenerelli

Project Mentor(s): Matthew Martinson

When the third and final season aired in 2007-2008, Avatar: The Last Airbender (ATLA) was, by any measure, a commercial and critical success, garnering a Peabody award for "adding thoughtful substance to a genre best known for its style." One of ATLA's defining features is the syncretism of its fictional cosmology which draws on the cultural traditions and religious thought of various strains of Buddhism, Hinduism, and Christianity, among other religions. The central question of ATLA is, how can one oppose evil without losing one's humanity. Through careful character development and complex narrative arcs, ATLA engages the viewer in a kind of storytelling that encourages the viewer to work out questions such as, who is evil, why, what is to be done, and by whom? I examine how ATLA's syncretic cosmology structures evil as an ostensibly unchangeable force that is characterized by a willful lack of compassion and a compulsion to destruction. What emerges is a worldview that demonstrates how it is possible to understand and respond to evil in the world and in oneself while also nurturing one's moral integrity and inner peace.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Avatar, Buddhism, Hinduism, Christianity, Religion, Syncretic

Emergency Psychiatric Healthcare Among Syrian Refugees in Greece

Shale Tenerelli

Project Mentor(s): Gretchen Taussig-Simpson, Matthew Martinson

In light of increasing numbers of political and climate refugees across the globe, on the one hand, and the rise in mental health conditions worldwide, on the other hand, this paper takes as a case study the distribution of emergency psychiatric healthcare among Syrian refugees in the refugee camps of Greece. I argue that digital health technologies provide effective, expedient, cost-efficient, and scalable treatment for refugees in cases where there are significant barriers to care.

Presentation Type: Oral Presentation (May 15, 9:00am–4:00pm)

Key Words: Mental Health, Psychiatry, PTSD, Refugees, Syria, Greece, Digital Healthcare

Ellensburg School District

Aquatic Insects in Reecer Creek, Ellensburg, WA

Magdalena Fuss, Oakey Hammond

Project Mentor(s): Jeff Hashimoto

In 2011 the Reecer Creek Floodplain Restoration Project restored one mile of stream in Ellensburg, WA. We wanted to show the biodiversity of aquatic insects within the restored portion of Reecer Creek. Having a diverse population is a result of a healthy environment. In order to assess the biodiversity of insects, we collected samples during the fall 2023 and spring 2024 and counted the type of species and the number of individuals of each species. We compared our data to 5 studies of biodiversity of aquatic insects in Reecer Creek since 2011.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Reecer Creek, Aquatic Insects, Biodiversity, Restoration

Observing the Effectiveness of the Restoration of the Reecer Creek Floodplain on the Diversity and Abundance of the Avian Population Based on Comparison to Non-Restored Sites

Jasmin Rivera, Kay Nolan, Jamie Thomas, Gwyndolyn Scoville
Project Mentor(s): Jeff Hashimoto, Jacob Luthardt

In 2011 a portion of the Reecer Creek floodplain was restored from an agricultural field to a riparian and floodplain zone. Establishing a comparison of species diversity and abundance in the floodplain relative to a non-restored location is key to determining the restoration project's impact on avian populations in the area. To accomplish this, we monitored avian songs and calls during the hibernal-vernal transitional period using an audio moth recorder on both the restored Reecer Creek floodplain and a non-restored location. Our project attempts to establish the effectiveness of the project as a habitat restoration effort through the avian population.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Birds, Riparian Zone, Population Comparison, Reecer Creek, Floodplain, Avian

Seasonal Changes in Native and Invasive Plants Observed Through Photographs of the Reecer Creek Floodplain

Serena Scheffer-Arango, Amber Fernandez
Project Mentor: Jeff Hashimoto

Reecer Creek, in Ellensburg, WA, was restored with native plants in 2011. Throughout the months of October through April, we took weekly photos at five locations with a variety of plant species. One of the locations is monitoring a single tree, and the other four capture a variety of plants. We analyzed the differences between native and invasive species, as well as seasonal and weather related changes. Our results could be useful for planning restoration of other disturbed areas.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Invasive, Native, Local, Plants, Photographs

Analyzing the Change in Organic Matter Within Soil Samples to Assess the Effectiveness of he **Reecer Creek Floodplain Restoration Project**

Adelayde Schumaier, Lydia Quinn, Briar Wilson
Project Mentor(s): Jeff Hashimoto

Soil organic matter is significant in providing nutrients and habitat to organisms in an environment. The Reecer Creek Floodplain Restoration Project, completed in 2011, re-vegetated a former agricultural area with native plants. We measured the percentage of organic matter in 11 soil samples through loss on ignition. We found that the average organic concentration at 10-15cm depth was 6.6% with individual samples varying from 5.7% to 8.7%. At 15-30cm depth the concentration was 6.24%. Our data demonstrates that there can be significant accumulation of organic matter within 12 years, making it applicable to future restoration projects.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Organic Matter, Soil, Sustainability

Monitoring Animals in the Reecer Creek Floodplain with a Wildlife Camera

Moon Wichers, Berkely Shields, Keira Charlton

The Reecer Creek floodplain restoration project in Ellensburg Washington was completed in 2012. One of the project's objectives was to revegetate the riparian and upland areas. Our project's goal was to observe what animal species are in the Reecer Creek floodplain. To identify species near the creek, we put a wildlife camera in the restored part of Reecer Creek and collected data from January to April 2024. We then compared biodiversity measures of species richness and species evenness to a disturbed area similar to the floodplain before the restoration project. In the Reecer Creek Floodplain, the revegetation has brought rodents, birds, and lagomorphs. Our study could help other restoration projects by showing how the restoration was effective in bringing back animal biodiversity.

Presentation Type: Poster (May 16, 10:30am–2:30pm)

Key Words: Reecer Creek, Animals, Wildlife Camera

Kurume Institute of Technology

Development of AI for High-Precision Cropping of Portrait Photos

Mahisa Hoshino

Project Mentor(s): Takahiro Baba

This presentation discusses the methodologies and procedures involved in developing photo cropping AI and proposes ideas for further advancement. The photography industry has an increasing demand for precise image cropping. In particular, manually achieving accurate cropping of individual hair strands is difficult and requires AI support. Furthermore, there is a need to streamline workflow processes for efficiency. As students in the Kurume Institute of Technology's "Community Issue-driven PBL" program, our group collaborated with MONOLITHIC DESIGN Co., Ltd. to develop AI software capable of achieving high-precision cropping, even down to individual hair strands. Using Alpha-Matting, our group sought to develop an AI program that could crop portrait photos with high accuracy, capable of creating composite photos seamlessly blending subjects into background images and improving workflow efficiency. In order to perform highly accurate cropping, it's necessary to be able to handle many scenes; therefore, we researched and collected many training images. Our research found that accuracy improved as the number of epochs increased, but If the number of epochs increased too much, overfitting occurred and accuracy decreased. The system can handle more diverse scenes by increasing the number of images and training. But, it turns out that it's not just the quantity of training data that matters but also the quality. In this case, MSE is used to evaluate clipping accuracy. MSE is the mean squared error. It calculates the value of the square of the difference between the predicted value and the correct value for each data. The sum is then divided by the number of data. The lower this value, the higher the clipping accuracy. Finally, each of the 10057 images was used for training. The MSE at 140 epochs was 0.002935515118273937, the highest value.

Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: AI, Community Issue-Driven PBL

Development of Image Recognition AI for Strawberry Detection and Sorting

Kodai Kiba
Project Mentor(s): Richard Lee

This presentation proposes an idea for a system for efficient sorting and packing of strawberries. Japanese strawberry producers are faced with labor shortages. In particular, packing operations face a lack of personnel who possess the necessary skills during the strawberry harvest season. In addition, the usual way of sorting strawberries is time-consuming, as people have to sort them one by one by hand. As a part of an ongoing Kurume Institute of Technology's "Community Issue-driven PBL" program described in this presentation, our project members collaborated with INAC System Co., Ltd., equipment manufacturer to develop an AI system that could reduce the amount of time and labor necessary to sort strawberries, thus providing a more efficient packing process. The project team created an image recognition AI using an algorithm called YOLO which specializes in image recognition, to recognize strawberries within certain conditions. We devised a system whereby the strawberry data read from the images is displayed on a screen on the worker's desk, allowing those without strawberry sorting skills to work more efficiently. This presentation will describe the steps toward developing an automated AI system that uses computer vision to detect and sort strawberries using YOLO and considerations for future project members.

Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: AI, Image Recognition AI

Mt. Stuart Robotics

Robot Competition

Mt. Stuart Robotics Team
Mentor(s): Jason A. Eng, Mt. Stuart Elementary School Teacher

Join us for an exhilarating showcase of innovation and creativity at Mt. Stuart Elementary School's Robotics Team Exhibition! Witness the brilliance of our young engineers as they unveil their cutting-edge robots, meticulously crafted for thrilling competitions.

Presentation Type: Live Performance (May 15, 3:00–3:50pm)

Registered Student Organizations

Graduate Student Association (GSA)

Why Graduate School?: GSA Executive Testimonies of Academic, Professional, and Personal Transformation in CWU Graduate School

Mariah Sebastiani, Weston Shipman, Allison Mills, Elizabeth Yanes, Mason Low
Project Mentor(s): Rodrigo Renteria-Valencia

A group of graduate students from the Graduate Student Association (GSA) will discuss their journeys and experiences in graduate school as well as the formation of the GSA at Central Washington University. Coming from a variety of departments, each student will discuss their research and how their time at Central supports their future plans as researchers, teachers, and academics. Furthermore, the panel will introduce the audience to the GSA and discuss how it provides graduate students with networking opportunities, professional development skills, and a community. Supporting both in person and online students, the GSA helps students connect with faculty and resources to prepare them for their future.

Presentation Type: Panel (May 15, 3:00-3:50pm)

Key Words: Graduate School, GSA, Leadership, Student Clubs, Professional Development, Intra-Disciplinary, Student Testimonies, Academic Community Building

Students With A Purpose (SWAP)

Fostering Student Empowerment and Community Engagement: The Impact of Student-Led SWAP Programs on Underrepresented College Student Success

Dylan Gilbert, Ava Pruitt, Audrey Tribble, David Torem, JeS Aiken, and Niranjan Malla
Project Mentor(s): Deanna Marshall, Jamie Rothwell, Meghan Rothwell
This research project investigated the transformative potential of interdisciplinary, student-led Students With A Purpose (SWAP) programs in higher education. The central research question revolves around understanding the impact of SWAP programs on underrepresented college students. The study explored their effectiveness in fostering social consciousness, leadership, and entrepreneurship skills among participants. The research addressed a critical aspect of student engagement and empowerment. By focusing on SWAP programs, the study makes a contribution to the area of inquiry by shedding light on SWAP's role in empowering underrepresented students. The research methodology involved a comparative study between Valdosta State University and Central Washington University SWAP chapters. A comprehensive literature review was conducted, emphasizing the SWAP model, and employed internal surveys, interviews, and document analysis to evaluate the achievements and strategies of these chapters. The outcomes showcase the substantial social, personal, and academic benefits experienced by SWAP program participants, which enhanced their critical thinking abilities and community engagement. These findings provide effective strategies that can serve as models for other universities interested in similar initiatives. Real success stories and insights into the impact of SWAP programs on underrepresented student retention will be presented. Given the decline in undergraduate student retention due to socioeconomic, cultural, and systemic barriers, this study underscores the necessity of engaging underrepresented student populations in higher education. It highlights the significant role of extracurricular experiential learning projects, like the SWAP programs, in bolstering student commitment to their campuses and local communities.
Presentation Type: Panel (May 15, 1:00-1:50pm)

Key Words: Student Engagement, Service Learning, Student Support Programs, Student Life

From Ideas to Action: CWU SWAP Sustainability Initiatives

Dylan Gilbert, Niranjan Malla, Audrey Tribble
Project Mentor(s): Deanna Marshall, Jamie Rothwell, Meghan Rothwell
This presentation delves into the dynamic landscape of student-led sustainability initiatives within the CWU SWAP community. Through a series of real-world examples, we will explore the journey of moving from concept to execution in sustainability awareness projects. Attendees will gain insights into identifying key sustainability issues that resonate with both students and the local community, designing innovative solutions, and implementing impactful actions. By sharing our experiences and lessons learned, this session aims to inspire and inform others interested in fostering sustainability awareness and action within their own communities.
Presentation Type: Panel (May 15, 1:00-1:50pm)

Key Words: Student Led Projects, Sustainability, Sustainability Awareness

Unleashing Potential: Empowering Students through Mentorship and Professional Growth

Dylan Gilbert, Jamie Rothwell, Meghan Rothwell
Project Mentor(s): Deanna Marshall

In today's competitive academic and professional environments, mentorship plays a pivotal role in student success and career development. This presentation underscores the importance of effective mentorship in nurturing students' aspirations and expanding their professional networks. We delve into the common challenges that students face in seeking mentors, such as fear of rejection and lack of confidence, and provide practical tools and strategies to overcome these barriers. Participants will learn how to identify potential mentors whose expertise aligns with their academic and career goals, and how to effectively communicate their ideas and ambitions. The presentation will highlight the mutual benefits of mentorship, including enhanced learning opportunities, career guidance, and increased access to professional networks. Additionally, the session will feature a live "Speed Mentoring" exercise, giving students the opportunity to practice their newly acquired skills. This interactive segment will connect students with university and community mentors, facilitating brief yet impactful exchanges aimed at refining students' approach to discussing their research interests and career aspirations. Join us to explore how mentorship can be a transformative tool for student development, fostering a foundation for lifelong professional relationships and success.

Presentation Type: Panel (May 15, 1:00-1:50pm)

Key Words: Mentorship, Professional Development, Student Engagement

Wenatchee Valley College

The Dollarization in Ecuador and Argentina: A Study of the Future of Latin America, the Cumpulsive Inflation Cycles, and the Political Drive of the New Century

Daniel I Arinez
Mentor(s): Waleed Muhammad

Argentina's recent election marked a significant turning point, particularly with the emergence of Javier Milei, which has cast a shadow over the future of Latin American socialism. Since the end of the dictatorship era, there has been a shift away from right-wing dictatorships toward socialist policies aimed at mitigating economic crises. However, the current landscape reflects a growing disillusionment with socialism in the region. For instance, Ecuador made a series of detrimental financial decisions that ultimately led to the abandonment of its national currency in favor of the US dollar. This move, known as dollarization, is now being considered in Argentina, a country grappling with one of the highest inflation rates in Latin America. This investigation seeks to analyze the impact of dollarization on Ecuador and assess whether Argentina might face similar challenges or if this decision could potentially alleviate its economic woes.

Presentation Type: Recorded (https://media.cwu.edu/channel/SOURCE+2024/342695472/subscribe)

Key Words: Dollarization, Ecuador, Argentina, Latin America, Debt, Oil, Natural Resources, Socialism, XXI Century, United States, Currency, Dollars

The Central Washington University Horn Ensemble

Jeffrey Snedeker, director

This program is a tribute to horn ensembles, featuring pieces of music that are identified with groups and composers who have contributed so much to the horn ensemble repertoire. The performance will be presented in Collage style, with the music performed continuously, including excerpts from the following pieces.

Bohemian Rhapsody (1975) — Freddie Mercury (1946-1991)
London Horn Sound — arr. Martin

March, from *Suite for Eight Horns* (1952) — Ronald LoPresti (1933-1985)
Los Angeles Horn Club
Kellen Schuetze, conductor

Frippery No. 2 (1964) — Lowell Shaw (b. 1930)
The Hornists Nest
Alex Coon, Jordyn Gribble, Isaac Rosado, Jaeden Tellvik, horns

Love for Robots (2017) — Emma Gregan (b. 1993)
NuCorno Ensemble
William Forbes, conductor

The Lion Sleeps Tonight (1939) — S. Linda (1909-1962)/G.D. Weiss (1921-2010)
Berlin Philharmonic horns — arr. Klaus Wallendorf
Alec Chinnery, Eamon Hill, John Roeder, Kellen Schuetze, horns

At Play on the Western Shore, from *Legend of the Sleeping Bear* (2002) — Eric Ewazen (b. 1954)
International Horn Society
Jaime Ramos, conductor

Hallelujah (1984) — Leonard Cohen (1934-2016)
Genghis Barbie — arr. Mark Drehmann
Lucy Jacky, Julia McConnachie, Tori Seward, Emma Tranum, horns

Allegro con brio, from *Quartet No. 1* (1987) — Kerry Turner (b. 1960)
American Horn Quartet
William Forbes, Beaumont Fry, Jaime Ramos, Connor Schwarz, horns

Heptafunk for horn ensemble (2016) — Ricardo Matosinhos (b. 1982)

Robin Hood, Prince of Thieves (1991) — Michael Kamen (1943-2003)
Vienna Horn Sound — arr. Salomen/Wagendristel

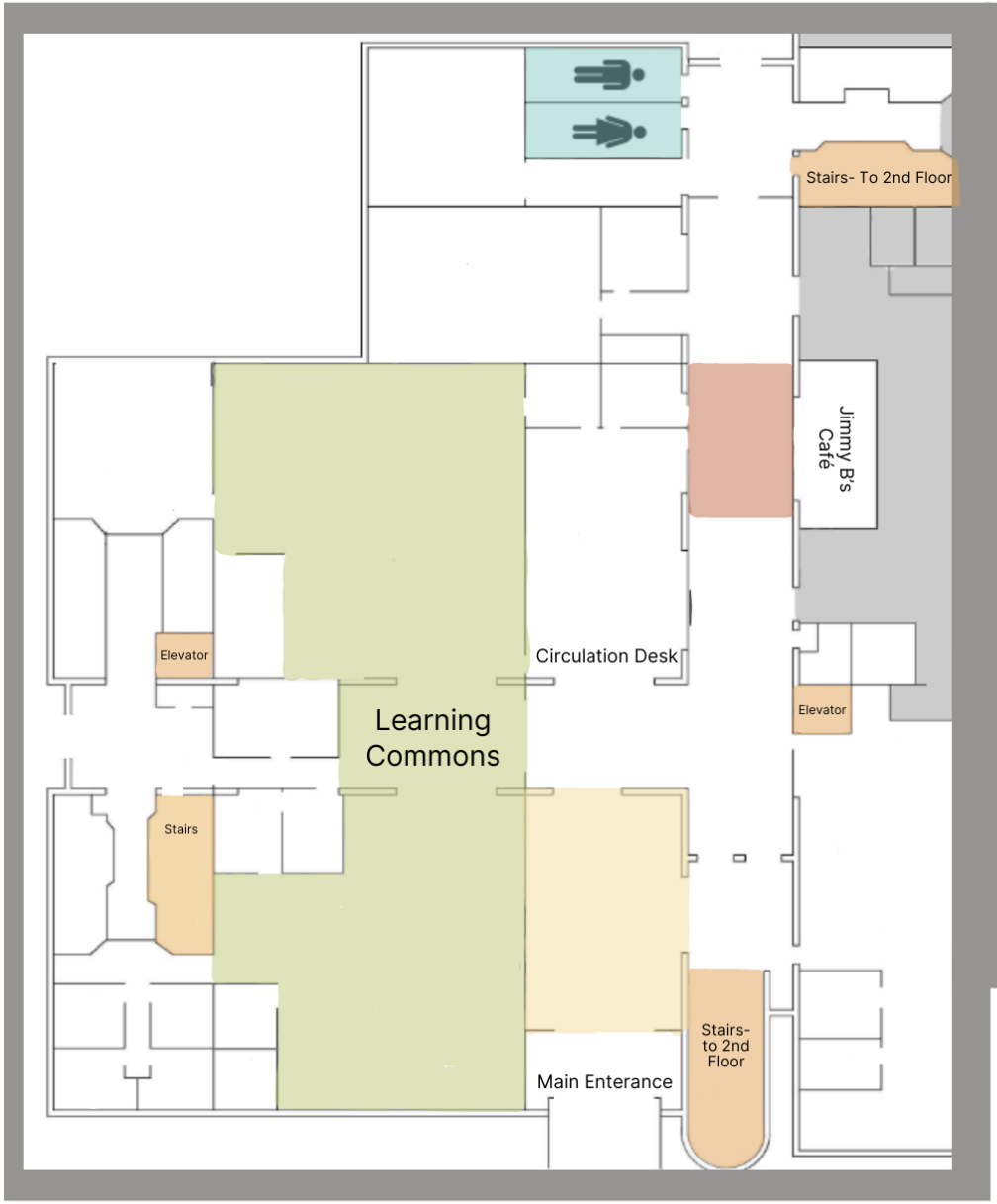
The Central Washington University Horn Ensemble is made up of university students, regardless of major, interested in playing the horn. Supported by the CWU Horn Club, the CWUHE performs 1- 2 full concert programs per year, has released two CDs, and has been featured at numerous Northwest Horn Society workshops, Washington Music Educators Association conferences, and symposia of the International Horn Society. In 2018, the ensemble placed second in the IHS 50 Ensemble competition at Ball State University in Muncie, Indiana. The ensemble has been invited to perform at IHS 56 in Fort Collins, Colorado.

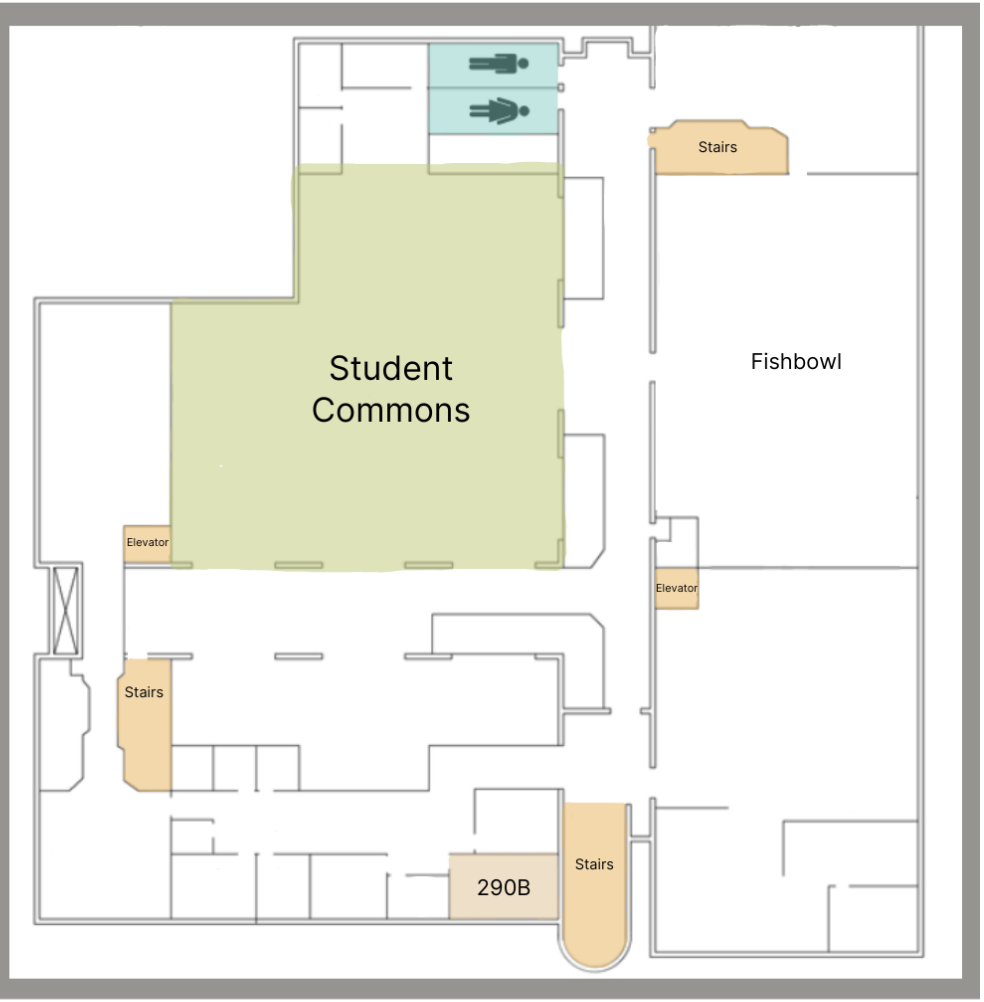
Central Washington University Horn Ensemble, Spring 2024

Alec Chinnery, *senior, Performance*
Alex Coon, *freshman, Performance*
William Forbes, *senior, Performance*
Beaumont Fry, *senior, Music Education*
Jordyn Gribble, *freshman, Music Education*
Eamon Hill, *junior, Music Education*
Lucy Jacky, *junior, Music Education*
Allison Knaff, *junior, Theatre Arts*
Gabrielle Kosoff, *senior, Music Education*
Julia McConnachie, *senior, Performance*
Alex Morris, *senior, Music Education*
Jaime Ramos, *senior, Music Education*
John Roeder, *junior, Music Education*
Isaac Rosado, *freshman, Music Education*
Kellen Schuetze, *senior, Performance/Music Ed*
Connor Schwarz, *senior, Performance*
Tori Seward, *junior, Music Education*
Jaeden Tellvik, *freshman, Music Education*
Emma Tranum, *senior, Performance/Music Ed*

SURC Floor Map

Library Floor Map





KEY

- Presentation Rooms
- Special Event locations
- Engagement Activities
- SOURCE Headquarters
- Check-In Area
- Restrooms
- Stairs & Elevators

OUR Friends & Partners

The Office of University Student Research (OUR) partners with and supports several programs and campus resources including:

- The Learning Commons
- CWU Libraries
- Multimodal Education Center (MEC)
- CWU Theatre Arts

CWU LEARNING COMMONS

MATH SERVICES

The CWU Math Services provides a space for you to work on math with friendly tutors to assist. Check in anytime we're open, and if you have a question, a tutor is present to offer support and help clarify concepts.

WRITING SERVICES

The Writing Services provides trained writing tutors who give constructive feedback on your drafts, help brainstorm ideas, and collect tips and resources for your research and writing process.

PALS TUTORING

PALs groups are learning communities, focused on a specific course and section helping students practice positive study habits and strengthen their understanding of class content. PALs groups meet weekly, led by a trained group facilitator who has successfully completed the course.

SUBJECT SPECIFIC

Subject Specific Tutoring is designed to offer one-on-one tutoring sessions for students in the following departments: accounting, biology, business, computer science, law and justice, psychology and sociology. Tutors have mastered many courses in these departments and are ready to assist you with your tutoring needs.

PEER MENTORING

Peer Mentoring is designed to help students succeed academically and encourage emotional and mental well-being. We focus on guiding students through goal setting for personalized outcomes, creating success strategies, and utilizing campus resources.

EXPLORATORY ADVISING

Exploratory Advising provides essential advising support for students who are exploring their academic major options. Advisors in this area will guide informed decision making and utilize student development theories and proactive advising strategies to support student's educational goals.

SPRING 2024 HOURS

Math and Writing

Monday - Thursday:
10 am - 9 pm
Friday: 10 am - 4 pm
Saturday: Closed
Sunday: 4pm-8pm

Exploratory Advising

Monday - Friday: 8am-5pm

For PALs meeting times, check out website. Our services also accomadate to our online students.

CONTACT US:

To schedule an appointment or to find out more information, email us at learningcommons@cwu.edu or call us at (509) 963-1270.

www.cwu.edu/learning-commons

FOLLOW US ON INSTAGRAM!

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CWU LEARNING COMMONS

SERVICIOS DE MATEMATICAS

Los Servicios de Matemáticas de CWU le brindan un espacio para trabajar en matemáticas con tutores amigables que lo ayudarán. Regístrese en cualquier momento que estemos abiertos y, si tiene alguna pregunta, un tutor estará presente para ofrecerle apoyo y ayudar a aclarar conceptos.

SERVICIOS DE ESCRITURA

Los Servicios de Escritura proporcionan tutores de escritura capacitados que brindan comentarios constructivos sobre sus papeles, ayudan a generar ideas y recopilan consejos y recursos para su proceso de investigación y escritura.

TUTORÍA DE PALS

Los grupos PAL son comunidades de aprendizaje, enfocadas en un curso y una sección específicos que ayudan a los estudiantes a practicar hábitos de estudio positivos y fortalecer su comprensión del contenido de la clase. Los grupos de PAL se reúnen semanalmente, dirigidos por un facilitador de grupo capacitado que ha completado y perfecto el curso.

TEMA ESPECÍFICO

La tutoría específica de la asignatura está diseñada para ofrecer sesiones de tutoría individuales para estudiantes de los siguientes departamentos: contabilidad, biología, negocios, ciencias de la computación, derecho y justicia, psicología y sociología. Los tutores han dominado muchos cursos en estos departamentos y están listos para ayudarlo con sus necesidades de tutoría.

MENTOR DE COMPAÑEROS

La tutoría entre pares está diseñada para ayudar a los estudiantes a tener éxito académico y fomentar el bienestar emocional y mental. Nos enfocamos en guiar a los estudiantes a través del establecimiento de metas para obtener resultados personalizados, crear estrategias de éxito y utilizar los recursos del campus.

ASESORAMIENTO EXPLORATORIO

El asesoramiento exploratorio proporciona apoyo de asesoramiento esencial para los estudiantes que están explorando sus opciones de especialidad académica. Los asesores en esta área guiarán la toma de decisiones informadas y utilizarán teorías de desarrollo estudiantil y estrategias de asesoramiento proactivo para apoyar las metas educativas de los estudiantes.

Primavera 2024 HORARIO

Matemáticas y Escritura

Lunes - Jueves: 10am - 9pm

Viernes: 10 am - 4pm

Sábado: Cerrado

Domingo: 4 pm - 8 pm

Asesoramiento exploratorio

Lunes - Viernes: 8am-5pm

Para conocer los horarios de las reuniones de PAL, consulte el sitio web. Nuestros servicios también se adaptan a nuestros estudiantes en línea.

CONTÁCTENOS:

Para programar una cita o obtener más información, envíenos un correo electrónico a learningcommons@cwu.edu o llámanos al (509) 963-1270.

www.cwu.edu/learning-commons

¡SÍGUENOS EN INSTAGRAM!

@cwulearningcommons

THE MULTIMODAL EDUCATION CENTER

PROVIDING RESOURCES TO FOSTER STUDENT SUCCESS

WHERE IS THE MEC?

Throughout the first floor of Samuelson Hall!

EQUIPMENT CHECKOUT

Samuelson Hall lobby

7-day loans!

Laptops, tablets, cameras, microphones, tripods, projectors, and much more!

CREATE LAB

Monday to Friday, 9AM-5PM.

Student staff available to help!

Desktop computers, software, laser cutting, 3D printing, Cricut machines, and more!

WORKSHOPS

In the create lab throughout the quarter.

Help students learn more about various digital programs!

VR LAB

Monday to Thursday, 3PM-6PM.

Open for students to book after completing training.

RECORDING STUDIOS

Includes lighting, camera, and microphone.

Available for student booking!

CWU

Sponsored by the Office of Undergraduate Studies and the Multimodal Education Center

For more information, visit:

Central Theatre Ensemble Presents

THE POWER OF YOUTH AND FINDING YOUR VOICE

Footloose

STAGE ADAPTATION BY DEAN PITCHFORD AND WALTER BOBBIE

Based on the Original Screenplay by Dean Pitchford
Music by TOM SNOW
Lyrics by DEAN PITCHFORD
Additional Music by ERIC CARMEN, SAMMY HAGAR,
KENNY LOGGINS and JIM STEINMAN

FOOTLOOSE is presented by arrangement with Concord Theatricals.
www.concordtheatricals.com

McCONNELL AUDITORIUM	7:30 PM PERFORMANCE	2 PM MATINEE
CWU Students $15 Youth/Senior $18 Adults $20	May 10-11 May 16-18	May 12 May 19

CWU

Sponsored by Central Theatre Ensemble

CWU is an AA/EEO/Title IX Institution. Anyone with a disability that needs accommodations to attend this event should contact Disability Services about accommodations at (509) 963-2214 at least 72 hours in advance.

Scan for tickets.
Or visit:
www.cwu.edu/tickets

Plan your day!

Day One!	Oral & Recorded Presentations CWU SURC
9:00AM	
10:00AM	
11:00AM	
12:00PM	
1:00PM	
2:00PM	
3:00PM	
4:00PM	

Day Two!	Poster Presentations CWU Library
10:00AM	
11:00PM	
12:00PM	
1:00PM	
2:00PM	

SOURCE 2024

proudly introduces...

CWU Central Washington University

+ LIBRARY LIBRARY OF CONGRESS

2024 is SOURCE's debut of LOC

The Library of Congress provides Congress with objective research to inform the legislative process, administers the national copyright system, and manages the largest collection of books, recordings, photographs, maps and manuscripts in the world.

May 15 - 16 2023

SURC | Brooks Library

ELLENSBURG CAMPUS

www.cwu.edu/source

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