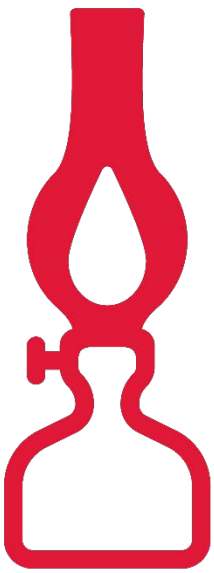

CURIOSITY IS THE WICK IN THE LAMP OF LEARNING

Student Research & Creative Works Symposium

Eastern Washington University

2024 Student Research and Creative Works Symposium

May 7th and 8th, 2024

People needing accommodations should contact the Symposium Director at symposium@ewu.edu

Table of Contents

Schedule Overview

DAY ONE

Tuesday May 7th, 2024

8:15 a.m. - 2:00 p.m.	**Oral Presentations**	*Patterson Hall 3rd Floor*
4:30 p.m. - 6:30 p.m.	**Creative Works**	*Art Building*

DAY TWO

Wednesday May 8th, 2024

8:15 a.m. - 1:00 p.m.	**Poster Sessions**	*PUB NCR*

Online version of the 2024 Symposium program and schedule is available at https://dc.ewu.edu/srcw_2024/

Symposium Sponsors

EWU Academic Affairs

Spokane Teachers Credit Union

Special Thanks

President Dr. Shari McMahan

Provost and Vice President for Academic Affairs Dr. Jonathan Anderson

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McNair Scholars Program

The Writers' Center

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Spokane Teachers Credit Union
For their generous donation and continued support

And Our Highest Thanks

To all the students, mentors, faculty & volunteers
who have continually worked to make the Symposium a success.

If you would like to contribute to the Symposium Foundation,
please contact the Symposium Office at symposium@ewu.edu

Please make checks payable to EWU Foundation for Student Research & Creative Works Symposium

Symposium Committee

The mission of the EWU Student Research and Creative Works Symposium is to promote student research, scholarship, and creative activity done in partnership with faculty and staff as a vital component of higher education. Students, faculty, administrators, dignitaries and the community-at-large are invited to attend, hear and discuss undergraduate and graduate creative and scholarly work.

2024 Symposium Committee Chair: Justin Otto

2024 Symposium Committee Members

1. Lynn Briggs
2. Rebecca Clark
3. Rob Davis
4. Kevin Decker
5. Greg duMonthier
6. David Early
7. Gail Forsgreen
8. Robert Gerlick
9. Thomas Hawley
10. Awlad Hossain
11. Ginelle Hustrulid
12. Jonathan Johnson
13. Krizstian Magori
14. Jonathan Middleton
15. Justin Otto
16. Pete Porter
17. Chad Pritchard
18. Michelle Schultz
19. Thomas Shaffer
20. Julia Smith
21. Leslie Swannack
22. Christina Valeo
23. Heather Veeder
24. Kristyne Wiegand

EWU's Ronald E. McNair Post-Baccalaureate Achievement Program

Fostering Excellence and Inspiring Awesome

As one of eight federally-funded TRiO outreach and student services programs, the goal of the TRiO Ronald E. McNair Post-baccalaureate Achievement Program is to increase the attainment of PhD degrees by students from first generation and underrepresented segments of society. Eastern's McNair Scholars Program prepares eligible participants for successful doctoral studies by providing opportunities for research or other scholarly activities including summer research internships, tutoring, academic counseling, seminars, and other educational activities designed to assist participants in securing admission to and financial assistance for doctoral enrollment. McNair research interns work closely with a faculty mentor to produce a scholarly research project and present their findings at a conference.

This research expectation has created an ongoing partnership between McNair and EWU's Symposium, which was first organized in 1997 by EWU chemistry professor Dr. Jeanne Small. The 1997 Undergraduate Research and Creative Works Symposium consisted of 16 total oral presentations (9 were McNair scholars); 12 poster presentations (4 were McNair Scholars) and two musical performances. In 2001, McNair Director Dr. Karen McKinney (now retired) took over coordination with the support of Dr. Ron Dalla (now retired) and the help of a graduate assistant. Dr. McKinney coordinated the event through 2005 in Monroe Hall, by which time the Symposium had grown to 145 presenters. The Symposium was moved to Senior Hall in 2006, and since then the event has grown to become a marquee event on campus.

Since the first EWU McNair grant was funded in 1995, McNair has worked closely with Eastern faculty to build a research center community where students thrive. Our quest is to continue this partnership with EWU McNair Faculty Mentors, staff, and administrators and continue the transformation of our students.

Since its inception, over 50 EWU McNair Scholars have earned doctorates, over 200 have earned master's degrees, and 62 are currently enrolled in graduate school. Of those enrolled, 38 are in PhD programs.

ORAL PRESENTATION SCHEDULE

Tuesday May 7th, 2024

Patterson Hall

8:15 a.m.	**Presenter Check-In Begins**	*Lobby in front of PAT 344*
8:15 a.m. - 2:00 p.m.	**Information Table**	*Lobby in front of PAT 344*
9:00 a.m. - 1:10 p.m.	**Orals 1: English, Psychology, Humanities, Religious Studies**	*PAT 304*
9:00 a.m. - 12:50 p.m.	**Orals 2: Sociology & Justice Studies, Management, Urban and Regional Planning, History**	*PAT 306*
9:00 a.m. - 1:35 p.m.	**Orals 3: Biology Session One**	*PAT 326*
9:00 a.m. - 1:35 p.m.	**Orals 4: Biology Session Two**	*PAT 328*
9:00 a.m. - 1:10 p.m.	**Orals 5: Interdisciplinary Studies, Chicano Education, Political Science, Education, Philosophy, Gender, Women's and Sexuality Studies**	*PAT 340*
9:00 a.m. - 12:20 p.m.	**Orals 6: Computer Science, Engineering, Geosciences, Wellness & Movement Sciences, Social Work, Music, Philosophy**	*PAT 348*

Oral Presentations Session 1: English, Psychology, Humanities, Religious Studies

PAT 304, 9:00 a.m. - 12:50 p.m.

9:05 AM	**Presenters:** Emily Lewan **Department:** English **Faculty Mentor:** Dr. Lynn Briggs **Title:** "Somehow Form a Family": Tony Earley's Assertion of Commonality to Highlight Difference
9:30 AM	**Presenters:** Abigail Blunt **Department:** English **Faculty Mentor:** Paul Lindholdt **Title:** Who is Crow? Exploring the Works of Ted Hughes
9:55 AM	**Presenters:** Kaylani Shah **Department:** English **Faculty Mentor:** Paul Lindholdt **Title:** The Myth of Leda in Hozier's Lyricism
10:20 AM	**Presenters:** Katie Gearing **Department:** English **Faculty Mentor:** Paul Lindholdt **Title:** Humanitarian Recognition in Jon Silkin's 'Caring for Animals'
10:45 AM	**Presenters:** Matthew Gardner **Department:** English **Faculty Mentor:** Dr. Beth Torgerson **Title:** "The Lure of The Unknown Abyss": Ambivalence and Hybridity in H.P. Lovecraft's The Shadow Over Innsmouth
11:10 AM	**Presenters:** Katelyn Confer **Department:** English **Faculty Mentor:** Paul Lindholdt **Title:** On Emily Dickinson
11:35 AM	**Presenters:** Victoria Layden **Department:** Psychology **Faculty Mentor:** Dr. Jillene Seiver **Title:** Accelerating Education: Video Playback Speed and Memory Retention
12:00 PM	**Presenters:** Isabella Avery **Department:** Humanities **Faculty Mentor:** Parker Shaw **Title:** Curanderismo and the Oral Health Equity Gap: How Traditional Folk Healing Among Hispanic Americans May Deter Individuals from Seeking Dental Care
12:25 PM	**Presenters:** Samuel Cash **Department:** Religious Studies **Faculty Mentor:** Garry Kenney **Title:** Gods, Heaven, and Hell: An Exploration of Afterlives In Mythology and Religion

Oral Presentations Session 2: Sociology & Justice Studies, Management, Urban and Regional Planning, History

PAT 306, 9:00 a.m. - 1:10 p.m.

9:05 AM	**Presenters:** Mekynzie Prescott **Department:** Sociology and Justice Studies **Faculty Mentor:** Kassahun Kebede **Title:** "Italians Count": A Look into the Italian American Population and Identity
9:30 AM	**Presenters:** Liezel John **Department:** Sociology and Justice Studies **Faculty Mentor:** Kassahun Kebede **Title:** An Overview of the Filipino American Population and History
9:55 AM	**Presenters:** Jasmine Joy Paloma **Department:** Sociology and Justice Studies **Faculty Mentor:** Kassahun Kebede **Title:** "I'm Not Going To Be One": Second Generation Thai-Taiwanese American
10:20 AM	**Presenters:** Lillian Cheney **Department:** Sociology and Justice Studies **Faculty Mentor:** Kebede, Kassahun **Title:** Grapple for Identity Amongst Second-Generation Mexican Americans
10:45 AM	**Presenters:** McKenna Gass **Department:** Management **Faculty Mentor:** Parker Shaw **Title:** The Effects Contributing to Workplace Sexual Harassment
11:10 AM	**Presenters:** Akolade Dada, Allison Zimmerman **Department:** Urban and Regional Planning **Faculty Mentor:** Margo Hill **Title:** Healing Lodge of the Seven Nations Feasibility Study pélpłkʷi citxʷs
11:35 AM	**Presenters:** Jai Anasazi-Matangi **Department:** Urban and Regional Planning **Faculty Mentor:** Jason Scully **Title:** Bridging Boundaries: Strategic Comprehensive Planning in Multi-State Metropolitan Areas
12:00 PM	**Presenters:** Christabel Agyei, Jay Anasazi-Matangi **Department:** Urban and Regional Planning **Faculty Mentor:** Dr. Jason Scully and Mr. Brett Lucas **Title:** City of Cheney Visioning Project
12:25 PM	**Presenters:** Kelly Mathews **Department:** Urban and Regional Planning **Faculty Mentor:** Jason Scully **Title:** Updating the Parks and Recreation Plan for Medical Lake Using the City's Natural and Historical Resources Featuring Three Scenarios of Analysis: Ecology, Economic Development, and Multimodal Connectivity
12:50 PM	**Presenters:** Hayley Olson **Department:** History **Faculty Mentor:** Ann Le Barr

	Title: The Sexuality of James the I and VI of England and Scotland: The Debate over the Nature of His Relationships with His Favorites

Oral Presentations Session 3: Biology Session One

PAT 326, 9:00 a.m. - 1:35 p.m.

9:05 AM	**Presenters:** Stephen Sharrett, Julianna Paulsen, James Lendemer, Krisztian Magori, Jesse Miller, Jessica Allen **Department:** Biology **Faculty Mentor:** Dr. Jessica L. Allen **Title:** Rarity, cause or consequence: Comparative population genomics of six lichenized fungi with contrasting range sizes, life histories, and morphologies
9:30 AM	**Presenters:** Julianna Paulsen, Stephen Sharrett, Devin Mumey, James Lendemer, Lalita Calabria, Jordan Hoffman, Eli Balderas, Jessica Allen **Department:** Biology **Faculty Mentor:** Jessica Allen **Title:** Mobile Genetic Elements in Rare, Threatened, and Range-Restricted Lichenized Fungi
9:55 AM	**Presenters:** Meg Lake, Stephen Sharrett, Elaine Larsen, Julianna Paulsen, Jessica Allen **Department:** Biology **Faculty Mentor:** Jessica Allen **Title:** Deconstructing White Imperialist Paradigms in Science: Integrating Interdisciplinary Frameworks into Biological Research
10:20 AM	**Presenters:** Elaine Larsen, Carissa Morrison **Department:** Biology **Faculty Mentor:** Jessica L Allen **Title:** Nostoc Genome Announcement
10:45 AM	**Presenters:** Meg Lake, Jeff Diez, Mark Schulze, Bruce McCune, Posy Busby, Sofia Green, Krisztian Magori, Jessi Allen **Department:** Biology **Faculty Mentor:** Dr. Jessi Allen **Title:** Differential water holding capacity in bryophyte species and organizational levels
11:10 AM	**Presenters:** Marion George, Alex Hays, Aspen Johnson, Ilona Kutsar, Raegan Laycock **Department:** Biology **Faculty Mentor:** Krisztian Magori **Title:** Impacts of Antibiotic Pollution on the Density of Antibiotic Resistant Bacteria in Greater Spokane, WA
11:35 AM	**Presenters:** Ashley Babin, Xochitl Chavez, Joshua Estudillo, Jacob Heaton, Nayeli Hernandez **Department:** Biology **Faculty Mentor:** Krisztian Magori **Title:** Tick Population Density in Spokane, Washington Parks
12:00 PM	**Presenters:** Hunter Briner, Braelyn Ballou, Jonathan Becerra **Department:** Biology **Faculty Mentor:** Krisztian Magori **Title:** Identifying breeding sites for mosquitoes and mosquito-like insects
12:25 PM	**Presenters:** Anna Carroll, Ana Beatriz Granman, Colton Quinn **Department:** Biology **Faculty Mentor:** Krisztian Magori **Title:** Exploring Possible Canine Diseases in Spokane Animal Shelters
12:50 PM	**Presenters:** Johnny Cardenas, Dalton Dawson, Flavio Rosales, Jessica Smith, Vladis Zetchov

	Department: Biology **Faculty Mentor:** Krisztian Magori **Title:** Detection of a Well-Established Parasite within Invasive Brook Stickleback (*Culaea inconstans*) Population at Turnbull National Wildlife Refuge
1:15 PM	**Presenters:** Makenna Tabino, Jackie Luna, Chelsea Schur **Department:** Biology **Faculty Mentor:** Dr. Krisztian Magori **Title:** The Effect of Bat Microbiomes and Ectoparasite Presence on White Nose Syndrome

Oral Presentations Session 4: Biology Session Two

PAT 328, 9:00 a.m. - 1:35 p.m.

9:05 AM	**Presenters:** Kyle Keenan **Department:** Biology **Faculty Mentor:** Dr. Paul Spruell **Title:** Investigating the Relationships between Biotic and Abiotic Factors Affecting Migratory Behavior in Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*) within the Priest River System.
9:30 AM	**Presenters:** Sawyer Nagle **Department:** Biology **Faculty Mentor:** Dr. Camille McNeely **Title:** The Roles of Dam Dimensions and Surface Porosity on the Water Storing Capacity of Beaver Dam Analogs Compared to Natural Beaver Dams
9:55 AM	**Presenters:** Devlin Mee, Carmen Nezat, Robin O'Quinn, **Department:** Biology **Faculty Mentor:** Carmen Nezat PhD **Title:** Synergistic Effects of EDTA and Biochar on Phytoextraction of Lead by the native annual sunflower, Helianthus annuus
10:20 AM	**Presenters:** Michael Trier **Department:** Biology **Faculty Mentor:** Rebecca Brown **Title:** Active versus Passive Restoration of Drained Reservoirs on Elwha River Ten Years After Dam Removal
10:45 AM	**Presenters:** Jonathan Becerra, Ramanpreet Singh, Sadie Merritt, Nguyen K. Nguyen, Michael Sanborn, Taiyo Sundheim **Department:** Biology **Faculty Mentor:** Justin Bastow **Title:** New possible canine testis tissue extraction and culture
11:10 AM	**Presenters:** Justin Roosma **Department:** Biology **Faculty Mentor:** Jason Ashley **Title:** Notch Signaling Drives Pathological Osteoclastogenesis in Multiple Myeloma
11:35 AM	**Presenters:** Margo Murphy **Department:** Biology **Faculty Mentor:** Judd Case **Title:** Impacts of Body Mass on Mammalian Microstructures and Cells Found in Compact Bone
12:00 PM	**Presenters:** Roxanne McPeck, Olivia Morgan, Andrea Castillo **Department:** Biology **Faculty Mentor:** Andrea Castillo, PhD **Title:** Identifying Targets of Small Regulatory RNAs: Transcriptomics in the Carcinogenic Pathogen, Helicobacter pylori
12:25 PM	**Presenters:** Emily Hamada **Department:** Biology **Faculty Mentor:** Bo Idsardi **Title:** Social Resource Availability and Use of Early Career STEM Teachers

12:50 PM	**Presenters:** Jair Alvarez, David Daberkoq **Department:** Biology **Faculty Mentor:** David Daberkow **Title:** Investigating the Impact of Pretreatment Intraperitoneal Oxytocin on Signs of Trauma
1:15 PM	**Presenters:** Katherine Cole **Department:** Biology **Faculty Mentor:** Dr. Robin O'Quinn **Title:** Assessing the Diversity and Restoration Potential of Native Prairie Arbuscular Mycorrhizal Fungi Communities

Oral Presentations Session 5: Interdisciplinary Studies, Chicano Education, Political Science, Education, Philosophy, Gender, Women's and Sexuality Studies

PAT 340, 9:00 a.m. - 1:10 p.m.

9:05 AM	**Presenters:** Gretchen Larmer **Department:** Gender, Women's & Sexuality Studies **Faculty Mentor:** Dr. Judy Rohrer **Title:** Anti-Transgender Care Bans: The Weaponization of Disinformation and the Political Ploy to Erase Transgender Youth
9:30 AM	**Presenters:** Jenna Fliesen **Department:** Interdisciplinary Studies **Faculty Mentor:** Majid Sharifi **Title:** Faith in Flux: The Interplay of Neoliberalism and Religion
9:55 AM	**Presenters:** Michaela Meek **Department:** International Affairs **Faculty Mentor:** Majid Sharifi **Title:** Free Trade Isn't Free: Implications for Food Security, A Case Study on Mexican Maize
10:20 AM	**Presenters:** Shaena Morgan **Department:** Political Science **Faculty Mentor:** Thomas Hawley **Title:** Big Oil Corporations' and Conservation Organizations' Effect on Generation Z's Attitude Towards Climate Change
10:45 AM	**Presenters:** Brandon Fletcher **Department:** Education **Faculty Mentor:** Kevin S. Decker **Title:** Highlighting the Importance of Gamifying Education to Increase Intrinsic Motivation in Students
11:10 AM	**Presenters:** Irie Browning **Department:** Philosophy **Faculty Mentor:** Christopher C. Kirby **Title:** The Soul of an Egret: A Cultural and Ethical Analysis of "Gibbons Raiding an Egret's Nest"
11:35 AM	**Presenters:** Luke Zagar **Department:** Philosophy **Faculty Mentor:** Dr. Terrance MacMullan **Title:** Crafting a Moral Response to Climate Disaster & Consumerism
12:00 PM	**Presenters:** Alicia Bailey **Department:** Philosophy **Faculty Mentor:** Dr. Terrance MacMullan **Title:** Latin American Philosophy: How Culture and History Shape Philosophy
12:25 PM	**Presenters:** Diana Ramos Sanchez **Department:** Chicano Education **Faculty Mentor:** Dr. Martin Meraz Garcia **Title:** Niños en la Oscuridad
12:50 PM	**Presenters:** Aspen Cullen

	Department: Gender, Women's & Sexuality Studies **Faculty Mentor:** Jessi Willis **Title:** The Swift Gaze: Analyzing Taylor Swift and Her Haters

Oral Presentations Session 6: Computer Science, Engineering, Geosciences, Wellness & Movement Sciences, Social Work, Music, Philosophy

PAT 348, 9:00 a.m. - 12:45 p.m.

9:05 AM	**Presenters:** Rahat Bhatia **Department:** Computer Science **Faculty Mentor:** Sanmeet Kaur **Title:** FarmFriend: Your crop companion
9:30 AM	**Presenters:** Bryan Snyder, Alysha McCullough, Clark Rabe, Curtis Melton, Nicholas Parkman **Department:** Computer Science **Faculty Mentor:** Sanmeet Kaur **Title:** Erik Box Games
9:55 AM	**Presenters:** Brandon Lewis **Department:** Engineering **Faculty Mentor:** Dr. Jason Durfee **Title:** Computer Modeling of Gaseous Species Transport and Combustion
10:20 AM	**Presenters:** Natalie Potter, Chad Pritchard **Department:** Geosciences **Faculty Mentor:** Chad Pritchard **Title:** U/Pb ages of isolated buttes in Spokane, Washington area to help project deformation in the subsurface
10:45 AM	**Presenters:** Breanna Batdorf, John Gerber **Department:** Wellness & Movement Sciences **Faculty Mentor:** John Gerber **Title:** Combined Anterior Cruciate and Medial Patellar-Femoral Ligament Reconstruction: A Case Study
11:10 AM	**Presenters:** William DeLay **Department:** Wellness & Movement Sciences **Faculty Mentor:** Dr. Kristyne Wiegand **Title:** The Effects of Velocity Based Training Versus Percentage Based on Lower Body Power in Female Collegiate Athletes
11:35 AM	**Presenters:** Katie Miller **Department:** Social Work **Faculty Mentor:** Rie (Leeay) Kobayashi, Ph.D., LMSW **Title:** Developing Affordable Affirmative Housing for Older Adults in Spokane, Washington
12:00 PM	**Presenters:** Jonathan Arguello **Department:** Music **Faculty Mentor:** Dr. Jonathan Middleton **Title:** What Is Sonification?
12:25 PM	**Presenters:** Sierra Burdette **Department:** Philosophy **Faculty Mentor:** Terry MacMullan **Title:** Baruch Spinoza and The Problem of Evil and Suffering

STUDENT CREATIVE WORKS SCHEDULE

Tuesday May 7th, 2024

Art Building Gallery & Lobby, RTV Building

4:30 p.m.	**Welcome & Presenter Check-In Begins**	*Art Building Lobby*
4:30 p.m. – 6:30 p.m.	**Appetizers and Refreshments**	*Art Building Lobby*
4:30 p.m. – 6:30 p.m.	**Art Exhibit**	*Art Building Gallery & Lobby*
5:00 p.m. – 6:35 p.m.	**Film Presentations**	*RTV 123*
5:20 p.m. – 6:30 p.m.	**Music Composition Presentations**	*Art Building Gallery*

STUDENT CREATIVE WORKS SCHEDULE

Art (4:30 p.m. – 6:30 p.m.)

Presenters: Caitlin Broxson **Faculty Mentor:** Jenny Hyde **Title:** Fish Teapot
Presenters: Caitlin Broxson **Faculty Mentor:** Jenny Hyde **Title:** Flu Season
Presenters: Cheryl Frostad **Faculty Mentor:** Marc LaPointe **Title:** Cradle the Life
Presenters: Cheryl Frostad **Faculty Mentor:** Marc LaPointe **Title:** Under the Canopy
Presenters: Moriah Godwin **Faculty Mentor:** Joshua Hobson **Title:** At a Loss For Words
Presenters: Addison Hansen **Faculty Mentor:** Annie Cunningham **Title:** The Chaos of Change
Presenters: Raven Hendershott **Faculty Mentor:** Hobson, Joshua **Title:** Anxiety, Healing, and Art
Presenters: Ari Hoskinson **Faculty Mentor:** Josh Hobson **Title:** August Triptych and Oregon
Presenters: M Jobe **Faculty Mentor:** Joshua Hobson **Title:** *Accidental Connection*
Presenters: Alyssa Kamp **Faculty Mentor:** Josh Hobson **Title:** Snail Church, Terracotta, 9" x 6", 2022
Presenters: Alyssa Kamp **Faculty Mentor:** Josh Hobson **Title:** Untitled Chaos Series, Gelatin Silver Print, 8’’ x 10’’, 2023
Presenters: Marisa Meneses **Faculty Mentor:** Marc LaPointe **Title:** Mourning
Presenters: Kyle Swiderski **Faculty Mentor:** Joshua Hobson **Title:** Nature's Embrace
Presenters: Travis Truly **Faculty Mentor:** Joshua Hobson **Title:** Things Are Lovely
Presenters: Grace Van Blaricom **Faculty Mentor:** Joshua Hobson

Title: Women
Presenters: Hannah Wilson **Faculty Mentor:** Marc LaPointe **Title:** Neon Nostalgia
Presenters: Sarah Wilson **Faculty Mentor:** Chris Tyllia **Title:** Looking Deeper

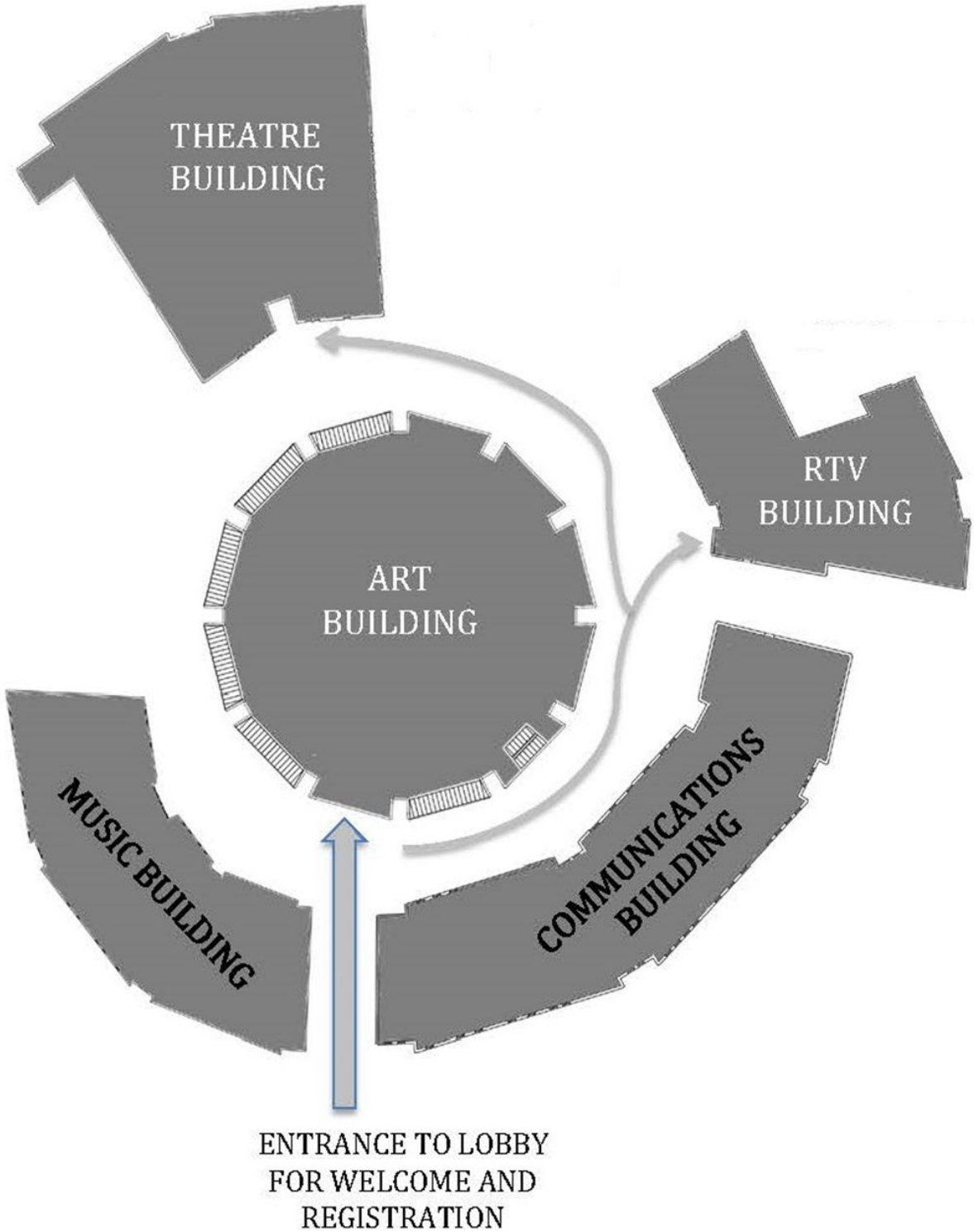
Film (RTV 123, 5:00 p.m. – 6:35 p.m.)

5:00 PM	**Presenters:** Thomas E. Walters **Faculty Mentor:** Pete Porter **Title:** Monsters and Fools: Gay Suppression in James Whale's The Invisible Man
5:25 PM	**Presenters:** Alexa Thomson **Faculty Mentor:** Pete Porter **Title:** Continuity of Intensified Continuity
5:50 PM	**Presenters:** Ranne Meloy **Faculty Mentor:** Pete Porter **Title:** Weezer Sucks (As Told By A Weezer Fan)
6:15 PM	**Presenters:** Ranne Meloy, Benjamin Chasse, Nathan Powell, Aiden Maher, Zachery Barron **Faculty Mentor:** Pete Porter **Title:** Where The F*** Are We?

Music (5:20 p.m. – 6:30 p.m.)

Presenters: Hilary Baird **Faculty Mentor:** Dr. Jonathan Middleton **Title:** Supermoon
Presenters: Christopher Cummins **Faculty Mentor:** Jonathan Middleton **Title:** Umi Kurete (The Sea Darkens)
Presenters: Dice Deacon **Faculty Mentor:** Dr. Jonathan Middleton **Title:** The Bludgeoning
Presenters: Rosalie Folger-Vent **Faculty Mentor:** Jonathan Middleton **Title:** Red Winged Blackbird
Presenters: Duff Overstreet **Faculty Mentor:** Jonathan Middleton **Title:** Sunshine

Fine Arts Complex Map



POSTER PRESENTATION SCHEDULE

Wednesday May 8th, 2024

Pence Union Building

8:15 a.m.	**Presenter Check-In Begins**	*PUB Lobby in front of NCR*
8:15 a.m. - 1:00 p.m.	**Information Table**	*PUB Lobby in front of NCR*
8:45 a.m. – 9:00 a.m.	**Welcoming Remarks**	*PUB NCR*
9:00 a.m. – 10:45 a.m.	**Poster Session 1**	*PUB NCR*
11:15 a.m. – 1:00 p.m.	**Poster Session 2**	*PUB NCR*

Poster Session 1

PUB NCR, 9:00 a.m. - 10:45 a.m.

Presenters: Nayeli Aguilar **Department:** Exercise Science **Faculty Mentor:** Otto Buchholz **Title:** Understanding and Treating Athlete Shoulder Instability
Presenters: Lyric Baker, Andrea Castillo **Department:** Biology **Faculty Mentor:** Andrea Castillo PhD **Title:** Testing if the Natural Antimicrobial Manuka Honey Induces A Viable But Not Culturable Bacterial State
Presenters: Isis Barragan Gomez **Department:** Exercise Science **Faculty Mentor:** Otto Buchholz **Title:** Psychological Interventions Used for Rehabilitation in Athletes Post-Injury
Presenters: Charles Blankenship **Department:** Music **Faculty Mentor:** Dr. Jonathan Middleton, Dr. Ben Luca Robertson. **Title:** European Free Tailed Bats Sonification
Presenters: Jodi Brandt **Department:** Biology **Faculty Mentor:** Judd Case **Title:** Thalassemia and the Protection Against Malaria
Presenters: Miranda Carmona **Department:** Economics **Faculty Mentor:** Dr. Mark Holmgren **Title:** Effect of Student Characteristics on their Academic Success
Presenters: Anna Carroll **Department:** Biology **Faculty Mentor:** Robin O'Quinn **Title:** Determining Optimum Germination Conditions in Western Stoneseed
Presenters: Joseph Deckhut **Department:** Biology **Faculty Mentor:** Dr. Judd Case **Title:** Using Polar Section Modulus to Define Avian Lifestyles
Presenters: Evan DeLeon **Department:** Psychology **Faculty Mentor:** Jillene Grover Seiver **Title:** Inferring Sexual Interst from Behavioral Cues as a Function of 2D:4D Ratio and Sex
Presenters: Isaac Dunmore **Department:** Geosciences **Faculty Mentor:** Chad Pritchard **Title:** Sampling potential hydrologic impacts from an underground fire lit by the Gray Road Fire, West Medical Lake
Presenters: Sydney Fergen

Department: Geosciences **Faculty Mentor:** Dr. Chad Pritchard **Title:** Historical Structural Analysis of the Rileyville Quadrangle, Page County, Virginia
Presenters: Aaron Fuzak, Chad Pritchard **Department:** Geosciences **Faculty Mentor:** Chad Pritchard **Title:** PFAS VARIATION THROUGH A WASTEWATER TREATMENT FACILITY PROCESS
Presenters: Emily Garza **Department:** Biology **Faculty Mentor:** Dr. Judd Case **Title:** Liver Affects on Cardiomyocytes
Presenters: Marion George, Talon Jost, Jenifer Walke **Department:** Biology **Faculty Mentor:** Dr. Jenifer Walke **Title:** Probiotic Potential of Bacterial Combinations for Amphibian Pathogen Remediation of *Batrachochytrium dendrobatidis*
Presenters: Emily Hamada, Jacob Heaton, Natalie McGuire, Sayla Merritt, Bukky Oredugba **Department:** Biology **Faculty Mentor:** Dr. Joanna Joyner-Matos **Title:** Investigating Macroinvertebrate Communities at Select Lentic Systems at Turnbull National Wildlife Refuge
Presenters: Jerusha Hampson **Department:** Geosciences **Faculty Mentor:** Chad Pritchard **Title:** Preliminary Per-and Polyfluoroalkyl Substances (PFAS) in surface waters in the West Plains Region of Spokane County
Presenters: Brittni Hastings **Department:** Geosciences **Faculty Mentor:** Chad Pritchard **Title:** Conflicting models for the formation of the Odessa Craters
Presenters: Isaias Hernandez-Dominguez, Chander Luderman-Miller **Department:** Computer Science **Faculty Mentor:** Dr. Sanmeet Kaur **Title:** Vysion Software
Presenters: Talon Jost **Department:** Biology **Faculty Mentor:** Dr. Jenifer Walke **Title:** Tetrodotoxin and Location, but Not Chytrid Fungal Infection, Influence Skin Microbiome Composition In Rough-skinned Newts (*Taricha granulosa*)
Presenters: Sylvia Kennerly, Rylee Kincaid **Department:** Chemistry and Biochemistry **Faculty Mentor:** Dr. Nicholas Burgis **Title:** Quantified expression of the ITPA enzyme mutations R178C within human neuron cells
Presenters: Hannah Kim **Department:** Biology **Faculty Mentor:** Dr. Jenifer Walke

Title: The Effects of Salinity on the Cutaneous Microbiome and Bd Infection of the Pacific Tree Frog (*Pseudacris regilla*)

Presenters: Ben Knoll, John Taylor, David Parker, Lilly Fetzer, Caleb Steinman
Department: Computer Science
Faculty Mentor: Dr. Sanmeet Kaur
Title: SecurIoTy: An Internet of Things Security Lab Platform

Presenters: Tosha Kristensen, Ryan Tibbetts, Alejandro Torres, Ashley Johnson
Department: Biology
Faculty Mentor: Charlotte R. Milling
Title: Environmental Variables That Affect Wildlife Movement at Turnbull Laboratory for Ecological Studies

Presenters: Jessica Lawrence, Natalie Potter, Chad Pritchard
Department: Geosciences
Faculty Mentor: Chad Pritchard
Title: U/Pb zircon ages of Saltese Upland Conservation Area, Priest River Core Complex

Presenters: Raegan Laycock
Department: Biology
Faculty Mentor: Judd A. Case
Title: The *Homo neanderthalensis* Diet and Lifestyle's Effect on Dental Anatomy in Comparison with *Homo sapiens*.

Presenters: Stephen Legg
Department: Biology
Faculty Mentor: Judd Case, PhD
Title: A Histological Exploration of Type I Diabetes

Presenters: Max Leonard, Kevin Taylor, Natalie Potter
Department: Geosciences
Faculty Mentor: Chad Pritchard
Title: Age and geochemistry of sillimanite-bearing gneiss from a possible core complex near Cheney, WA

Presenters: Citlali Lopez Pineda, Emma Eko, Andrew Dorgan, Benjamin Lundgren
Department: Chemistry and Biochemistry
Faculty Mentor: Benjamin R. Lundgren
Title: Is Two Better Than One? Comparing Expression of *Pseudomonas aeruginosa* and *Pseudomonas putida* in the Presence of Alternate Sulfur Sources

Presenters: Kenzington Mann, Eric Abbey
Department: Chemistry and Biochemistry
Faculty Mentor: Dr. Eric Abbey
Title: Dehydro Coupling of Organoborohydrides to Form BN-Heterocycles

Presenters: Andrew McCoy, Jack Albert, Stephanie Barr, Fahed Mehyar
Department: Physical Therapy
Faculty Mentor: Fahed Mehyar
Title: Initial Investigation of Blood Flow Restriction Training (BFR) Effect on Back Muscles

Presenters: Margot Mejia
Department: Social Work
Faculty Mentor: Dr. Rie Kobayashi
Title: Understanding the Immigrant Experience and Reducing Social Isolation Among Older Immigrant Adults in the U.S.

Presenters: Olivia Morgan, Roxanne McPeck, Andrea Castillo
Department: Biology

Faculty Mentor: Dr. Andrea Castillo
Title: Quantifying Relative Abundance of a *Helicobacter pylori* mRNA (flgE) Putatively Targeted by a Small RNA

Presenters: Carissa Morrison
Department: Biology
Faculty Mentor: Jessica Allen
Title: For the Love of Enlichenment

Presenters: Elliana Petrin, Brendan Kendall, Michael Sinclair, Hunter Allen, Calvin Crawford
Department: Computer Science
Faculty Mentor: Sanmeet Kaur
Title: Magic Queries

Presenters: Nolan Posey, Tanner Stephenson, Timothy Nelson, Daniel Palmer, Matthew Matriciano
Department: Computer Science
Faculty Mentor: Sanmeet Kaur
Title: Welcome To Cheney Mobile App

Presenters: Natalie Potter, Chad Pritchard
Department: Geosciences
Faculty Mentor: Chad Pritchard
Title: Deciphering the Shedroof Formation, a Proterozoic conglomerate structurally (?) overlying the Belt Supergroup in N Idaho and NE Washington

Presenters: Nicasio Santos
Department: Psychology
Faculty Mentor: Kayleen Islam-Zwart
Title: Alcohol and the Resulting Consequences of Delirium Tremens

Presenters: Jeff Schell, Charlotte Milling
Department: Biology
Faculty Mentor: Charlotte Milling
Title: The Effect of Moon Phase on Predator and Prey Activity Levels on Turnbull National Wildlife Refuge

Presenters: Alexander Scoles, Aaron Fuzak, Natalie Potter, Marilyn Smith, Erin Toulou, Chad Pritchard, Ethan Rychart, Alida Flores, Danial Aghassi
Department: Geosciences
Faculty Mentor: Dr. Chad Pritchard
Title: EWU Hydrogeologic Experience in Saltese Basin, eastern Washington

Presenters: Raul Segura, Sarah Johansson
Department: Psychology
Faculty Mentor: Sarah Johansson
Title: Teacher Self-Perception in multicultural student-teacher relationships, evaluating biases, and efforts to engage with students culture.

Presenters: Marilyn Smith, Chad Pritchard, Richard Gaschnig
Department: Geosciences
Faculty Mentor: Chad Pritchard, PhD
Title: Refining Ages of Granitic Rocks at the Intersection of the Sevier Orogeny and Priest River Core Complex in the Spokane Area

Presenters: Rachel Thayer, Jenna Thomason
Department: Psychology
Faculty Mentor: Dannielle Sitzman
Title: Does Memory Trust Predict Confidence in Memory Performance?

Presenters: Nicole Thomas **Department:** Social Work **Faculty Mentor:** Rie Kobayashi **Title:** Advocacy for the Older Population
Presenters: Jenna Thomason, Marysa Rogozynski **Department:** Psychology **Faculty Mentor:** Dr. Amani El-Alayli **Title:** The Application of the Dunning-Kruger Effect to Perceptions of One's Own Sexism
Presenters: Erin Toulou **Department:** Geosciences **Faculty Mentor:** Chad Pritchard **Title:** A Theoretical Geophysical Analysis of a Subsurface Carbonatite Body at Mountain Pass, CA
Presenters: Eric Wamsley **Department:** Physical Education, Health and Recreation **Faculty Mentor:** Nate Lawton **Title:** The Ethical Considerations of Cardiopulmonary Resuscitation
Presenters: Zac Ziegler **Department:** Biology **Faculty Mentor:** Andrea Castillo **Title:** Elucidating the Genetic Basis of Hydrogen Sulfide Production in *Desulfovibrio piger*

Poster Session 2

PUB NCR, 11:15 a.m. - 1:00 p.m.

Presenters: Henry Allen **Department:** Engineering **Faculty Mentor:** Dr. Awlad Hossain **Title:** Vacuum Assisted Resin Transfer Method
Presenters: Cannon Barnett **Department:** Biology **Faculty Mentor:** Krisztian Magori **Title:** An Overview of Deer Ked Species *Lipoptena depressa* — Identification, Life Cycle, Pathogens, and Impacts on Ecosystem
Presenters: Monique Baxter **Department:** Geosciences **Faculty Mentor:** Dr. Brian Buchanan **Title:** Heritage Site Analysis Using Remote Sensing: A study of Fort Beausejour/Cumberland and the Chignecto Isthmus
Presenters: Eric Beaulaurier, Jason Ashley **Department:** Biology **Faculty Mentor:** Jason W Ashley **Title:** Post translational modification of CSF1R as a mechanism for ligand preference
Presenters: Kayla Besel **Department:** Chemistry and Biochemistry **Faculty Mentor:** Ashley Lamm **Title:** Synthesis of Borazine Polymers
Presenters: Rahat Bhatia **Department:** Computer Science **Faculty Mentor:** Stuart Steiner **Title:** SmartBot
Presenters: Ben Bobeck, Nate Boutain, Noah Hieb, Esther Kumba, Jordan Mitchell **Department:** Engineering **Faculty Mentor:** Dr. Matthew Michaelis **Title:** SURFACE GEOMETRY AND ITS INFLUENCE ON PROPELLING LIQUID WITH THE LEIDENFROST EFFECT
Presenters: Trinity Boyd **Department:** Design **Faculty Mentor:** Travis Masingale **Title:** NourishAI: Crafting Your Personal AI Dietitian for Holistic Health
Presenters: Roary Bruce **Department:** Psychology **Faculty Mentor:** Jill Seiver **Title:** Feeling of Control as a Function of Cellphone Use in the Morning
Presenters: Zackery Castillo da Silva, Samuel Carpenter, Carson Desimone **Department:** Geosciences **Faculty Mentor:** Richard Orndorff

Title: Palouse Prairie Restoration Soils Classification
Presenters: Brooke Chisholm, Kolby Emtman, Gabrielle Jung, Karly Kenny, Kaleb Kolb, Tosha Kristensen, Willow Marso, Devlin Mee, Aidan Nett, Grace Ogle, Liela Saunders, Ryan Tibbetts, Raigan Wendt **Department:** Biology **Faculty Mentor:** Ross Black **Title:** Top-down versus Bottom-up Regulation in Aquatic Communities: An Experimental Test of Nutrient Availability versus Herbivore Concentration Effects on Primary Productivity in the TLES Pond
Presenters: Carson Desimone **Department:** Geosciences **Faculty Mentor:** Dr. Carmen Nezat **Title:** Plant-available Lead in Prairie Restoration Soil Previously Exposed to Trapshooting
Presenters: Douglas Doner **Department:** Computer Science **Faculty Mentor:** Dr. Bojian Xu **Title:** Utilizing Document Retrieval to Inform Large Language Models in an Educational Setting
Presenters: Elisabeth Ellingson **Department:** Geosciences **Faculty Mentor:** Dascher, E.D. **Title:** Sustainable Burial Alternatives
Presenters: Jonah Frago **Department:** Biology **Faculty Mentor:** Luis Matos **Title:** Testing the Lytic Capability of Recombinant P100.1 Phage Endolysin against *Cutibacterium acnes*
Presenters: Hammed Gafar **Department:** Biology **Faculty Mentor:** Dr. Jason Ashley **Title:** Unraveling Notch-Dependent Genes in Osteoclast Differentiation: A Novel Approach to Identify Therapeutic Targets for Osteoporosis
Presenters: Travis Hodges **Department:** Design **Faculty Mentor:** Travis Masingale **Title:** AI image generation in game design: *The Future of AI asset Prompting*
Presenters: Meena Jain Kristyne Wiegand **Department:** Exercise Science **Faculty Mentor:** Dr. Kristyne Wiegand **Title:** Hips Don't Lie: Analyzing Frontal Plane Kinematics in Adults of Varying Ages During Step Tasks
Presenters: Mohammad Kaddoura, Mamiko Patterson **Department:** Biology **Faculty Mentor:** Jason Ashley **Title:** Notch Signaling in Melanoma-Modulated Osteoclastogenesis
Presenters: Micah Lamb **Department:** Chemistry and Biochemistry **Faculty Mentor:** Dr. Ashley Lamm **Title:** Hydrolysis Kinetics of Trimeric Benzodiazaborole
Presenters: Jessica Lawrence **Department:** Geosciences

Faculty Mentor: Lindsey MacKenzie **Title:** Paleohydraulic Analysis of Megaripples from Outburst Floods in Omak, Washington
Presenters: Jessica Lawrence, Kai Valentine, Annika Smith, Sydney Fergen **Department:** Geosciences **Faculty Mentor:** Richard Orndorff **Title:** Geotechnical Analysis of Soil Sample PP-7 from EWU Palouse Prairie Restoration Site, Cheney, WA
Presenters: Victoria Layden **Department:** Psychology **Faculty Mentor:** Dr. Jillene Seiver **Title:** Accelerating Education: Video Playback Speed and Memory Retention
Presenters: Eric Leachman, Antonio Espinoza **Department:** Computer Science **Faculty Mentor:** Antonio M. Espinoza **Title:** Twitch.tv: The Communities We Make and the Language We Use
Presenters: Paxton McKee **Department:** Chemistry and Biochemistry **Faculty Mentor:** Ashley Lamm **Title:** Synthesis and Kinetics of Triazatriborinotrisbenzazaborole
Presenters: Helen Melake **Department:** Biology **Faculty Mentor:** Suzanne Bassett **Title:** A Soil Analysis of Bacterial Antibiotic Producers
Presenters: Carissa Morrison **Department:** Chemistry and Biochemistry **Faculty Mentor:** Ashley Lamm **Title:** Boron-Nitrogen-Carbon Polymers
Presenters: Devin Mumey, Jessica Allen **Department:** Biology **Faculty Mentor:** Dr. Jessica Allen **Title:** Genome Architecture, Secondary Metabolite Profiles, and Morphological Diversity in the *Cladonia chlorophaea* Group
Presenters: Caleb Nass, Brennen Bazaldua, Matthew Mason, Dylan Cummings, Derek Ren **Department:** Engineering **Faculty Mentor:** Dr. Bae **Title:** eVTOL Delivery Drone
Presenters: Melanie Novak **Department:** Biology **Faculty Mentor:** Camille McNeely **Title:** Storage of Soil Carbon by Beaver Dams and Beaver Dam Analogs
Presenters: Ashley Ogle, Robin O'Quinn **Department:** Biology **Faculty Mentor:** Robin O'Quinn **Title:** The Role of Exogenous Gibberellic Acid (GA3) Application in Breaking Seed Dormancy in *Clematis hirsutissima*
Presenters: Kelly Parke **Department:** Disability Studies and Universal Access **Faculty Mentor:** Ryan Parrey

Title: Atmospheres of Ableism: A Phenomenological Exploration of Everyday Encounters
Presenters: Anna Pugh **Department:** Anthropology **Faculty Mentor:** Dr. Julia Smith **Title:** The Unstable Start of the Japanese Internment Experience: Reconstructing the Puyallup Assembly Center
Presenters: Eric Rada, Brenden Johnson **Department:** Engineering **Faculty Mentor:** Heechang (Alex) Bae **Title:** Exploring the Influence of Acetone Vapor Processing and Subsequent Drying Methods on the Fatigue Performance of 3D Printed ABS Parts
Presenters: Bailee Romaker **Department:** Biology **Faculty Mentor:** Dr. Bo Idsardi **Title:** Factors Affecting Instructional Practices in Course-based Undergraduate Research Experiences
Presenters: Gracie Rosenbaum, Darren Ginder, Mitchell Gainer, David Daberkow **Department:** Biology **Faculty Mentor:** David Daberkow **Title:** The Influence of Anesthesia on Dopamine Signaling in the Rat Dorsal Striatum
Presenters: Maggie Semmens, Ashley Lamm **Department:** Chemistry and Biochemistry **Faculty Mentor:** Dr. Ashley Lamm **Title:** B-N-C Polymer Synthesis and Degradation
Presenters: Matthew Slater, Lauren Stachowiak **Department:** Geosciences **Faculty Mentor:** Lauren Stachowiak **Title:** A Mixed Methods Approach to Dendroarchaeology: A Case Study in the Horse Heaven Hills
Presenters: Bryan Snyder **Department:** Computer Science **Faculty Mentor:** Shamima Yasmin **Title:** Enhancing Literary Understanding in Secondary Education through Role Playing Games
Presenters: Sarah Stone **Department:** Chemistry and Biochemistry **Faculty Mentor:** Dr. Ashley Lamm **Title:** Applications of Cyclopentadiene for Cancer Treatment
Presenters: Sarah Stone **Department:** Biology **Faculty Mentor:** Paul Spruell **Title:** Applications of CRISPR in the Treatment of Cataracts
Presenters: Wen Sun **Department:** Computer Science **Faculty Mentor:** Dan Li **Title:** Classification for Imbalanced Credit Card Transaction Data
Presenters: Makenna Tabino **Department:** Biology **Faculty Mentor:** Dr. Rebecca Brown

Title: Determining the Long-Term Effectiveness of Seeding Post-Dam Removal in the Elwha River, WA, Through Soil Seed Bank Analysis
Presenters: Kevin Taylor, Kylee Woodworth, Brittni Hastings **Department:** Geosciences **Faculty Mentor:** Dr. Richard Orndorff **Title:** GEOTECHNICAL ANALYSIS OF SOIL SAMPLE PP-9: PALOUSE PRAIRIE RESTORATION PROJECT- CHENEY, WA
Presenters: Leya Thornton, Arianna Hunt, Thomas Cass **Department:** Wellness & Movement Sciences **Faculty Mentor:** Garth Babcock **Title:** Low-Level Laser Therapy and Cryotherapy as Interventions for Muscle Recovery Following Strenuous Exercise
Presenters: Alejandro Torres **Department:** Biology **Faculty Mentor:** Justin Bastow **Title:** Species Abundance and Richness of Native Bees in EWU's Prairie Restoration Site Compared to Adjacent Wheat Field and Natural Areas
Presenters: Morgan Whapeles **Department:** Design **Faculty Mentor:** P. Colin Manikoth **Title:** Exploring the Social and Educational Dynamics of the Apple Vision Pro
Presenters: Devon Wilson **Department:** Anthropology **Faculty Mentor:** Julia Smith **Title:** A Language Unwritten

Asynchronous Presentations

Eastern Washington University has students in online programs and in-person programs at locations outside of the Cheney/Spokane area. The following 2024 Student Research and Creative Works Symposium oral presentations and posters are given by EWU students in other locations. They are available at **https://dc.ewu.edu/srcw_2024/asy_2024/**

Presenters: Josh Burdick **Department:** Psychology **Faculty Mentor:** Julie Swets, PhD. **Title:** Impacts of Nostalgia Intervention on Wellbeing Over Time: A Proposed Study
Presenters: Anne Clase **Department:** Children's Studies **Faculty Mentor:** Belinda Hammond **Title:** Perinatal Palliative Care: An Integrative Literature Review
Presenters: Timothy Davies **Department:** Social Work **Faculty Mentor:** Rie Kobayashi **Title:** Housing Insecurity and Older Adults
Presenters: Marianne Lane **Department:** Social Work **Faculty Mentor:** Rie Kobayashi **Title:** The Use of Technology in Addressing Gaps in Care for Older Adults Living with Dementia.
Presenters: Kaitlin Perrin **Department:** Social Work **Faculty Mentor:** Rie Kobayashi, Ph.D., LMSW **Title:** Support Needed at End-of-Life: Death Doulas are Here to Help
Presenters: Samantha-Garcia Sanchez-Garcia **Department:** Social Work **Faculty Mentor:** Dr. Rie Kobayashi **Title:** Improving elder’s overall well-being.

Abstracts & Project Descriptions

Presenters: Nayeli Aguilar
Department: Exercise Science
Faculty Mentor: Otto Buchholz
Title: Understanding and Treating Athlete Shoulder Instability
Presentation Type: Poster
Abstract: One of the most prevalent conditions among overhead athletes is shoulder instability. Decreased strength, limited range of motion, frequent dislocations, and the possibility of bone trauma in the shoulder joint are all associated with shoulder instability. Thus, medical professionals must educate athletes which treatment route – nonoperative or surgical – would enable a highly motivated athlete to make a quick and efficient comeback in participating along with the risks. The choice ultimately comes down to the patient's willingness to endure a lengthier recovery period to minimize any risk factors or accept them for a faster recovery. This study's purpose is to provide other medical professionals with critical knowledge so they can give their athletes the best quality care possible. This presentation will discuss available treatments, with an emphasis on the Bankart repair, Latarjet procedure, and conservative treatment when considering return to play timelines. The advantages and disadvantages will be discussed, as well as the indications for both surgical techniques. Using search terms such as "shoulder instability," "athletic population," and "return to play," information from databases including EBSCOhost and the Journal of Athletic Training were acquired for this study. The QUEST tool was utilized to evaluate research articles for high-quality evidence; articles with a score of 22 or higher were deemed high-quality. This search produced recommendations to give a patient at least three months' worth of conservative treatment before seeking surgical care. Thereafter, the optimal surgical course should be determined by considering all damage in the joint, including ligamentous issues or bone loss.

Presenters: Christabel Agyei, Jay Anasazi-Matangi
Department: Urban and Regional Planning
Faculty Mentor: Dr. Jason Scully and Mr. Brett Lucas
Title: City of Cheney Visioning Project
Presentation Type: Oral Presentation
Abstract: As part of a 2-quarter class, a visioning project was conducted for the City of Cheney to guide future development to contribute to the long-term sustainability and resiliency of a vibrant and inclusive community. This vision report focuses on proactive measures to enhance the city of Cheney's quality of life, economic growth, sustainability, and well-being by presenting growth trends, conducting surveys, and producing baseline reports based on community feedback and Census data. A preliminary analysis was conducted to understand the overall character and needs of the City of Cheney. Survey questions were subsequently created to collect responses from residents in Cheney. These survey questions were tailored to cover the results gained from the preliminary study. The survey results were used to draft three vision statements for Cheney's future development, emphasizing maintaining its small-town character, enhancing educational ties with Eastern Washington University, and ensuring balanced growth in critical areas like housing, natural spaces, and transportation. These vision statements aim to guide Cheney towards a future that respects its past, responds to present needs, and anticipates future aspirations through strategic planning and community engagement. Another aspect of this visioning was the town-and-gown situation between Cheney and Eastern Washington and other aspirational town-and-gown cities from which Cheney could learn. The results and findings from this project were reported to the City Council of Cheney. Attached below are the names of the students and professors involved in this project. Two professors and ten students worked on this project.

Presenters: Henry Allen
Department: Engineering

Faculty Mentor: Dr. Awlad Hossain
Title: Vacuum Assisted Resin Transfer Method
Presentation Type: Poster
Abstract: Vacuum Assisted Resin Transfer Method
The vacuum assisted resin transfer method (VARTM) is a process used to fabricate composite materials. This process is done using a mold or plate as a base and then building up the rest of the set up from there. On the base is the vacuum seal tape, spiral or percolated tubing, a connector for the tubing, the fiber plies in the center, separation layer, vacuum mesh, and the vacuum bag layer. This setup is then connected to the resin container. The other end is connected to a catch pot and vacuum pump. The purpose of the VARTM guided study was to get a VARTM set up working in the EWU materials project lab. The set up created for this required buying the catch pot and spiral hose materials, and 3-D printing of the connectors for the spiral to outside tubing. Using this set up it was observed that the resin flowed through the system at an extremely slow rate which caused the resin to harden before it could all be pulled into the system by the pump properly. Another observation was made that the epoxy used held many small bubbles that were difficult to remove. The seal was also not consistent; for some of the sheets the seal survived until the full twenty-four-hour cure times, other samples the seal slowly failed. It caused inconsistency, and reduced flow rate. The four usable sheets were then cut into dog bone shapes to be tensile tested. From the data gathered, each sheet had massive spread in max load values between its samples. It was expected that the samples for each sheet would follow a closer spread than this. For future experiments to fix these inconsistencies it is recommended to use a silicon mold for a better seal material. The incorrect epoxy, separation, and breather materials also can cause inconsistency, and acquiring the correct ones should improve the resin flow.

Presenters: Jair Alvarez, David Daberkoq
Department: Biology
Faculty Mentor: David Daberkow
Title: Investigating the Impact of Pretreatment Intraperitoneal Oxytocin on Signs of Trauma
Presentation Type: Oral Presentation
Abstract: Oxytocin is a treatment for PTSD. Previous research suggests that pre-treatment of intranasal oxytocin attenuates signs of fear in rats; however, the impact of intraperitoneal (i.p) oxytocin pre-treatment on signs of fear in rats is unknown. We investigated the effects of i.p. oxytocin pre-treatment on signs of fear. Male Sprague-Dawley rats were divided into 5 groups, (n=8 per group); 1.) controls (vehicle and no foot shock), 2.) shock (vehicle and foot shock), 3.) low dose (0.03 mg/kg oxytocin and foot shock), 4.) medium dose (0.3 mg/kg oxytocin and foot shock), and 5.) high dose (1.0 mg/kg oxytocin and foot shock). Rats were treated with oxytocin (or vehicle) 30 min prior to fear conditioning. Day 1, rats were placed in fear-conditioning chamber which delivered five foot shocks at an intensity of 0.6 mA to the metal grate floor. Day 2, the rats were re-exposed to chamber for 5 minutes, not shocked, and freezing time was recorded via a motion detector. Day 3, rats were re-exposed to chamber for 5 min and shocked again with the same parameters. Day 4, rats were re-exposed to the chamber for 5 min, not shocked, and freezing time was recorded. Preliminary data suggests that the low dose of oxytocin (0.03mg/kg) decreases freezing relative to the untreated shock group. An additional day of shock showed a significant decrease in freezing with the high dose (1.0mg/kg). These data suggest that oxytocin, administered i.p., can be used as a prophylactic pre-treatment to mitigate signs of fear.

Presenters: Jai Anasazi-Matangi
Department: Urban and Regional Planning
Faculty Mentor: Jason Scully
Title: Bridging Boundaries: Strategic Comprehensive Planning in Multi-State Metropolitan Areas
Presentation Type: Oral Presentation
Abstract: This research explores the complexities of multi-state urban area coordination through comprehensive planning, addressing the critical need for cohesive growth and development in metropolitan

regions spanning state borders. The study scrutinizes the collaborative dynamics of municipalities within these regions, focusing on the interplay of legal frameworks, governance structures, and planning practices. Utilizing a mixed-methods approach, including case studies, legislative reviews, and stakeholder interviews, the research identifies the challenges of jurisdictional disparities and the benefits of integrated planning. Findings highlight the pivotal role of legislative tools and intergovernmental relations in fostering sustainable urban development. The analysis reveals that effective coordination among state, county, and city governments, supported by adaptable legal frameworks and proactive comprehensive planning, is essential for mitigating the fragmentation of services and ensuring equitable growth. The study contributes to urban planning literature by offering insights into the governance of multi-state metropolitan areas and proposing strategies for enhancing collaboration and socio-economic equity. Through empirical examination and comparative analysis, it provides actionable recommendations for policymakers and planners to navigate the complexities of regional urban development.

Presenters: Jonathan Arguello
Department: Music
Faculty Mentor: Dr. Jonathan Middleton
Title: What Is Sonification?
Presentation Type: Oral Presentation
Abstract: This project outlines my senior capstone project centered around the fusion of data analytics and music, leveraging insights gained from a recurring podcast titled "The Score." The objective was to delve into the emerging field of data-driven music creation, examining its implications for both music and the STEM field. Drawing upon interviews with Dr. Middleton and Dr. Robertson, this project aimed to conduct qualitative research.

Presenters: Isabella Avery
Department: Humanities
Faculty Mentor: Parker Shaw
Title: Curanderismo and the Oral Health Equity Gap: How Traditional Folk Healing Among Hispanic Americans May Deter Individuals from Seeking Dental Care
Presentation Type: Oral Presentation
Abstract: There is a staggering oral health equity gap between Hispanic Americans and other ethnic groups in the United States. The external reasons have been well-researched, including barriers to accessing healthcare that result from structural economic and social inequalities. Less researched, however, are the internal reasons for such a significant disparity, i.e. cultural beliefs, attitudes, and practices within the Hispanic community that deter individuals from seeking professional care. One such practice is *curanderismo* or traditional folk medicine. While curanderismo has been researched extensively in the fields of anthropology and general medicine, its implications have seldom been applied to dentistry in the existing literature. This project seeks to address that need by intertwining previous studies done on *curanderismo* with relevant studies done in dentistry. Specifically, I will assert that, for many Hispanic Americans, *curanderismo* offers a more attractive alternative to Western dentistry in several ways: it reinforces traditional beliefs surrounding health ailments that may not be accurate, and it is part of a larger social structure within the Hispanic community that traditionally does not place importance on regular dental visits. Ignorance of these factors may keep the equity gap from closing in dentistry. I will also discuss solutions that may be implemented to address this inequity.

Presenters: Ashley Babin, Xochitl Chavez, Joshua Estudillo, Jacob Heaton, Nayeli Hernandez
Department: Biology
Faculty Mentor: Krisztian Magori
Title: Tick Population Density in Spokane, Washington Parks
Presentation Type: Oral Presentation

Abstract: In the US, ticks can carry a variety of disease-causing organisms. These diseases include Lyme disease, babesiosis, ehrlichiosis, and Rocky Mountain Spotted Fever. The goal of this study is to identify areas where caution and proper attire should be worn to avoid possibly taking ticks home with you. Hikes and outdoor excursions are popular places where ticks are more likely to be detected on humans and canines. With the hiking season approaching, we will collect data from 4 popular hiking routes in Spokane, Washington, in order to identify which one has the highest density of ticks. We will be collecting data from the Bowl and Pitcher Loop Trail, Waterfall Loop Trail, and Dishman Hills Natural Area Trail, and the Rocks of Sharon Trail hiking routes. We'll drag a corduroy sheet behind us, which the ticks will cling to, making it easy to assess the tick population in the area. The quantity of ticks will be recorded along with the ticks per square meter in each region. Our hypothesis is tick populations will be higher in places with larger concentrations of plants, humans, and pet activity. Therefore, with prime tick season approaching our goal is to help inform the public about high-tick population places to avoid when seeking destinations to hike, which will be aided by the results of this experiment.

Presenters: Alicia Bailey
Department: Philosophy
Faculty Mentor: Dr. Terrance MacMullan
Title: Latin American Philosophy: How Culture and History Shape Philosophy
Presentation Type: Oral Presentation
Abstract: Latin American Philosophy: How History and Culture Shape Philosophy and the Differences Between Latin America and the United States
The cultural and historical differences between Latin America and the United States change the way these cultures view and practice philosophy. The cultural traditions and values in Latin America are different than the values traditionally promoted in the United States. There are differences in culture and history between Latin America and white America, but those differences can be used to bring us together to create a community. My paper explores those differences in more detail and provides examples of ways that those differences can be used to facilitate understanding and create a relationship and community between Latin American people and the United States, namely white Americans.

Presenters: Hilary Baird
Department: Music
Faculty Mentor: Dr. Jonathan Middleton
Title: Supermoon
Presentation Type: Creative Work
Abstract: "Supermoon" is a poem written by Bridgette White. For my project I took this poem and composed it into a song which included voice and saxophone. The poem goes on to describe how we are not alone because the moon sees us and our struggles in life, but it shines. I chose voice to evoke the bright sense of the moon and saxophone to capture the quiet togetherness of the people below the moon.

Presenters: Lyric Baker, Andrea Castillo
Department: Biology
Faculty Mentor: Andrea Castillo PhD
Title: Testing if the Natural Antimicrobial Manuka Honey Induces A Viable But Not Culturable Bacterial State
Presentation Type: Poster
Abstract: Antibiotic resistance among bacteria poses a significant threat to global health. Mechanisms that contribute to antibiotic resistance include genetic mutations, acquisition of resistance genes, and transition to persister and Viable But Not Culturable (VBNC) dormant states. While genetically identical to their non-resistant counterparts, persister and VBNC cells evade the effects of antibiotics through metabolic inactivity. Antibiotics are only effective if their targeted processes, e.g., DNA replication, are occurring. Because

environmental stressors, notably antibiotics, can induce bacteria to enter dormant states, there is a need for alternative antimicrobials that minimize or do not induce such states. The antimicrobial Manuka Honey (MH) is effective against a wide range of bacteria, without evidence of resistance development. Its multifaceted antimicrobial mechanisms make it a valuable agent for treating bacterial infections. Our research investigates MHs recalcitrance to antibiotic resistance development by testing the hypothesis that MH induces fewer VBNCs than conventional antibiotics. To investigate this, we treated the bacteria *Staphylococcus aureus* with minimum inhibitory concentrations of MH or the conventional antibiotic tobramycin and then used the viable plate count (VPC) to identify metabolically active cells and the live/dead (LD) staining method to identify all live cells. The number of VBNC cells equals the LD cells number minus the VPC cell number. For *S. aureus*, tobramycin treatment induced more VBNC cells than MH treatment. We are currently extending our experiments to the bacterial pathogens, *Pseudomonas aeruginosa* and *Escherichia coli*. Results of our experiments will elucidate MH's impact on bacteria physiology and its effectiveness as an antimicrobial.

Presenters: Cannon Barnett
Department: Biology
Faculty Mentor: Krisztian Magori
Title: An Overview of Deer Ked Species *Lipoptena depressa* — Identification, Life Cycle, Pathogens, and Impacts on Ecosystem
Presentation Type: Poster
Abstract: Deer Keds are a type of parasitic fly found on cervids that are often mistaken for ticks. Hunters, or anybody who finds themselves in an environment where deer pass through, may come into contact with these insects. For this reason, along with for the sake of cervid population health monitoring, it is important to understand the capacity of this specific species of keds to transmit harmful pathogens. A sample of nine keds were collected last fall from a dead deer by faculty and staff at EWU Biology in the Spokane area. This poster will provide an overview of what deer keds are, and explain the processes used to identify the specific species of these keds along with their previously scarcely documented sexual dimorphism. The sex ratio is important to keep track of, as more female keds means a greater growth rate of the insects. In addition, the poster will dive into methods of detecting the presence or absence of pathogenic *Anaplasma* and *Bartonella* bacteria. The poster will also contain information on what one should do if they suspect that they may have been exposed to the keds, along with further research proposals.

Presenters: Isis Barragan Gomez
Department: Exercise Science
Faculty Mentor: Otto Buchholz
Title: Psychological Interventions Used for Rehabilitation in Athletes Post-Injury
Presentation Type: Poster
Abstract: There are usually many considerable numbers of injuries sustained throughout sports, whether at the high school, collegiate, or professional levels. Within that, these athletes' mental health has a huge impact on how they manage their injuries. As more significant injuries occur, athletes may have a negative psychological reaction to their injuries. It is conceivable that athletes have not developed effective coping strategies, making recovery from injuries more challenging. In order to assist athletic trainers and clinicians in making an informed decision about whether to incorporate psychological interventions into their practice, the purpose of this Critically Appraised Topic (CAT) is to review the available research regarding the integration of psychological interventions into the rehabilitation process in injured collegiate athletes. A literature search was conducted using keywords (i.e. psychological interventions, post-injury, athletes, and effectiveness), then inputting into databases (i.e. Google Scholar, EBSCOhost, NLM-NIH) and then assessed the quality of the results using the Quality Assessment Scoring Tool (QUEST). All articles included must have a minimum score of 22, ensuring that the highest quality articles are used. This poster will cover psychological interventions that can be included in your athlete's recovery process. The psychological interventions described in the current research promote the

use of imagery, goal planning, self-talk, and social support. Further discussion will focus on the best psychological interventions for injured athletes.

Presenters: Breanna Batdorf, John Gerber
Department: Wellness & Movement Sciences
Faculty Mentor: John Gerber
Title: Combined Anterior Cruciate and Medial Patellar-Femoral Ligament Reconstruction: A Case Study
Presentation Type: Oral Presentation
Abstract: OBJECTIVE: To provide athletic trainers, physicians, and other healthcare professionals with more information regarding anterior cruciate ligament (ACL) and medial patellar-femoral ligament (MPFL) combination injuries and the rehabilitation process after reconstruction surgery. BACKGROUND: There is a plethora of research regarding ACL injuries and rehabilitation. Rehabilitation following MPFL surgery is much less abundant. The combination ACL and MPFL injury and subsequent surgical reconstruction is extremely rare. Only a singular case report is found in the literature and that particular report does not include much information regarding the rehabilitation following surgery. RECOMMENDATION: The recommendations for this presentation are based on a singular, non-athletic patient, and considerations must be made for competing athletes. Recommendations include modifying an ACL post-surgical rehabilitation protocol to account for the MPFL reconstruction, and patellar glide requirements. The modifications may include a delay in patellar mobilization, more time in a full leg brace or more aggressive pursuit of knee flexion progress.

Presenters: Monique Baxter
Department: Geosciences
Faculty Mentor: Dr. Brian Buchanan
Title: Heritage Site Analysis Using Remote Sensing: A study of Fort Beausejour/Cumberland and the Chignecto Isthmus
Presentation Type: Poster
Abstract: The Chignecto Isthmus in New Brunswick, Canada, hosts three heritage sites and the UNESCO Fundy Biosphere Reserve. This natural land bridge served as a significant trade hub for the Mi'kmaq community pre-European contact. This study, however, focuses on heritage sites associated with 18th-century conflicts between France and Britain. These sites played a crucial role in protecting the Chignecto Isthmus during the mid-18th century. This project has three goals. First, the researcher wants to show the viability of using open-source remote sensing data on lesser-known heritage sites. Secondly, using remote sensing techniques, the aim is to visualize the iconic "star fort structure" of Fort Beausejour/Cumberland. Finally, using Sentinel 2 satellite data this researcher will visualize the larger Chignecto Isthmus including the additional sites of Beaubassin and Fort Lawrence National Historic Sites, and analyze this data for common threats to heritage sites. By leveraging open data point cloud information and satellite remote sensing, we can explore the lesser-studied Chignecto Isthmus without disturbing the biosphere. Results will demonstrate that remote sensing techniques are a viable option to understand lesser-known historical sites and visualize common threats to the preservation of heritage sites. In conclusion, open data point cloud information and satellite remote sensing are viable options for understanding heritage sites and the threats that may impact their preservation.

Presenters: Eric Beaulaurier, Jason Ashley
Department: Biology
Faculty Mentor: Jason W Ashley
Title: Post translational modification of CSF1R as a mechanism for ligand preference
Presentation Type: Poster
Abstract: Macrophages are immune cells that help provide the first line of defense against a wide range of internal and external insults and create the bridge between innate and adaptive immune responses. When macrophage homeostasis is disrupted disease states occur. Associated disease states include rheumatoid

arthritis, osteoporosis, and multiple sclerosis which can severely affect quality of life for those affected. The survival and proliferation of macrophages is largely controlled by signaling through colony stimulating factor 1 receptor (CSF1R). Notably, this receptor can be activated by two non-homologous ligands, colony stimulating factor 1 (CSF1) and interleukin-34 (IL34). These two ligands are differentially required for macrophage homeostasis across body systems and have different associated pathologies. The ability to separately influence these ligands could provide a novel therapeutic target for these diseases. While the differential effects of CSF1Rs dual ligands have been demonstrated, the structural mechanisms leading to these effects are well understood. In our work we have found that IL-34 appears to only bind the smaller glycoprotein 130kD (gp130) version of the CSF1R receptor while CSF1 appears to bind both gp130 and the larger glycoprotein 150kD (gp150) forms of the receptor. This provides a novel explanation for the differential signaling and binding affinity seen between the ligands. We are additionally investigating the potential role of sialic acid, a negatively charged sugar that is added to CSF1R, in influencing this difference in binding affinity.

Presenters: Jonathan Becerra, Ramanpreet Singh, Sadie Merritt, Nguyen K. Nguyen, Michael Sanborn, Taiyo Sundheim
Department: Biology
Faculty Mentor: Justin Bastow
Title: New possible canine testis tissue extraction and culture
Presentation Type: Oral Presentation
Abstract: A novel method of obtaining live thin sections of dog testes was developed. In contrast with traditional cell culture system, where tissues are disrupted into single cells with proteolytic enzymes and cultivated in optimal growth media, dog testes thin sections were generated with an electric slicer (the type that can be found at any supermarket). Thus, the experiment attempted to culture mammalian organ sections while being cost-effective. If successful, this system would enable mammalian organotypic cell cultures to be widely employed in reproductive biology. Dog testes were obtained from a local spay/neuter veterinary clinic and sliced into 400-600μm thickness with the electric slicer. The sections were cultured in Petri dishes containing Tissue Culture Media-199 (TCM-199). The sections media was equilibrated with a blood gas mixture (7% CO_2 :7% O_2 : balanced N_2) and cultured in an air-tight plastic chamber at 37 degrees Celsius in a water-jacketed incubator. As time elapsed, the sections were observed to thicken, curve on edges and transform into tiny testis-like structures. These changes occurred after 7 to 10 days of culture and progressed until staining commenced. The sections were confirmed to be alive after 21 days of culture by live/dead cell staining. Through this preliminary work, future studies can employ this system to potentially obtain viable mature sperm cells *in vitro*.

Presenters: Kayla Besel
Department: Chemistry and Biochemistry
Faculty Mentor: Ashley Lamm
Title: Synthesis of Borazine Polymers
Presentation Type: Poster
Abstract: Plastics and polymers are incredibly useful and ubiquitous in our daily lives but they are incredibly persistent in the environment, killing more than 1.1 million seabirds and animals each year and the global production of plastic has doubled since 1950.[1] A potential path to eliminate this problem is to create polymers that biodegrade or breakdown over time or in certain conditions. Three distinct degradable polymers were synthesized. The synthesis, characterization, and kinetics monitored by UV/Vis over a range of pH's will be discussed.
1. Derraik, J. G. B. "The pollution of the marine environment by plastic debris: a review" *Marine Pollution Bulletin*, **2002**, *44*, 842-852

Presenters: Rahat Bhatia
Department: Computer Science

Faculty Mentor: Sanmeet Kaur
Title: FarmFriend: Your crop companion
Presentation Type: Oral Presentation
Abstract: --Across the world, agriculture is an important business that employs a large percentage of the workforce and is essential to the maintenance of international food supply chains. Despite its significance, many farmers find it difficult to get the vital information they need regarding their crops; these problems include communication difficulties, a lack of crop inspectors, and other issues that prevent their questions from being answered. This work presents a novel software solution that is implemented using a chatbot interface and is intended to bridge the information gap that exists between farmers and the vital data they need. This solution grants farmers easy and immediate access to vital agriculture related queries in their native language
This methodology encompasses thorough data collection, processing, and storage strategies, coupled with an innovative retrieval system that applies the Maximum Marginal Relevance (MMR) technique to balance the relevance and diversity of the information provided. We utilize advanced Natural Language Processing (NLP) techniques, including tokenization and chunking, to preprocess data, significantly enhancing the efficiency of the data retrieval and response generation process. Specifically, the framework that was used employs the Langchain library for text segmentation and the OpenAI Embeddings API for generating semantically rich vector embeddings of agricultural content. These embeddings are stored and managed using the Chroma vector store, facilitating efficient retrieval based on query relevance.
To make this chatbot more accessible and user-friendly, we have integrated text-to-speech (TTS) and speech-to-text (STT) technologies. This enables farmers to interact with the chatbot through voice commands and receive audible responses, breaking down literacy barriers and making critical agricultural knowledge more accessible to a broader audience. The integration of these technologies into a pre-trained Language Model (LLM) allows for the generation of precise, actionable responses to farmer inquiries, thereby promising to transform agricultural practices worldwide. This approach allows the farmers to access valuable information, elevating crop quality and yields, and illustrates the revolutionary potential of AI in agriculture. By proposing a scalable and innovative model, this research highlights how AI can bridge gaps in critical sectors, making essential information accessible to those who need it the most.

Presenters: Rahat Bhatia
Department: Computer Science
Faculty Mentor: Stuart Steiner
Title: SmartBot
Presentation Type: Poster
Abstract: As traffic management becomes increasingly complex and environmental concerns grow, the creation of autonomous vehicles represents a significant advancement. In this seam, our contribution comes in the form of SmartBot, a bot we've developed using a combination of robust hardware, computer vision, and deep learning technologies. We aim to enhance road safety by reducing accident risks and streamlining traffic control via autonomous navigation. Additionally, SmartBot is set to transform last-mile delivery by ensuring efficient, autonomous transport of products, thereby offering vital logistical support. It further provides guidance and navigation assistance, making navigation through complex environments like malls and airports seamless and precise. Through its applications, SmartBot not only contributes to creating safer, more efficient cities but also paves the way for a more interconnected and accessible world.
For hardware development, NVIDIA Jetson Nano was used. This chip is used for edge computing to navigate the intricacies of urban environments with unmatched precision. Coming to the software and algorithmic side, libraries and frameworks like OpenCV were used for real-time visual data processing, lane tracking, traffic sign recognition, and obstacle avoidance. The integration of TensorFlow and PyTorch enables the development of complex deep learning models for real-time decision-making, while the CUDA Toolkit and JetPack SDK will ensure optimal performance of AI and computer vision tasks. Additionally, we plan to enhance spatial

awareness by the Point Cloud Library (PCL), with Pandas and NumPy facilitating the efficient analysis and handling of sensor data for informed navigation decisions.
SmartBot's ability to handle intricate deep learning algorithms and make decisions in real time will allow it to reinvent the performance of autonomous vehicles through the integration of robotics and artificial intelligence technology. The combination of advanced software with specialized hardware, as demonstrated by SmartBot, efficiently overcomes the issues associated with autonomous navigation. In addition to advancing the fields of intelligent robotics and autonomous vehicles, SmartBot also sets new standards in the industry and offers a creative, scalable solution to problems with urban mobility and environmental sustainability. This represents a major advancement in the development of smarter, more livable cities that are both inside and outside of buildings.

Presenters: Charles Blankenship
Department: Music
Faculty Mentor: Dr. Jonathan Middleton, Dr. Ben Luca Robertson.
Title: European Free Tailed Bats Sonification
Presentation Type: Poster
Abstract: Data Sonification is a form of auditory display for data analysis. This project's analysis focuses on the auditory display of aerial/flight data representing eight different European Free Tailed Bats in Mirandela, Portugal. The data points were originally collected to determine if these bats were utilizing wind patterns to achieve extreme flight heights at remarkable speeds for the species. For the purposes of this sonification, the primary data mappings are pitch for height data at measured sea level, and note duration value (length) for speed.

Presenters: Abigail Blunt
Department: English
Faculty Mentor: Paul Lindholdt
Title: Who is Crow? Exploring the Works of Ted Hughes
Presentation Type: Oral Presentation
Abstract: English poet Ted Hughes lived a life of tragedy. He lost many loved ones to suicide. His first wife, well-known poet Sylvia Plath, took her life after her marriage to Hughes fell apart. Six years later, Hughes' mistress Assia Wevill took her life and the life of the daughter she had with Hughes. Many might think that this is a coincidence, but it leaves one to wonder if these women shared similar experiences in their relationships with Hughes. This presentation seeks to uncover any personality traits of Ted Hughes that are reflected in his collection of poems titled *Crow*. The presentation will start by looking at the life of Ted Hughes, followed by exploring his poems "Examination at the Womb-Door," "Crow's Theology," and "Crow's First Lesson." Then the presentation will identify any underlying themes in these poems that could indicate more about the nature and disposition of Ted Hughes.

Presenters: Ben Bobeck, Nate Boutain, Noah Hieb, Esther Kumba, Jordan Mitchell
Department: Engineering
Faculty Mentor: Dr. Matthew Michaelis
Title: SURFACE GEOMETRY AND ITS INFLUENCE ON PROPELLING LIQUID WITH THE LEIDENFROST EFFECT
Presentation Type: Poster
Abstract: This research project aims to provide insight into achieving a liquid pump without the need for any mechanical operation, using only heat. Previous research suggests that the geometry of a surface significantly influences the trajectory of a fluid experiencing the Leidenfrost Effect. This project outlines an engineering process to deepen our understanding of how a surface's geometry, specifically a ratchet-like or sawtooth shape, affects a liquid undergoing this phenomenon. The experimental conditions involve exploring the relationship

between the tooth angle and tooth depth on the surface of each testing specimen, and their impact on the velocity of a water droplet on a superheated surface. A custom testing apparatus, designed, created, and assembled by our research team, facilitates this exploration by providing the specimens with an adjustable angle of elevation. This apparatus is central to operating the designed experiments and compiling the findings. The results, enabled by this apparatus, will be presented and meticulously documented to support future research or innovation. Advanced techniques, such as CNC milling, have been instrumental for the precise construction of each testing specimen. The investigation focuses on identifying the optimal tooth angle, tooth depth, and angle of elevation by analyzing the liquid's velocity across different specimen surfaces.

Presenters: Trinity Boyd
Department: Design
Faculty Mentor: Travis Masingale
Title: NourishAI: Crafting Your Personal AI Dietitian for Holistic Health
Presentation Type: Poster
Abstract: NourishAI revolutionizes personalized health by integrating OpenAI's GPT with comprehensive nutritional databases, creating a culturally sensitive, AI-powered dietitian. This cutting-edge tool offers bespoke dietary advice, promoting holistic health and sustainable eating habits tailored to individual needs, preferences, and cultural backgrounds. Emphasizing ethical AI use, NourishAI addresses privacy and environmental sustainability, positioning it at the forefront of digital nutrition guidance. Its intuitive user interface simplifies access to health insights, encouraging positive lifestyle changes across diverse populations. This project not only exemplifies innovation in health technology but also sets new standards for personalized, ethical nutritional advice in the digital age.

Presenters: Jodi Brandt
Department: Biology
Faculty Mentor: Judd Case
Title: Thalassemia and the Protection Against Malaria
Presentation Type: Poster
Abstract: Thalassemia is a common hemoglobinopathy and observed in parts of the world where malaria is present. Thalassemia is another hemoglobin genetic mutational disease, that can affect either the beta chain or alpha chain of a hemoglobin molecule which causes either alpha thalassemia or beta thalassemia. Thalassemia results in abnormally shaped red blood cells such as target cells, ovalocytes, microcytes, and various others. The shape and the smaller size of these abnormal red blood cells inhibit malaria from being able to bind to them and causing infection. Thalassemia has many other associated problems such as anemia, liver disease, and premature death. We aimed to assess which condition of thalassemia provides the most protection against malaria and has the least associated risks. We found there are many different forms of thalassemia. Some severe forms of thalassemia, such as hemoglobin bart's hydrops fetalis, can result in stillbirths while other less severe forms can have a normal life expectancy. Both alpha and beta thalassemia can reduce the severity of malaria. Alpha thalassemia was shown to protect against more severe malaria. Although beta thalassemia did protect against malaria, once combined with sickle cell disease the protective properties were cancelled out.

Presenters: Hunter Briner, Braelyn Ballou, Jonathan Becerra
Department: Biology
Faculty Mentor: Krisztian Magori
Title: Identifying breeding sites for mosquitoes and mosquito-like insects
Presentation Type: Oral Presentation
Abstract: There are over 40 different species of mosquitoes in Washington. Mosquitos can be a vector to many diseases such as West Nile, western equine encephalitis, or St. Louis encephalitis. In Washington, you can expect to find mosquitos around the summer months of June, July, and August. However, due to the short time

frame and the current time in season not being ideal for finding mosquitoes we will be broadening our research scope to mosquito-like insects like midges. These are types of flies that bite people and mammals and can spread diseases like the bluetongue virus. We hypothesize that sites close to water with vegetation and pH from 5-7 will be breeding sites. We will identify breeding sites for these insects at Turnbull and surrounding lakes. At each of these sites, we will collect samples from the water using skim nets to identify what types of insects live there and breed there. We will choose what sites to collect samples from by looking at water pH, vegetation, food sources, and temperature and see which sites have the highest chance of being breeding sites for mosquitoes and mosquito-like insects. Many of these insects are seasonal and prefer certain water sources and specific conditions which is why we will be using these factors to identify breeding sites. With this information, we can alert the public to which areas have a high number of biting insects and which areas to avoid.

Presenters: Irie Browning
Department: Philosophy
Faculty Mentor: Christopher C. Kirby
Title: The Soul of an Egret: A Cultural and Ethical Analysis of "Gibbons Raiding an Egret's Nest"
Presentation Type: Oral Presentation
Abstract: The 12th century Song dynasty painting "Gibbons Raiding an Egret's Nest" is not the most well known painting, and brief writings about it are concerned primarily with the rebus in the image as an example of clever Chinese wordplay. However, while the pun of the image is a form of linguistic storytelling linked with the visual art, a closer examination reveals more layers to the painting. The egret's natural existence as a pure-white bird inspired a literary symbolism throughout poetry of earlier dynasties, and so the choice of this avian subject holds more than just its pun potential. Additionally, the Song dynasty held a renewed interest in Confucianism, and examining the story of "Gibbons Raiding an Egret's Nest" through Confucian virtues adds complex elements to the painting. The story of the egret, then, is many-layered, with two distinct and conflicting sides: the good luck and congratulations of the rebus pictured on this small fan affixed to an album page; the other, the story of an egret (with all the symbolism egrets hold) alone that should not be alone, while roving monkeys stealing her children. Song dynasty artists created paintings with attention not just to the physical craft but also in understanding the true nature of the artwork, and thus even "Gibbons Raiding an Egret's Nest" contains a complex story of the winds of fate on the life of the virtuous person.

Presenters: Caitlin Broxson
Department: Art
Faculty Mentor: Jenny Hyde
Title: Fish Teapot
Presentation Type: Creative Work
Abstract: During my time at my ceramics class at EWU, I wanted to get better at using the wheel and making art pieces that can be used for everyday use. For one of my projects, I decided to focus on making a teapot with a higher spout that could be able to pour liquids with a nice flow. Before I started this project, I have made a teapot in the past during my time at community college but looking back I wasn't really happy with how it poured water so I used this opportunity to make a better one.
For this project, I created the base and lid with a wheel while the other pieces where sculpted and hand-built such as the handle and spout alongside the other details. The reason I made it look like a fish is because the spout reminded me of fish lips so I decided to give it some silly eyes, gills, and a pair of fins for decoration. The hardest and most important part for me was making the spout as it was really time consuming in the terms of making sure it was attached properly as well as making sure it would function how I wanted it to. I learned that the best teapot spouts have small sharp points at the end of them that allow liquid to flow from a less turbulent point creating a nicer laminar flow which is what greatly helped in the end as I personally believe that the piece works how I wished it would.

Overall, this is personally one of my favorite ceramic pieces that I have made in recent times as it helped me practice my technique on more advanced usable ceramic designs.

Presenters: Caitlin Broxson
Department: Art
Faculty Mentor: Jenny Hyde
Title: Flu Season
Presentation Type: Creative Work
Abstract: This piece is a digital self-portrait that I created in Adobe Illustrator around the beginning of spring when the snow was starting to melt. During this time of year, I usually will end up with a sudden case of a nasty flu that most of the time clogs my nasal system and makes me constantly cough like a barking sealion. No matter how much I try to wash my hands or cover my mouth, I always catch it from someone else in my family around the same time almost every year. The worst part of being sick is when you still need to go out into town for your classes at university and/ or the grocery store for a supply run and usually ends up uncontrollably coughing and sneezing loudly in front of everyone which will draw unwanted attention to an issue that you can't really control. I mainly used the color green in this picture to represent illness and the gross feelings associated with getting sick on the face and on the floating orbs to represent how it is almost impossible to avoid getting sick.

Presenters: Roary Bruce
Department: Psychology
Faculty Mentor: Jill Seiver
Title: Feeling of Control as a Function of Cellphone Use in the Morning
Presentation Type: Poster
Abstract: The experiment will review the relationship between cell phone use in the morning and feelings of control outcomes and productivity throughout the day. We plan to assign participants into three groups: one being instructed to scroll their phones during the first hour of waking, a control group told to do what they usually would, and a third group to refrain from scrolling during their first hour of waking. After the first hour, all the participants will be asked to complete a short daily survey covering the confounds and contributing to the results. We plan to collect data through a pre-and post-survey to evaluate feelings of control. We will experiment from a Monday to a Sunday, lasting a week. The Participants will be randomly assigned to each group, taking the sample from lower level Psychology classes to provide Sona credits. The experiment aims to see if someone should refrain from using their cell phone in the first hour of the day. Very little literature goes over good practices at the beginning of the day through the morning routine. This applied research might help find a better path to set you up for success rather than a day of willpower to get responsibilities done.

Presenters: Sierra Burdette
Department: Philosophy
Faculty Mentor: Terry MacMullan
Title: Baruch Spinoza and The Problem of Evil and Suffering
Presentation Type: Oral Presentation
Abstract: This research project explores the age-old philosophical notion of the Problem of Evil and Suffering and its contradicting reality concerning the Abrahamic religious doctrines. The research essay focuses on the fundamental inquiry- if evil and suffering occur in the universe, then how can there be certainty of an Abrahamic deity's presence? Various arguments and critiques against traditional theistic beliefs are examined and highlight the ongoing debate between theists and atheists regarding the nature of an Abrahamic God and the occurrence of suffering in the world. This study identifies what specific requirements are needed in finding a co-existing argument to satisfy the Problem of Evil and Suffering, and the general ideologies of an Abrahamic God. This philosophic project proposes the philosopher Baruch Spinoza's metaphysics and religious

interpretation of God, as a possible argument to this theistic dilemma. Baruch Spinoza's philosophy indicates evil and suffering arise not from divine intervention but as a natural consequence of the causal relations within the universe. Baruch Spinoza's theology and metaphysics offer a compelling perspective that reframes the concept of God to reconcile with the duality of evil and suffering. This research project concludes by debating the implications of Spinoza's theistic interpretation for individuals coming to terms with life's uncertainties and suggests that embracing the natural order of the cosmos can provide comfort in the face of suffering's existence.

Presenters: Josh Burdick
Department: Psychology
Faculty Mentor: Julie Swets, PhD.
Title: Impacts of Nostalgia Intervention on Wellbeing Over Time: A Proposed Study
Presentation Type: Poster
Abstract: Research indicates that nostalgia, "a sentimental longing or wistful affection for the past," increases perceptions of social support and meaning in life. The proposed study is intended to complement the existing cross-sectional studies via examination of nostalgia's effects over time. This study will measure the effects of weekly nostalgia interventions on loneliness and well-being over a period of three weeks.
Participants will engage in three weekly nostalgia interventions in which they write about and reflect upon a personally significant nostalgic memory. After each weekly session, participants will complete measures for loneliness as well as two key areas of well-being: perceived social support and meaning in life. We expect to observe an increase in well-being and a decrease in loneliness over time. Furthermore, we will examine an interaction between time and trait loneliness. We hypothesize that over time participants will report lower loneliness and greater well-being after the nostalgia intervention, with strongest effects for participants whose baseline loneliness is high.
Prior research has established the effectiveness of nostalgia as a potent resource for improving well-being, and this study will expand on this by exploring its effects over time. The findings from the study will be highly applicable for individuals who cannot access expensive therapy or other treatments for loneliness. Positive-psychology-inspired interventions like this may provide an effective avenue to bypass some financial and cultural barriers to therapy and overall well-being improvement.

Presenters: Johnny Cardenas, Dalton Dawson, Flavio Rosales, Jessica Smith, Vladis Zetchov
Department: Biology
Faculty Mentor: Krisztian Magori
Title: Detection of a Well-Established Parasite within Invasive Brook Stickleback (*Culaea inconstans*) Population at Turnbull National Wildlife Refuge
Presentation Type: Oral Presentation
Abstract: Turnbull National Wildlife Refuge is a variety of habitats important for the resting, nesting and foraging of migratory birds near Cheney, WA. It is naturally fishless, but we have seen a population of invasive fish, called the Brook stickleback come to inhabit it. We are looking at these fish to investigate an established parasite, called *Contraceacum multipapillatum* (nematode) found within. We will collect fish from 3 previously studied lakes (Middle Pine, Black Horse, and Kepple) and 3 new lakes (Beaver, 30 Acre and Winslow). Previous research discovered that the lakes further south had a higher concentration of infected fish. We will determine infection rates and test our hypothesis that more parasitic nematodes will be found in the southernmost lakes compared to the northern lakes by capturing fish using a minnow trap and cutting them open to see if they have been infected with the parasite. Once we have extracted the nematodes from the fish, we will run PCR to determine the exact genotype of nematodes found within and confirm that it is indeed *Contraceacum multipapillatum*.

Presenters: Miranda Carmona
Department: Economics

Faculty Mentor: Dr. Mark Holmgren
Title: Effect of Student Characteristics on their Academic Success
Presentation Type: Poster
Abstract: For some time, we've been hearing of instances in which immigrant children are faced with difficult upbringings that hinder their learning abilities. One of the specific barriers mentioned is language. This project seeks to examine the effect of several factors on the number of students who meet the SBAC ELA test. To do this, I will construct a multiple regression to examine if there are factors significantly affecting the number of students meeting ELA standards. As a result of this project, our community may be aware of growing concerns in many of our hometowns.

Presenters: Anna Carroll
Department: Biology
Faculty Mentor: Robin O'Quinn
Title: Determining Optimum Germination Conditions in Western Stoneseed
Presentation Type: Poster
Abstract: Commonly known as western stoneseed, *Lithospermum ruderale* Douglas ex Lehm, of the plant family Boraginaceae, is a flowering plant native to the western United States, including eastern Washington. It is known for its hard, stony seeds and is a common species in arid habitats including the prairie ecosystems of the inland Pacific Northwest. The Eastern Washington University prairie restoration project aims to restore about 120 acres of former agricultural land to its native prairie state and includes planting native perennial species common to these prairies. Many of these, including stoneseed, are difficult to germinate and establish. This project aims to determine optimal germination conditions for *L. ruderale*, about which little is currently known. 48 seeds from eight populations of *L. ruderale* collected from various location in eastern Washington over the past several years were subjected to four possible treatments: control where seeds were subjected to cold stratification only, scarification where the seed coats were abraded to allow uptake of water, exogenous application of gibberellic acid (GA3), or both GA3 and scarification. Seeds for all treatment groups were cold-stratified for 60 days and monitored for germination during and after cold stratification to compare success and speed of germination from the various groups.

Presenters: Anna Carroll, Ana Beatriz Granman, Colton Quinn
Department: Biology
Faculty Mentor: Krisztian Magori
Title: Exploring Possible Canine Diseases in Spokane Animal Shelters
Presentation Type: Oral Presentation
Abstract: Animal shelters serve a very important purpose but unfortunately also come with the risk of animals contracting and spreading diseases. Canine influenza is one of the most common diseases spread through dog-to-dog contact. Infected dogs can be contagious prior to symptom onset, and the virus can survive on clothing and other surfaces for up to 24-48 hours. It is highly contagious, causing illness in about 80% of exposed dogs. Most dogs recover but it can lead to secondary bacterial infections with more complications. Intestinal worms are also spread very easily between dogs and can cause diarrhea, anemia, and rarely death. Our research seeks to determine if the canine influenza or intestinal worms are present at local shelters. We will gather nasal drip samples from dogs currently at SpokAnimal and use a rapid test to determine if any dogs are positive for canine influenza. We will also collect fecal samples and test them for intestinal worms. We hypothesize that we will find few, if any, cases of canine influenza, and multiple cases of intestinal worms. Our results can be used to determine whether further public outreach and/or vaccination efforts are advised.

Presenters: Samuel Cash
Department: Religious Studies
Faculty Mentor: Garry Kenney

Title: Gods, Heaven, and Hell: An Exploration of Afterlives In Mythology and Religion
Presentation Type: Oral Presentation
Abstract: With the popularity of religions throughout history, many have overlapped specifically within their systems that are equivalent to Christianity's heaven and hell. This comparison and contrast with the mythological afterlives throughout different eras of history, such as Norse, Greek, and Egyptian, can help us trace patterns throughout the belief of a certain topic. The goal of this paper is to explore the origins of the heaven and hell in various myths in different cultures, locations, and eras to understand certain patterns within religions that can be traced to contemporary times using a timeline. This timeline can introduce how belief in afterlives has changed throughout eras with the study of texts, images, and artifacts from history.

Presenters: Zackery Castillo da Silva, Samuel Carpenter, Carson Desimone
Department: Geosciences
Faculty Mentor: Richard Orndorff
Title: Palouse Prairie Restoration Soils Classification
Presentation Type: Poster
Abstract: The Palouse Prairie restoration site is a section of the Palouse Prairie that has experienced intensive agricultural use over more than a century. The goal of the restoration is to return this section of agricultural land to its original state, and provide access to encourage recreation, explorations, and educational opportunities. To aid in this endeavor, we took a soil sample from the site (named PP-5) using an auger and tested the engineering properties of the sample. Eastern Washington University has plans to build trails and educational sites throughout this area, therefore documenting the engineering properties of Palouse Prairie Soils will be necessary for future development. Using ASTM standards (such as the sieve and standard proctor tests), we determined our soil's specific gravity, particle size distribution plastic limit (PL), liquid limit (LL), plasticity index (PI), optimal water content, maximum dry bulk unit weight, and unconfined compressive strength. These tests allowed us to classify our soil using the unified soil classification system (USCS). Soil sample PP-5 was found to be a SC type soil, this means it is a soil dominated by sand-sized grains with a significant amount of clay giving it some cohesive properties.

Presenters: Lillian Cheney
Department: Sociology and Justice Studies
Faculty Mentor: Kebede, Kassahun
Title: Grapple for Identity Amongst Second-Generation Mexican Americans
Presentation Type: Oral Presentation
Abstract: This paper explores the challenges second-generation Mexican Americans face in forming their identity. The data was collected from primary and secondary sources and included interviews with a second-generation Mexican American. The paper concludes that second-generation individuals may use different ways to identify themselves, depending on the ethnicity and political affiliations of the people they interact with. Moreover, the paper discusses the advantages of being a second-generation Mexican American, such as speaking another language, a broader cultural awareness, and a stronger sense of selflessness. However, the paper also notes several disadvantages, including experiencing racial prejudice, conflicts with interracial relationships, and cultural expectations that can impact mental health.

Presenters: Brooke Chisholm, Kolby Emtman, Gabrielle Jung, Karly Kenny, Kaleb Kolb, Tosha Kristensen, Willow Marso, Devlin Mee, Aidan Nett, Grace Ogle, Liela Saunders, Ryan Tibbetts, Raigan Wendt
Department: Biology
Faculty Mentor: Ross Black
Title: Top-down versus Bottom-up Regulation in Aquatic Communities: An Experimental Test of Nutrient Availability versus Herbivore Concentration Effects on Primary Productivity in the TLES Pond
Presentation Type: Poster

Abstract: The purpose of this experiment was to evaluate the effects of nutrient availability and herbivore concentrations on algal primary productivity in the TLES pond. Primary productivity is a vital indicator of the health of local environments. Determining factors that drive primary productivity within an ecosystem are necessary for ecologists to develop best practices in ecosystem management. We created a complete factorial design testing two separate null hypotheses: herbivore concentrations do not affect primary production rates, and nutrient availability does not affect primary production rates. We utilized 20L cubitainers in the pond where we manipulated zooplankton concentration, nitrate, and phosphate based on ambient average levels determined from eight samples. Our experiment used nine separate treatments with eight replicates per treatment. After a 7-day incubation period in the pond, cubitainers were retrieved and we analyzed their chlorophyll concentrations using a fluorometer. We calculated primary productivity by comparing the initial and final chlorophyll readings. Significance of treatment effects were statistically determined using two-way ANOVA. Results will be presented at the symposium.

Presenters: Anne Clase
Department: Children's Studies
Faculty Mentor: Belinda Hammond
Title: Perinatal Palliative Care: An Integrative Literature Review
Presentation Type: Oral Presentation
Abstract: This integrative literature review explores multiple components shown to improve patient and family care throughout the complex perinatal palliative care process. Perinatal palliative care (PPC) is a subspecialty of palliative care that aims to support families throughout pregnancy, birth, and infant illness or death with a comprehensive and compassionate approach. Without quality patient care, families are left vulnerable during this emotionally and physically challenging time. I completed a literature review exploring several resources related to PPC and compiled the most relevant resources to explore essential or relevant aspects of quality PPC care. These aspects are interdisciplinary teams, anticipatory grief, hope, bonding, pain and symptom management for infants, loss and grief, sibling support, spiritual support, cultural support, and follow-up care. From my research, I see the inclusion or understanding of these areas as the pillars of quality patient care in PPC. It should, therefore, be considered highly important in pursuing the highest quality patient and family experience possible.

Presenters: Katherine Cole
Department: Biology
Faculty Mentor: Dr. Robin O'Quinn
Title: Assessing the Diversity and Restoration Potential of Native Prairie Arbuscular Mycorrhizal Fungi Communities
Presentation Type: Oral Presentation
Abstract: Arbuscular mycorrhizal fungi (AMF), belonging to the phylum Glomeromycota, are key to healthy, functioning terrestrial ecosystems worldwide. Associating with over 80% of all extant land plants, they play a pivotal role in nutrient cycling, contribute to overall plant health, and mitigate inter-specific plant competition. Given their significance to terrestrial ecosystem functioning, AMF have a crucial role to play in the success of habitat restoration. However, AMF community composition is significantly impacted by commercial agricultural practices. The Eastern Washington University (EWU) Prairie Restoration Project aims to restore ~120 acres of farmland to native prairie. This project will investigate the role of AMF in prairie restoration through a two part study. Firstly, we will use DNA metabarcoding to characterize the community composition of AMF across various land-use types, including native remnant prairies, Conservation Reserve Program (CRP) lands, and conventional farmland. We hypothesize that native prairies will have the highest AMF diversity, conventional farmland will have the lowest, and CRPs will call somewhere in between. Secondly, we will conduct a greenhouse study to assess the role of locally adapted AMF in mediating competition between important native prairie species and troublesome weedy annuals. We hypothesize that inoculation with AMF

will result in an increase in above ground biomass and growth rate of native species compared to weedy taxa, resulting in a competitive advantage. The findings of this research will support the EWU prairie restoration efforts.

Presenters: Katelyn Confer
Department: English
Faculty Mentor: Paul Lindholdt
Title: On Emily Dickinson
Presentation Type: Oral Presentation
Abstract: The following paper will explore the relationship between Emily Dickinson's poetry, the circumstances of her life, and the historical context in which she lived to glean an understanding of how her mental health influenced her work. Selected poems by Dickinson will be reviewed and analyzed, along with a brief overview of nineteenth century attitudes towards female mental health with a particular emphasis on the medical diagnosis of female hysteria.

Presenters: Aspen Cullen
Department: Gender, Women's & Sexuality Studies
Faculty Mentor: Jessi Willis
Title: The Swift Gaze: Analyzing Taylor Swift and Her Haters
Presentation Type: Oral Presentation
Abstract: Taylor Swift is a popular culture icon. She is an inspiration, a trailblazer, and even a leader to many people. Swift is noted as being an "economic phenomenon" (CNN). Taylor Swift was also announced as the Global Top Artist of 2023. Taylor Swift was so impactful specifically in America that the Federal Reserve Bank of Philadelphia even mentioned her in their Beige Book. Despite being an incredible female entrepreneur, to some people on the opposing side, she is a "talentless bimbo" or just a "girl who writes about boys." These demeaning, infantilizing, and blatantly sexist exclaims, are part of a wider sexist culture that dominates American life. In this presentation, the history of hatred of Swift will be analyzed, the actual hate will be analyzed, the term Swift Gaze will be defined and expanded on, connections to power and oppression will be made, and Swift herself will be intersectionally and ethically analyzed.

Presenters: Christopher Cummins
Department: Music
Faculty Mentor: Jonathan Middleton
Title: Umi Kurete (The Sea Darkens)
Presentation Type: Creative Work
Abstract: As fall turns to winter and dusk to night, a singer as witness, while waterfowl grow restless. Three haikus set to music.

Presenters: Akolade Dada, Allison Zimmerman
Department: Urban and Regional Planning
Faculty Mentor: Margo Hill
Title: Healing Lodge of the Seven Nations Feasibility Study pélpłkʷi citxʷs
Presentation Type: Oral Presentation
Abstract: The Healing Lodge of the Seven Nations Feasibility Study investigates the establishment of a female-only inpatient facility for addressing substance abuse and mental health issues among indigenous women. Emphasizing the integration of cultural and holistic approaches, the study underscores the necessity for trauma-informed care that resonates with the cultural context. The research furnishes comprehensive data supporting the project's feasibility by employing methodological tools such as GIS mapping, cost analysis, and design considerations. The study encompasses an in-depth evaluation of various factors, including the historical

and cultural backdrop of HL7N, demographic profiles of the seven tribes, and the structure of Indian Health Services (IHS) Youth Regional Treatment Centers (YRTCs). A literature review on youth treatment facilities and comparing IHS youth treatment providers provide insights into effective interventions and the prevailing healthcare landscape. Slope analysis is utilized to determine the optimal location for the facility. At the same time, the construction execution section delineates the phases of development, from scope definition to final construction, ensuring a structured approach to the project. Financial viability is appraised through construction cost estimates, staffing analysis, and funding opportunities. Design layouts emphasize creating a healing and culturally appropriate environment while addressing regulatory compliance. The study concludes with recommendations for collaboration and support for successful implementation, highlighting the potential positive impacts on the community and stakeholders. This study contributes to the broader field of culturally sensitive healthcare, suggesting avenues for enhancing treatment approaches for indigenous and marginalized populations.

Presenters: Timothy Davies
Department: Social Work
Faculty Mentor: Rie (Leeay) Kobayashi
Title: Housing Insecurity and Older Adults
Presentation Type: Oral Presentation
Abstract:
This presentation examines the complications and insecurities that lead to older adults experiencing housing insecurity that leads to being unhoused. Research indicates that reduction in fixed income, unexpected major life events, and increases in housing costs are the three major contributing factors to older adults experiencing homelessness. Given that 1-in-6 people in the United States are aged 65 and older, reducing the risk of individuals from this group becoming unhoused is a critical task for society at large, avoiding unnecessary stressors on a large segment of the population. Regional data is examined to determine the need for action on a scale local to Spokane. Knowing that reduced-income housing is strained locally and has lengthy waitlists, two alternative solutions are proposed: 1. Increasing housing density by reducing restrictions around auxiliary dwelling units, and 2. Piloting a *HomeShare* housing model.

Presenters: Dice Deacon
Department: Music
Faculty Mentor: Dr. Jonathan Middleton
Title: The Bludgeoning
Presentation Type: Creative Work
Abstract: This piece is empty and dark, and it tells the story of a man who experiences loss before his own death. I've written the text myself, I believe the music will be a solid reflection of the subject-matter. I've used various effects for both voice and instruments. Subharmonics are to be utilized by the two performers, as well as some percussive techniques. The music is set very low in pitch as a general which contributes to the empty feeling. As the composer I'd not be shocked if a listener heard this and was unsettled.
Composed as Dice C. Deacon

Presenters: Joseph Deckhut
Department: Biology
Faculty Mentor: Dr. Judd Case
Title: Using Polar Section Modulus to Define Avian Lifestyles
Presentation Type: Poster
Abstract: In shallow marine fossil deposits of latest Cretaceous (Maastrichtian) age, avian fossils are few. The avian fossils recovered almost exclusively exhibit a foot-propelled diving lifestyle. Other lifestyles, such as running, soaring, or flapping, are not yet represented. Latest Cretaceous avian fossils that show a foot-propelled

diving lifestyle include *Vegavis iaai* and *Polarornis gregorii* from Antarctica, *Neogaeornis wetzeli* from Chile, and a grebe-like tarsometatarsus (fusion of tarsals and metatarsals) from New Jersey. One would expect that avian fossils from shallow marine deposit would include a mix of shore birds, sea birds, and foot-propelled divers rather than only one of these lifestyle groups. *Antarcticavis capelambensis* is one fossil, discovered in Antarctica, that currently has an unknown niche. Determining the lifestyle of this species will provide greater insight as to what lifestyles were present within Neornithes during the Maastrichtian. To find this lifestyle, this study compares the *Antarcticavis* bones with the bones of birds that represent different lifestyles, such as the local ducks, and ground birds like chicken and quail. Through the use of a polar section, modulus, calculations from measurements of modern and fossil avian humeri and femora, it is possible to predict lifestyles based on the bendability of these bones. *Antarcticavis* did not fall close to any of the lifestyles that were plotted from a previous study, so new representatives of unplotted lifestyles are being added to the dataset. New data increases the probability of finding the niche of *Antarcticavis*, as well as progressing our understanding of avian evolution and survival.

Presenters: William DeLay
Department: Wellness & Movement Sciences
Faculty Mentor: Dr. Kristyne Wiegand
Title: The Effects of Velocity Based Training Versus Percentage Based on Lower Body Power in Female Collegiate Athletes
Presentation Type: Oral Presentation
Abstract: INTRODUCTION: Velocity-based training (VBT) is an alternative and more individualized approach for determining resistance than percentage-based training (PBT) within a strength training program. However, VBT benefits in female collegiate athletes are not well-documented. The purpose of this study is to compare the effects of VBT to PBT on strength and power in female collegiate athletes. METHODS: Sixteen female collegiate soccer and volleyball athletes were randomly assigned to an 8-week strength and power-focused PBT or VBT protocol. Before and after the training period, vertical jump (VJ), maximal back squat, and reactive strength index (RSI) were measured. A 2x2 factorial ANOVA (α=.05) was used to assess group and time differences in the variables of interest. RESULTS: There was a significant interaction for RSI (VBT: -16.3±4.4; PBT:2.9±24.5; p=0.33), but no significant main effects (p>.05). There was a significant main effect of time for VJ (VBT:16±.0.6; PBT:1.5±0.7) and squat (VBT:11.9±7.7; PBT:11.5±5.6; p.05). CONCLUSION: Both VBT and PBT effectively improved VJ and squat. As such, both methods can effectively improve strength, but VBT may limit speed-based development in measures such as RSI.

Presenters: Evan DeLeon
Department: Psychology
Faculty Mentor: Jillene Grover Seiver
Title: Inferring Sexual Interst from Behavioral Cues as a Function of 2D:4D Ratio and Sex
Presentation Type: Poster
Abstract: Research over the past 40 years has shown that male college students perceive more sexual intent in friendly female behavior than female college students do. This effect may be due to male socialization to view friendly women as sexually receptive or due to biological predispositions. The current study sought to determine whether the differences between males and females might be attributable to differences in prenatal exposure to testosterone. We predicted that people with a smaller 2D:4D ratio, a measure of prenatal testosterone exposure, would perceive greater sexual intent in friendly female scenarios.
Psychology students rated the sexual intent of female actors in scenarios describing friendly behaviors, and then we took digital photos of their outstretched hands, palms up. Afterward, the length of the index finger (2D) and the ring finger (4D) on each participant's photographed hand was measured, and the 2D:4D ratio for each hand was calculated. The ratings of the sexual intent of female actors behaving in a friendly way (e.g., "She smiled at him") were analyzed in a MANOVA. Males gave higher ratings of sexual intent than females did, and

participants with smaller 2D:4D on their right hands gave higher ratings of sexual intent than participants with larger or equal 2D:4D ratios. These results support a biological basis for sex differences in interpretations of friendly female behavior.

Presenters: Carson Desimone
Department: Geosciences
Faculty Mentor: Dr. Carmen Nezat
Title: Plant-available Lead in Prairie Restoration Soil Previously Exposed to Trapshooting
Presentation Type: Poster
Abstract: Lead is a widespread and dangerous environmental contaminant that affects much of the world today. It is commonly known as a neurotoxin that causes significant health effects. One such lead-contaminated area is a portion of the Eastern Washington University (EWU) prairie restoration site which was formerly a dryland wheat field. This site has been contaminated with lead due to previous trapshooting activity that made use of lead ammunition. The lead ammunition has been thoroughly mixed into the upper layers of soil through decades of tilling. Fortunately, lead has low mobility in soil and is therefore unlikely to contaminate nearby water sources. Thus, the main issue is how lead affects the soil ecosystem and human health. Considering that the goals of the EWU prairie restoration project are to re-establish native vegetation, it is important to know if the lead is available for plant uptake. The goal of this study is to determine the bioavailability of lead in the soil. This is accomplished using a sequential leach and digestion procedure that quantifies the lead in the exchangeable fraction (the most plant-available form), that weakly bound to carbonates and phosphates, and total lead. Preliminary data indicate total lead concentrations exceed 500 mg/kg soil in the trapshooting area and are 5-10 mg/kg in nearby soils not affected by trapshooting. The results of this study will allow for the recognition of a lead-contaminated area so that it can be remediated and/or monitored.

Presenters: Douglas Doner
Department: Computer Science
Faculty Mentor: Dr. Bojian Xu
Title: Utilizing Document Retrieval to Inform Large Language Models in an Educational Setting
Presentation Type: Poster
Abstract: The advent of Large Language Models, such as ChatGPT, provide many opportunities for students to interact with a computer system using natural language. These models can be tailored or “prompted” to communicate with users in many diverse manners, by utilizing their vast base of compressed knowledge acquired through pretraining on enormous sets of unstructured data to mimic human speech and understanding. One drawback of this approach is that because of the knowledge compression, as well as the knowledge cutoff that hampers knowledge of current events, the large language model may provide overly general or inaccurate (hallucinated) information. One approach to solving this problem is to use Retrieval-augment Generation (RAG), which is a system of storing and retrieving documents relevant to a user’s query to inform the model beforehand as “context” to either give the language model domain-specific information, or current information it may not have access to.
My proposed system utilizes Retrieval-augmented Generation in an educational setting by giving students access to a session-based chat with a large language model, as well as the ability for instructors to upload domain-specific knowledge or supporting documents that would give context for important current topics in a course or supporting documents. Because this system is computerized, students would have access to a tutor with in-depth knowledge of the material 24 hours a day. This system could give students an extra resource to approach and ask questions about the current material or homework assignment, potentially increasing student success. Further work could include instructor supervision of conversations as well as weekly reports of common questions asked to inform the instructor of any gaps in knowledge to cover during lecture.

Presenters: Isaac Dunmore

Department: Geosciences
Faculty Mentor: Chad Pritchard
Title: Sampling potential hydrologic impacts from an underground fire lit by the Gray Road Fire, West Medical Lake
Presentation Type: Poster
Abstract: Eastern State Hospital (ESH) dumped and buried construction related material along the south west shores of West Medical Lake. Based on aerial photos from 1957, the dump was established with pine trees growing on the landfill. The dump is approximately 400 feet long, 50 ft wide and about 30 ft deep or about 6000,00 cubic feet of material. On August 18, 2023, during the Gray Road Fire, the buried site was ignited and has since continued to burn underground. Department of Health Services hired a consultant to analyze soils from the dump using the TCLP method for standard RCRA metals and only barium (Ba) was detected. Radioactive waste was considered a possible contaminant, but not observed by FAFB crews that assessed the site. However, Department of Ecology representatives reported temperatures of 200 degrees Fahrenheit and elevated volatile organic compounds (VOC) readings in the area. The presence of asbestos has also halted digging up the dump until a better cataloging of the contamination is conducted. A separate sampling event north of the dump was conducted in the mid-2010's to assess the input of heavy metals and PFAS from discharge of reclaimed water from ESH into West Medical Lake, which reported increasing heavy metal concentrations with depth in lake sediments and decreasing PFAS with depth, indicating that heavy metal contamination was historic and PFAS contamination is more recent, which makes sense since PFAS wasn't widely used until the late 1970's. This project tests if heavy metals and PFAS may have been released by the fire and migrated to West Medical Lake via stormwater or the thousands of gallons that have been sprayed on the fire in an attempt to put it out. Understanding transport of subsurface contamination is unique in our area due to the presence of scabland topography resulting from Pleistocene megafloods that scoured the region.

Presenters: Elisabeth Ellingson
Department: Geosciences
Faculty Mentor: Dascher, E.D.
Title: Sustainable Burial Alternatives
Presentation Type: Poster
Abstract: Examining Proximity and Regional Availability of Sustainable Burial Alternatives: A Geospatial Analysis
Conventional modern burial practices require large amounts of resources while contributing to soil and water pollution. In the United States typical modern burials have been estimated to require 20 million board feet of hardwood, 58,500 metric tons of steel, 1.5 million metric tons of concrete, and 16.3 million liters of embalming fluid annually (Woodson 2014) and each individual burial can cost tens of thousands of dollars. Sustainable alternatives to modern burial include increasingly common practices such as cremation and newly available options including green burial, alkaline hydrolysis, and human composting. These options are toted as more sustainable alternatives to modern burial practices, but their availability and accessibility remain limited and are often encumbered by legal and political processes. The location, proximity, and regional availability of sustainable burial alternatives in Washington state were determined by analyzing ely, publicly available data in a geographic information system (GIS) This study also attempts to assess how well each option addresses the three tenets of sustainability using descriptive statistics and a content analysis. The number of locations offering a sustainable burial alternative in Washington state is limited, with most locations on the west side. The price point for the different options varies substantially. Most sustainable burial alternatives appear to do a better job of addressing environmental sustainability than economic or social sustainability. Economic and locational accessibility appear to be the main hurdles sustainable burial alternatives must address moving forward.

Presenters: Sydney Fergen
Department: Geosciences

Faculty Mentor: Dr. Chad Pritchard
Title: Historical Structural Analysis of the Rileyville Quadrangle, Page County, Virginia
Presentation Type: Poster
Abstract: The Northwest corner of Virginia, within the Appalachian Mountains, formed during a collision of continents called the Alleghenian Orogeny roughly 250 million years ago(Ma). This Permian event caused plates to collide, reforming the fractured continental crust back into one supercontinent called Pangaea, and closing the Rheic ocean. These large-scale compressional tectonics formed the Tactonic Mountain range, which has gradually eroded exposing series of plunging folds, imbricated thrust faults, and other structures along the east coast. This poster presents a detailed structural analysis of the Rileyville quadrangle to help decipher regional geologic history and an origin story for folds in Page County, Virginia.
Rocks mapped in the Rileyville quadrangle range in age from Ordovician to late Devonian period. Analysis of rock attitude calculated the orientation and style of the main folds, as well as minor anticlines and synclines. The larger syncline structure is moderately inclined with an axial plane dipping 33 degrees NW and striking at 221. The fold axis was virtually horizontal with a plunge of 0.1, trending 041. The second order anticline and syncline pair were similar orientations, but with steeper dips identified as open, upright, horizontal folds. This type of feature demonstrates the extensional tectonics that led to the development of a series of thrust faults along the edge of the fold paired with an approximate stress from 130 (SE) during the Alleghenian Orogeny. The unconformities found in the stratigraphy were caused by intervals of little to no deposition and instead indicate periods of erosion.

Presenters: Brandon Fletcher
Department: Education
Faculty Mentor: Kevin S. Decker
Title: Highlighting the Importance of Gamifying Education to Increase Intrinsic Motivation in Students
Presentation Type: Oral Presentation
Abstract: Student absenteeism is at an all-time high in large part due to low student engagement, which is a critical aspect of student success in school. This paper uses arguments from John Locke (born August 29, 1632, Wrington, Somerset, England—died October 28, 1704, High Laver, Essex), who wrote extensively on student rights and education and influenced many thinkers in his time, to focus on the effectiveness of the gamification of education to support student engagement and diminish absenteeism. The use of game elements in non-game settings such as points, leaderboards, and achievements gives a visual representation of progress in relation to other students and drives motivation through peer and self-competition and immediate reward instead of delayed reward. This paper collects research from a multitude of studies that test the effectiveness of the gamification of education and assesses their findings. Despite some criticism, findings show that gamification positively impacts intrinsic motivation, emotional state, and the perception students have of education in most of the studies conducted with students.

Presenters: Jenna Fliesen
Department: Interdisciplinary Studies
Faculty Mentor: Majid Sharifi
Title: Faith in Flux: The Interplay of Neoliberalism and Religion
Presentation Type: Oral Presentation
Abstract: This research analyzes the complex interplay between neoliberalism and religion, particularly Islam. There has been a significant shift towards minimizing the state's role in social welfare, which has propelled faith-based organizations (FBOs) to step in as primary service providers. This transformation has led to the commodification of welfare services, affecting how religions and FBOs operate within society.
A pivotal aspect of the research is the intricate relationship between neoliberalism and Islamic social values, especially with the rise of "'pious neoliberals" who aim to meld market-driven development with Islamic ethics

repackaged as market commodities. This fusion has redefined religious authority and practices, emphasizing the importance of economic resources and entrepreneurialism within religious circles.
This paper illustrates the varied effects of neoliberalism on religion through the examples of Egypt and Turkey. In Egypt, the intersection of economic liberalism with Islamic social values has transformed religious education and the provision of social services. Conversely, in Turkey, the advent of "Islamic capitalism" and the commercialization of religious services highlight the profound impacts of neoliberal policies.
This research underscores the necessity of understanding the linkage between neoliberalism and religion to grasp the extensive societal shifts underway while emphasizing the adaptive strategies religious groups might employ in the face of neoliberal challenges.

Presenters: Rosalie Folger-Vent
Department: Music
Faculty Mentor: Jonathan Middleton
Title: Red Winged Blackbird
Presentation Type: Creative Work
Abstract: Red Winged Blackbird is my original composition inspired by a visit to the Turnbull National Wildlife Refuge. I recorded bird calls and was inspired by the sounds of Red Winged Blackbirds. I used their repetitive call as the theme of my piece written for French Horn, Trombone, Vibraphone, and Cello. This theme is passed between the different voices whilst it is supported and countered by grand and playful accompaniment. I attempted to capture the vastness of the wetlands at Turnbull while also depicting the joyous flight and song of the birds. I feel this piece communicates the beauty and joy of the natural spaces in Eastern Washington.

Presenters: Jonah Frago
Department: Biology
Faculty Mentor: Luis Matos
Title: Testing the Lytic Capability of Recombinant P100.1 Phage Endolysin against *Cutibacterium acnes*
Presentation Type: Poster
Abstract: Acne vulgaris is one of the most common skin diseases globally. It is a chronic inflammatory disease of the pilosebaceous unit (hair follicle, hair shaft, and sebaceous gland collectively). The integumentary, endocrine, and immune systems all play roles in acne development and severity in addition to microbiotic colonization. One key aspect of acne pathogenesis is a disturbance of healthy strain diversity of the skin bacterium *Cutibacterium acnes*. Many acne treatments revolve around topical peroxides, antibiotics, and topical or systemic retinoids all of which directly, or indirectly target *C. acnes*. These treatments carry a variety of side effects and contribute to rising antibiotic resistance. Bacteriophages (or phage) are viruses that infect bacteria. Some phages produce enzymes called endolysins which contribute to a lytic life cycle wherein the phage kills the infected cell. Bacteriophages have been studied and successfully demonstrated reduction of *C. acnes* load in acne lesions, as well as reduced symptoms in patients. All current research uses live phages. This provides logistical challenges as the phages must be cultured, maintained, and kept alive until treatment. Here, we seek to recombinantly produce, and extracellularly excrete the endolysin protein responsible for targeting and killing *C. acnes* in a *Lactococcus lactis* production system. We hypothesize that the enzyme will retain its cell binding, and lytic capabilities through recombinant production and will cause significant reduction in *C. acnes* load when exposed to cultures. If successful, phage therapies do not contribute to raising antibiotic resistance, allow low-cost long-term storage, and allow scalable production.

Presenters: Cheryl Frostad
Department: Art
Faculty Mentor: Marc LaPointe
Title: Cradle the Life

Presentation Type: Creative Work
Abstract: Cradle the Life
33" x 14"
Wild-gathered materials, fabric
2023
Experiences create feelings that are stored away in our memories. I think a lot about our collective human history, how we interact, influence, and connect with one another and our world. As a multidisciplinary artist, I incorporate various materials and processes to create experiential works that reconnect us to ourselves and to our environment.
I am a gatherer. I gather twigs and stones and leaves on my walks. I gather memories in objects and photos. When I am creating, I weave together my gatherings, using whatever medium feels right to recreate the emotional experience. Experience is my teacher, and nature is my inspiration.
In this piece I have gathered wild growing plants that some consider weeds and woven them along with strips of quilting materials into a cocoon or cradle. This represents a safe haven of protection and reinforces humanity's connection to mother Earth.

Presenters: Cheryl Frostad
Department: Art
Faculty Mentor: Marc LaPointe
Title: Under the Canopy
Presentation Type: Creative Work
Abstract: Under the Canopy
16" x 20"
Acrylic on Canvas, leather, dogwood branches
2023
Nature doesn’t like to be confined, and a square blank canvas can be so rigid and unyielding. So, in my sculptural acrylic painting "Under the Canopy" I have sliced into my canvas to give nature a little freedom. This work is inspired by elements of nature. Through my manipulation and assemblage of materials I am investigating the complex relationship humans have with nature. The colorfully painted canvas has been cut, twisted, and carefully stitched back together with strips of leather to create three-dimensional layers. Red dogwood twigs I have gathered are nestled within the layers, waiting to be discovered. I am evoking both the sacredness and fragility of nature. My experimental process speaks to the human destruction of the environment and our sole responsibility and ability to heal it. The color and curls of canvas bring movement to the work and nudge the viewer to move around and observe from different angles. The openings and layers in the piece challenge us to look deeper, beyond the surface, to examine our perspective and our relationship to the natural world.

Presenters: Aaron Fuzak, Chad Pritchard
Department: Geosciences
Faculty Mentor: Chad Pritchard
Title: PFAS VARIATION THROUGH A WASTEWATER TREATMENT FACILITY PROCESS
Presentation Type: Poster
Abstract: PFAS concentrations were measured at a wastewater treatment facility to see the effect the treatment process had on PFAS levels. Samples were collected following an initial clarifier, second clarifier, sand filtration system, ultraviolet light purification system, and then from the effluent produced by the facility. The effluent flows from a pipe that enters a wetland, where it evaporates or infiltrates the groundwater. Municipal and septic treated systems are considered possible point sources for PFAS contamination in groundwater. Sampling levels of PFAS after treatment will give insight into the concentrations and expected phases of PFAS that may be found in the local groundwater, along with the effectiveness that specific treatment methods have in

removing PFAS from wastewater. This sampling is part of a larger areawide PFAS fate and transport model, which hopes to shed light on the extent of PFAS contamination in the area.

Presenters: Hammed Gafar
Department: Biology
Faculty Mentor: Dr. Jason Ashley
Title: Unraveling Notch-Dependent Genes in Osteoclast Differentiation: A Novel Approach to Identify Therapeutic Targets for Osteoporosis
Presentation Type: Poster
Abstract: Within the dynamic process of bone remodeling, osteoclasts play a crucial role in bone resorption, while osteoblasts contribute to bone formation, maintaining skeletal integrity. The equilibrium between these is essential for bone health, as disruptions may lead to conditions like osteoporosis. Osteoclasts originate from macrophages, and their differentiation is regulated, and Notch signaling pathway is a key player in this regulation. Gamma-secretase, an enzyme involved in various cellular functions, regulates the Notch pathway and can be inhibited by DAPT.
Analysis of differentially expressed genes (DEGs) from previous RNASeq experiments conducted on osteoclast differentiation under DAPT treatment identified genes that could potentially be influenced by Notch signaling modulation. However, selecting Notch-specific genes from the broader pool of DEGs poses a challenge due to gamma secretase's involvement in diverse metabolic pathways. To address this, our study employs IMR-1A, an inhibitor disrupting the recruitment of Mastermind-like 1 to the Notch transcriptional activation complex needed to initiate the expression of notch-specific genes.
We categorizes these DEGs into metabolic pathways through gene set enrichment analysis (GSEA). Subsequently, genes will be selected from each pathway, and validation using RT-qPCR will confirm which DEGs are Notch-dependent, shedding light on additional pathways influenced by Notch signaling.
This research aims to differentiate the subset of DEGs influenced by Notch pathway modulation, improving our understanding of its role in cellular processes. Ultimately, identifying key genes involved in Notch signaling may present potential therapeutic targets for mitigating osteoporosis symptoms, such as bone fractures, by inhibiting osteoclast formation.

Presenters: Matthew Gardner
Department: English
Faculty Mentor: Dr. Beth Torgerson
Title: "The Lure of The Unknown Abyss": Ambivalence and Hybridity in H.P. Lovecraft's The Shadow Over Innsmouth
Presentation Type: Oral Presentation
Abstract: As made clear in his personal correspondence, H.P. Lovecraft maintained a lifelong obsession with racial and cultural purity and maintaining strict lines of racial segregation. However, critics have frequently noted that Lovecraft’s novella, *The Shadow Over Innsmouth*, ends its allegory of miscegenation on a note of ambivalence, with the narrator's attitude towards his new hybrid racial identity vacillating between revulsion and awe. This presentation is a literary analysis of H.P. Lovecraft’s *The Shadow Over Innsmouth*, using an examination of Lovecraft’s letters, which argues that the novella first dramatizes Lovecraft’s beliefs on racial segregation and personal revulsion towards people of other races, before undermining this narrative and arriving at an irresolvable ambivalence which mirrors Lovecraft’s simultaneous fear of, and fascination with the unknown.

Presenters: Emily Garza
Department: Biology
Faculty Mentor: Dr. Judd Case
Title: Liver Affects on Cardiomyocytes

Presentation Type: Poster
Abstract: Liver diseases have been shown to impact the heart, such as cirrhosis inducing difficulties within cardiomyocyte contractibility due to thickening of heart tissue. Heart diseases have also been shown to impact the liver as well in cases involving hepatic congestion. In this research, I will be covering the histological pathologies of cardiomyocytes in relation to the effects they may show upon liver diseases. Previous research in this field seemed to show a continuous link between the heart and liver affecting each other. This study will aim to demonstrate cardiomyocyte effects that were results of liver disease. Cardiomyocyte effects may be shown through using and analyzing histological slides of both heart and liver tissues, and will assist in addressing how the heart's tissue physically responds to liver difficulties. Cardiac vessels, intercalated discs, fibroblasts, nucleus, and sarcomeres were documented for later comparison. So far, samples provided involving an individual with liver difficulties had demonstrated abnormalities amongst the intercalated discs, number of fibroblasts, and the myocytes appeared to be paler in dye. Other morphological areas seemed to still be normal, such as the sarcomeres. To better understand the effects of liver disease on heart tissue, next I will research how the preparation methods used to fix these slides may have affected the results, and how cardiomyocytes present postpartum to evaluate other possible explanations.

Presenters: McKenna Gass
Department: Management
Faculty Mentor: Parker Shaw
Title: The Effects Contributing to Workplace Sexual Harassment
Presentation Type: Oral Presentation
Abstract: Sexual harassment is unwelcome sexual advances that can be a combination of verbal or physical behaviors that are of a sexual nature. Sexual harassment can take place anywhere and to anyone. While corporate human resources officers have worked with the United States government in providing training and guidelines, like Title VII, to combat sexual harassment and other such behaviors, some factors outside of the workplace, such as America's social hierarchy, contribute to the persistence of such behaviors. This presentation will examine those factors and the preventative measures necessary to abolish sexual harassment in the workplace.

Presenters: Katie Gearing
Department: English
Faculty Mentor: Paul Lindholdt
Title: Humanitarian Recognition in Jon Silkin's 'Caring for Animals'
Presentation Type: Oral Presentation
Abstract: This project focuses on the underlying themes of Jon Silkins's poem "Caring for Animals," published in his book *The Peaceable Kingdom* (1954). In this poem, Jon Silkin explores humanity through the imagery of animals that are hurt and in need. Using the allegory of wounded animals in place of the concept of destitute humans, Silkin pulls at the emotional heartstrings of the reader, who might be called to take action. Through exploration of the poem line by line, it can be interpreted that the meaning of the poem is connected to humans more than the presented animals. Research of Jon Silkin's tumultuous life provides context to the poem as well. His service in World War I, his homelessness and food insecurity, and the death of his first son were all attributes that might have contributed to Silkin's underlying theme of the need for humanitarian efforts in "Caring for Animals."

Presenters: Marion George, Talon Jost, Jenifer Walke
Department: Biology
Faculty Mentor: Dr. Jenifer Walke
Title: Probiotic Potential of Bacterial Combinations for Amphibian Pathogen Remediation of *Batrachochytrium dendrobatidis*

Presentation Type: Poster
Abstract: *Batrachochytrium dendrobatidis* (Bd) induced chytridiomycosis is a disease associated with numerous amphibian extinctions. Bd infects skin cells, causing damage and potential mortality due to electrolyte imbalance and septicemia. Due to the pathology of Bd, research has focused on the amphibian skin microbiome as a source of mitigation. Microbiome members can increase host survival by secreting antifungal metabolites. Bd inhibition by these bacteria in isolation has been widely studied in amphibians; however, in other systems, co-cultures of two bacterial species can alter the metabolic profiles of participants, leading to enhanced inhibition against a third species. Genus *Streptomyces* is known for extensive bioactive metabolite secretion, including antifungals, and is found in the amphibian skin microbiome. I will analyze Bd-inhibitory relationships using laboratory assays challenging Bd with *Streptomyces* in isolation and combination with other amphibian skin symbionts *Janthinobacterium lividum*, *Bacillus sp*. and *Pseudomonas sp.* We hypothesize that the Bd inhibitory capacity of metabolites secreted in Bd-bacteria co-cultures will vary depending on species composition of co-cultures. Bacterial species were isolated and had DNA extracted, amplified, and the 16S rRNA gene sequenced. Isolates will be placed in bipartite and tripartite liquid cultures containing Bd. Metabolites of these cultures will be extracted and tested against Bd using a standard 96-well assay protocol. Bd inhibition will be measured using optical density at 492 nm, and inhibition values will be compared statistically to test my hypothesis. This work will provide insight into bacterial community-dependent pathogen resistance and potential probiotics for Bd remediation.

Presenters: Marion George, Alex Hays, Aspen Johnson, Ilona Kutsar, Raegan Laycock
Department: Biology
Faculty Mentor: Krisztian Magori
Title: Impacts of Antibiotic Pollution on the Density of Antibiotic Resistant Bacteria in Greater Spokane, WA
Presentation Type: Oral Presentation
Abstract: The spread of antibiotic resistance genes is a large global health threat to the mitigation of bacterial infections. The amplification of antibiotic resistance genes is due to horizontal gene transfer among bacteria, which is exacerbated with environmental pollution of antibiotics. This study aims to provide insight into the differential densities of antimicrobial resistant bacteria throughout Spokane, WA through sample collection from areas of variable antibiotic pollution. Due to antibiotic contamination in human waste, there is more antibiotic pollution in places where human wastewater flows compared to places where it does not. We hypothesize that there is a positive correlation between antibiotic resistant bacteria density and antibiotic pollution. Our methods will include collecting soil samples from locations we expect to have antibiotic pollution (near Sacred Heart Hospital, near the water aquifer that runs under Sacred Heart Hospital, and near the Spokane River) and locations we expect to have less antibiotic pollution (Turnbull Wildlife Refuge, Manito Park, and Cheney farmland). We will then grow bacteria from the soil samples on TSA plates, isolate bacterial colonies, use the Kirby Bauer antibiotic resistance disc test, and calculate colony forming units (CFUs). We hope our research will paint a more complete picture of antibiotic resistant bacteria density in the Spokane area. This can provide a better understanding of the spread of antibiotic resistance due to antibiotic pollution and the need to slow this pollution.

Presenters: Moriah Godwin
Department: Art
Faculty Mentor: Joshua Hobson
Title: At a Loss For Words
Presentation Type: Creative Work
Abstract: My name is Moriah Godwin, and I'm a painter who creates vibrant portraits that challenge traditional beauty standards and encourage viewers to appreciate a diverse range of beauty, self-expression, and feminine strengths. Even though my subjects have neutral facial expressions, they exude a strong sense of self. I invite the viewer to understand my subjects deeper than surface level.

I will be sharing two to three paintings that explore feelings of individuality and sonder.
“At a Loss For Words,” 14”x15,” watercolor on paper, February 2022
“We Are Worlds Away,” 9”x12,” gouache and colored pencil on paper, December 2022
“Spill,” 7”x9,” gouache and colored pencil on paper, July 2023

Presenters: Emily Hamada
Department: Biology
Faculty Mentor: Bo Idsardi
Title: Social Resource Availability and Use of Early Career STEM Teachers
Presentation Type: Oral Presentation
Abstract: Early career secondary science and mathematics teachers are the most vulnerable to leaving education. Social resources, such as a teacher next door or family members, can help support teachers, build resilience, and establish additional social, material, and/or human resources. This quantitative observation study examined the social resources that early career science and mathematics teachers in high needs schools had access to and used over one academic year. This work was framed by the Conservation of Resources theory, which describes how individuals with more resources are more capable of gaining additional resources and be less vulnerable to resource loss. Participants included science (n=22) and mathematics (n=4) teachers in their first five years of teaching across the United States. Teachers completed electronic surveys at the beginning, middle, and end of the year to report on their access and use of social, material, and human resources over the course of the 2022-2023 academic year. I used Friedman tests to determine if teachers’ access and use of social resources changed over the year. There was a slight increase in the number of social resources available to teachers across the year, but their use of resources did not change over time. Teachers frequently used the teacher next door and students and rarely used professor(s) and peer(s) from an induction program. Future research will explore the ways in which social resources influence the use of other resources and develop teacher resilience.

Presenters: Emily Hamada, Jacob Heaton, Natalie McGuire, Sayla Merritt, Bukky Oredugba
Department: Biology
Faculty Mentor: Dr. Joanna Joyner-Matos
Title: Investigating Macroinvertebrate Communities at Select Lentic Systems at Turnbull National Wildlife Refuge
Presentation Type: Poster
Abstract: In 1999, the non-native Brook Stickleback (*Culaea inconstans*) fish was found on Turnbull National Wildlife Refuge (WA). As this refuge is managed for waterfowl it is of concern that the fish could negatively impact aquatic habitats, predominantly through macroinvertebrate consumption. In 2012 and 2015 our lab investigated the water quality and macroinvertebrate communities in lakes that did or did not have fish. In 2022 we observed fish in two lakes (Long and Lasher) that previously were fishless. To further explore the potential impact of this non-native fish, we examined four lakes in 2023: the two recently-“invaded” lakes, one lake in which fish have been historically recorded (30 Acre), and a fishless lake (TLES). We surveyed multiple sites per lake (May-October) as water depths allowed. We measured water temperature, dissolved O2, conductivity, and pH. We used baited traps to verify fish presence/absence. Macroinvertebrates from the water/substrate interface were collected in a standardized sweep and counted. Across the historically-invaded, fishless, and one recently-invaded lake, there were no significant differences in the number of taxa or number of macroinvertebrates per site (both P=0.361). Compared 2012 and 2015, both recently-invaded lakes had fewer taxa, and all lakes had fewer macroinvertebrates collected. Water quality measurements in 2023 were indistinguishable across lakes. Conductivity in the historically-invaded lake and dissolved O2 in the fishless lake were higher in 2023 than in 2015. While we did not detect significant differences between lakes in 2023, this study contributes to ongoing monitoring of Brook Stickleback and their potential impact.

Presenters: Jerusha Hampson
Department: Geosciences
Faculty Mentor: Chad Pritchard
Title: Preliminary Per-and Polyfluoroalkyl Substances (PFAS) in surface waters in the West Plains Region of Spokane County
Presentation Type: Poster
Abstract: Per-and Polyfluoroalkyl Substances (PFAS) have become a national issue as regulatory limits for these toxins have recently been added to the Clean Water Act. The West Plains has been significantly impacted by PFAS contamination due to the decades-long use of aqueous film-forming foam (AFFF) for firefighting training at both Fairchild Airforce Base and the Spokane International Airport. Though research is still underway, it is known that PFAS contamination in West Plains groundwater is significant and widespread. This study focuses on West Plains surface waters, as there is currently little information about how these water bodies are impacted by PFAS.
In 2016, Department of Ecology sampled surface water from West Medical Lake (Mathiew and McCall, 2017). The data showed PFOS levels between 6.71 and 9.21 part per trillion (ppt), PFHxA between 32.5 and 33.1 ppt, and PFOA between 42.5 and 55.1 ppt. Total PFAS levels ranged from 153 to 170 ppt. However, West Medical Lake has been the effluent sink for Eastern State Hospital and now the City of Medical Lake's wastewater treatment plant. The Spokane River at Nine Mile was also sampled during the same study. Total PFAS ranged from 9.37 to 11.3 ppt. It is less clear where PFAS may be entering the river.
This study expands on West Plains surface waters and includes multiple lakes, creeks, and springs, as well as samples of rain, snow, and lake surfactant foam. Since West Plains groundwater and surface waters generally flow northeast towards the Spokane River, we also include samples from multiple locations along the river to determine if PFAS levels change downstream. This study is part of the larger West Plains PFAS Fate and Transport Study, which is being conducted to gain a comprehensive understanding of PFAS sources and to determine their pathways and distribution throughout water on the West Plains.

Presenters: Addison Hansen
Department: Art
Faculty Mentor: Annie Cunningham
Title: The Chaos of Change
Presentation Type: Creative Work
Abstract: When creating works with clay, I am inspired by the natural form of my thrown pieces as a foundation for creation. Working in the round I use sgraffito to create designs inspired by nature, interweaving them with abstract shapes and lines to embrace the chaos of change. I incorporate words or poems that are representative of what I am experiencing from one season to the next. I believe the clay has a message which is already present, waiting to be revealed, it is my purpose to bring that information to light. The variation of shape in each planter encourages me to release control and expectation.

Presenters: Brittni Hastings
Department: Geosciences
Faculty Mentor: Chad Pritchard
Title: Conflicting models for the formation of the Odessa Craters
Presentation Type: Poster
Abstract: Unique features in the Roza Member of the Columbia River Basalt (CRB) has been described by multiple styles of formation. The main unifying feature of the different explanations is that they are associated with pahoehoe emplacement (lava flow textures) of the CRBs and then exposed by Pleistocene megafloods. The posters described the different methods of emplacement and tries to focus on the simplest approach, which is normally tumuli. The craters are generally circular, but can be elongated. Some models described tilted basaltic columns away from the center of the crater by diking, but may be tilted as part of emplacement. Many models

rely on palagonite at the center of the structure, which is not generally found at the outcrops, however, glass and palagonite can be found in larger (tilted) tilted vesicles, or flow contacts. Some craters also have un-tilted cores, suggesting that the central flow auto-intruded. Distribution of the craters seems to mimic lava flow paths and tumuli breakout structures, providing a simpler model than sag flow out or other phreatomagmatic-dependent models of formation.

Presenters: Raven Hendershott
Department: Art
Faculty Mentor: Hobson, Joshua
Title: Anxiety, Healing, and Art
Presentation Type: Creative Work
Abstract: Anxiety is a fickle thing. Though seemingly small, it affects most people in different ways and can make a person feel fragmented and as if the world is shifting beneath their feet. Over the years I have performed research in the broad avenues of psychology, sociology and the esoteric. This work had led me to study the hypothesis that we all have phases and layers in the ethereal plane. Some of these phases require us to peer deep into ourselves to address our mortality, rest and heal, and perform shadow work (or inner work as Jung called it). These three aspects are important to discovering the cure for that fractured feeling of an unbalanced mental or emotional state that many traumatic events often leave behind. It is this research and these experiences that fuels my creativity.
Though the mediums and techniques vary, my work is always constructed intuitively, aesthetically, and with a measure of formal elements. With these principles in mind, I aim to let the work speak for itself and stir the viewers personal intuition for the deepest meaning. Therefore, it is my hope is that the work produced will promote healing, comfort, and help the viewer to realize that they are not alone in this ethereal journey we call life.

Presenters: Isaias Hernandez-Dominguez, Chander Luderman-Miller
Department: Computer Science
Faculty Mentor: Dr. Sanmeet Kaur
Title: Vysion Software
Presentation Type: Poster
Abstract: This research project delves into the realm of assistive technology by utilizing the Flutter framework alongside modern computer vision AI models to develop innovative medical software. The primary objective is to empower individuals with visual impairments, specifically blind individuals, by providing them with a novel tool that enhances their perception of the world around them.
The motivation behind this work stems from the significant challenges faced by blind individuals in navigating their environment independently. Existing solutions often fall short in providing a comprehensive and user-friendly experience. Hence, our research aims to bridge this gap by combining the versatility of the Flutter framework with cutting-edge computer vision AI models to create a robust and intuitive medical software solution.
The scope of this project extends to the development of a mobile application designed for blind users. The application employs real-time computer vision algorithms to analyze the user's surroundings, providing auditory feedback and descriptive information about the objects and scenes captured through the device's camera. The integration of Flutter ensures a seamless and responsive user interface, fostering a positive and user-friendly experience.
Methodologically, the research involves the implementation of state-of-the-art computer vision algorithms within the Flutter framework. The project employs rigorous testing methods, utilizing simulated and real-world scenarios to validate the accuracy and effectiveness of the developed medical software.
Preliminary findings showcase promising results in enhancing the perceptual capabilities of blind individuals. The software effectively identifies and describes objects, enabling users to navigate and comprehend their

surroundings more independently. The positive impact on users' quality of life underscores the potential of this research in addressing a critical societal need.
Conclusions drawn from this work emphasize the significance of integrating Flutter and computer vision AI for creating accessible and empowering solutions for individuals with visual impairments. The intended impression is to contribute to the ongoing discourse surrounding assistive technologies and inspire further innovations in the intersection of mobile development and computer vision for societal betterment. Recommendations include continued refinement and expansion of the software, with an emphasis on user feedback and collaboration with the blind community to ensure inclusivity and user satisfaction.

Presenters: Travis Hodges
Department: Design
Faculty Mentor: Travis Masingale
Title: AI image generation in game design: *The Future of AI asset Prompting*
Presentation Type: Poster
Abstract: The use of AI image generation tools in design is still an unexplored field, with new technologies coming out everyday. Dalle-3 through Open AI is one of these many technologies, providing limitless potential for asset creation and visualization; especially within the game design field. Dall-e 3 can be prompted and convinced to create assets following styles normally thought to be possible only through specified AI programs such as Mid-Journey or Leonardo.AI. By providing the AI a persona, the AI believes it is this new personality and generates to fulfill this idea. When telling the AI it was a professional glass blower, who creates glass sculptures, the AI believed it and created images of beautifully designed blown glass statues realistic to requested prompts. The prompt engineering research has so far been tested in fantasy item, character, and building design following traditional tabletop RPG design standards. This will revolutionize the asset prompt and creation market by reducing the amount of required AI model subscriptions needed to generate images of specific styles and qualities for the average designer. This research is set to prove AI prompting, when understood, invites endless game design possibilities through the image generation capabilities of Dall-e 3.

Presenters: Ari Hoskinson
Department: Art
Faculty Mentor: Josh Hobson
Title: August Triptych and Oregon
Presentation Type: Creative Work
Abstract: *August* is a collection of three pen and ink drawings that go together to form a narrative. This triptych explores themes of generational trauma and abuse.
Oregon is an autobiographical pen and ink drawing about my trip to the Oregon coast after my father took his own life. The piece is both melancholic and peaceful, reflecting my thoughts on the concept of death.

Presenters: Meena Jain, Kristyne Wiegand
Department: Exercise Science
Faculty Mentor: Dr. Kristyne Wiegand
Title: Hips Don't Lie: Analyzing Frontal Plane Kinematics in Adults of Varying Ages During Step Tasks
Presentation Type: Poster
Abstract: Aging is linked to reduced physical activity, which can lead to a loss of strength and coordination. Older individuals display greater asymmetries and altered kinematic patterns in fundamental movements, which can contribute to injury. PURPOSE: To assess the relationships between age and frontal plane kinematics of the hip and knee during step-up and step-down tasks. METHODS: Eighteen participants completed the study (6 males, age 38.89±16.24). Participants completed three single-leg step-ups and step-downs on each limb from a 25 cm height while 2D kinematics were recorded. Contralateral hip drop and knee valgus angles were identified. The average maximum and minimum values of the dominant limb were calculated across trials.

Range of motion (ROM) for each angle was calculated as the average minimum value minus the average maximum value. The relationships between age and hip drop ROM, knee valgus ROM, and contralateral hip drop were assessed using bivariate correlations (α=0.05). RESULTS: No significant correlation was found between age and contralateral hip drop (Right: r=.070, p>0.05; Left: r=-0.032, p> 0.05) or knee valgus (Right: r=-152, p>0.05; Left: r=-0.239, p>0.05) during the single-leg step-up. No significant correlation was found between age and contralateral hip drop (Right: r=-0.112, p>0.05; Left: r=-0.400, p>0.05) or knee valgus on the left limb (r=0.184, p>0.05) during the single-leg step-down. A moderate correlation was observed between age and knee valgus during the single-leg step-down on the right limb (r=0.497, p

Presenters: M Jobe
Department: Art
Faculty Mentor: Joshua Hobson
Title: *Accidental Connection*
Presentation Type: Creative Work
Abstract: In 2023 the us surgeon general released a 72pg document addressing the loneliness and isolation epidemic affecting our country. It outlines the rapid decline in social connection within our communities following the pandemic and the infinite growth of social media. This piece of art is a 44" frame containing a square 42" image, almost entirely wrapped in matting. The matting is scored on the backside, allowing for the audience to participate, tearing off portions of the image to reveal the bigger picture. Each piece of matting has a note of affirmation to be taken by the viewer. The hope is that the connection between the art and viewer holds just enough power to remind them they aren't alone.

Presenters: Liezel John
Department: Sociology and Justice Studies
Faculty Mentor: Kassahun Kebede
Title: An Overview of the Filipino American Population and History
Presentation Type: Oral Presentation
Abstract: The impact of the U.S. military occupation in the Philippines is examined to provide context for why Filipinos migrated to the United States, along with how colonialism and global capitalism have impacted the experiences of Filipinos who reside in the United States. Information compiled in this paper was collected from various sources, including textbooks, news articles, academic journals, and websites affiliated with research centers and educational institutions. Examination of historical contexts that help explain the inner machinations of Filipino immigration to the United States also helps explain how Filipino American experiences define their identities as a minority group in the nation. The culmination of research from these sources argues for a profound impact of U.S. imperialism and colonialism upon the lived experiences, representation, and mental health of Filipino Americans in both the past and present.

Presenters: Talon Jost
Department: Biology
Faculty Mentor: Dr. Jenifer Walke
Title: Tetrodotoxin and Location, but Not Chytrid Fungal Infection, Influence Skin Microbiome Composition In Rough-skinned Newts (*Taricha granulosa*)
Presentation Type: Poster
Abstract: Chytridiomycosis is an amphibian fungal skin disease caused by *Batrachochytrium dendrobatidis* (Bd) and linked to global population declines and extinctions. However, some amphibians are less susceptible to infection through intrinsic factors, including skin microbes aiding defense through resource competition and antifungal metabolite production. Amphibians can also release toxins, such as tetrodotoxin (TTX) in the genus *Taricha*, in response to stress cues to defend against disease, parasitism, and predation. Despite a previously observed negative relationship between levels of TTX concentration and Bd infection intensity, the influences

of TTX concentration on host microbiome diversity and pathogen dynamics across a geographic range remains unanswered. We examined the relationship among TTX concentration, Bd infection, and skin microbiome composition in Rough-skinned Newts (*Taricha granulosa*, n = 90) from six locations in the Pacific Northwest, USA. Skin swabs were collected for Bd infection intensity quantification using TaqMan qPCR and microbiome characterization using Illumina MiSeq 16S rRNA gene amplicon sequencing, and skin punches were collected to quantify TTX concentration using Competitive Inhibition Enzymatic Immunoassays. There were significant differences in TTX concentration and Bd infection across locations, but no direct interactions between TTX concentration and Bd infection intensity or presence. Microbiome composition varied with TTX concentration and location, but not Bd infection prevalence. Further study is necessary to determine the directionality of the TTX-microbiome relationship, that is, whether TTX concentration determines microbiome composition or if the microbiome can influence TTX concentration in Rough-skinned newts.

Presenters: Mohammad Kaddoura, Mamiko Patterson
Department: Biology
Faculty Mentor: Jason Ashley
Title: Notch Signaling in Melanoma-Modulated Osteoclastogenesis
Presentation Type: Poster
Abstract: Melanoma, a cancer originating from mutated melanocyte (pigment-producing) cells, is primarily present in the skin but may spread to other organs. If the melanoma tumor becomes malignant, it can invade other organs via the cardiovascular and lymphatic systems. Metastatic melanoma in the bone is capable of inducing osteoclastogenesis, leading to an increase in lacunar bone resorption. Associated symptoms include bone pain, pathological fractures, hypercalcemia, and neurological symptoms due to spinal cord and nerve compression. The Notch signaling pathway is a cell-contact-dependent pathway that regulates cell proliferation, cell fate, differentiation, and apoptosis in all multicellular animals. Based on prior evidence of Notch signaling's essential nature to osteoclast differentiation, we hypothesize that Notch signaling is utilized in the communication between metastatic melanoma cells and osteoclasts. In this study, we plan to explore the change in differentiation rates of osteoclasts from bone marrow macrophages in the presence of A375 melanoma cells with typical and altered Notch signaling capacities. Modified A375 cells will express one of two Notch pathway inhibitory proteins, dominant negative Mastermind-like or dominant negative Mindbomb-1, or enhanced green fluorescent protein as a control. After this initial stage, we will measure melanoma cell proliferation and viability and the resultant osteoclastogenesis when co-cultured with osteoclast precursors. Alterations in the behavior of A375 cells or their ability to influence osteoclast differentiation will be evidence of a role for Notch signaling. Completion of this work will provide a strong foundation for future research based on this specific interaction between the two cell populations.

Presenters: Alyssa Kamp
Department: Art
Faculty Mentor: Josh Hobson
Title: Snail Church, Terracotta, 9" x 6", 2022
Presentation Type: Creative Work
Abstract: I chose to create something whimsical, amusing and happy. This work portrays ten coil snails who sit atop 10 red mushrooms, which follow the waves of the rainbows they're riding. I made this piece using hand building techniques in ceramics. I created my snail church out of terracotta, colored slip and underglaze. When I was making this piece I created a world where the snails are silly little friends with flowers painted on their backs and they come to sit on these mushrooms as a happy pastime. My ceramic work provides a childlike sense of wonder and imagination. This is something that I value as it's very important to remember to be playful and silly especially in a world that is often not.

Presenters: Alyssa Kamp

Department: Art
Faculty Mentor: Josh Hobson
Title: Untitled Chaos Series, Gelatin Silver Print, 8'' x 10'', 2023
Presentation Type: Creative Work
Abstract: This project was a study of myself. I did a series of gelatin silver prints exploring techniques of cutting film, single exposure, double exposure and triple exposure on film. When creating my untitled chaos series I was going through a really challenging time where my state of internal chaos was reflecting horribly into a state of external chaos. These two played off of each other and I found myself constantly feeling burnt out, frantic and behind. Photographing myself and my space was something very vulnerable because this topic was messy. It was messy in my head, but also messy in my space. It felt embarrassing at first, but when I became submerged in the project I was able to find peace and confront some of my chaos.

Presenters: Kyle Keenan
Department: Biology
Faculty Mentor: Dr. Paul Spruell
Title: Investigating the Relationships between Biotic and Abiotic Factors Affecting Migratory Behavior in Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*) within the Priest River System.
Presentation Type: Oral Presentation
Abstract: Numerous salmonid species demonstrate a diverse range of life histories, encompassing both resident and migratory behaviors. Migratory life histories play a pivotal role in ecosystems for various reasons, facilitating genetic exchange between populations and yielding larger-sized females with increased fecundity relative to residents. This study took place within the lower Priest River located in northern Idaho, which is highly susceptible of degrading habitat. Previous research has discovered this system as a significant contributor to migratory Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*, WCT). Continuing with these results we compared four Priest River tributaries that produced high proportions of migratory individuals (Big, Saddler, North Fork East River, and Quartz Creek), and compared them to four tributaries that produced low migratory proportions (Benton, Kavanaugh, Uleda, Keokee Creek) between June and September. Of the eight tributaries, fish density was collected using multi pass depletion estimates in conjunction with stream temperature, and flow velocity. With the use of a generalized boosted regression model, in RStudio, temperature had the largest influence in explaining migratory behavior. Among all eight tributaries, Big Creek hosted the highest number of migratory individuals, with 31 out of 70 individuals recorded. It also experienced the warmest temperature at 19.13°C. Notably, it reached its peak maximum temperature earliest on August 15th and sustained a warmer temperature for an extended duration compared to other tributaries. As temperature rises beyond the optimal range for salmonids, an individual will vacate these tributaries or consequently face mortality, ultimately leading to the expression of migratory life histories.

Presenters: Sylvia Kennerly, Rylee Kincaid
Department: Chemistry and Biochemistry
Faculty Mentor: Dr. Nicholas Burgis
Title: Quantified expression of the ITPA enzyme mutations R178C within human neuron cells
Presentation Type: Poster
Abstract: Human inosine triphosphate pyrophosphatase, or ITPA, is an enzyme encoded by the ITPA gene, which plays a crucial role in nucleotide metabolism through the removal of abnormal purines. ITPA regulates cellular levels of the abnormal nucleotide inosine triphosphate (ITP) by hydrolyzation to the monophosphate form (IMP). Severe mutations in the ITPA gene result in the impairment of the ITPA enzyme, leading to the accumulation of ITP within the cell. The R178C mutation is a lethal variant, where cysteine replaces arginine at position 178, destabilizing the enzyme and rendering it inactive. These high levels of ITP can disrupt nucleotide, DNA, and RNA metabolism, ultimately culminating in early infantile encephalopathy, cardiac defects, and eventual mortality. Exposure to the noncanonical purine 6-N-hydroxylaminopurine (HAP) within

cells is cytotoxic and a mutagen in addition to inhibiting DNA synthesis. While the damage resulting from the ITPA enzyme mutation is well observed, it is not understood how the defect is expressed within the cell. To better understand how this mutation causes infantile encephalopathy, we will use cell cultures exposed to HAP and MG132 (a proteasome inhibitor) to track cell viability and protein expression through fluorescent plate analysis, and mRNA expression levels of cell lysate using quantitative-Polymerase Chain Reaction (qPCR). The qPCR results will provide further direction to explore the mechanism and expression of ITPA gene mutations and improve understanding of the mechanisms of this enzyme opening doors to potential methods of treatment for affected individuals.

Presenters: Hannah Kim
Department: Biology
Faculty Mentor: Dr. Jenifer Walke
Title: The Effects of Salinity on the Cutaneous Microbiome and Bd Infection of the Pacific Tree Frog (*Pseudacris regilla*)
Presentation Type: Poster
Abstract: Anthropogenic climate change and infectious diseases are leading causes of amphibian population decline around the world. Changes in precipitation and salinity have reduced habitat availability and altered physiological performances for amphibian survival. The salt refugee hypothesis however, proposes that amphibians have stronger abilities to defend against pathogens in higher saline environments. Along the coast of California, Monterey County is a known breeding ground for endangered amphibian species living in these conditions. The prevalence and intensity of *Batrachochytrium dendrobatidis* (*Bd*) and the composition of skin microbial communities will be evaluated on the model study species, the Pacific Tree Frog (*Pseudacris regilla*) to test the salt refugee hypothesis. We hypothesize amphibians in higher salinity will have lower *Bd* rates and more bacterial diversity. Ten skin swab samples will be collected at 20 sites in Monterey across a salinity gradient (0.5 ppt- 30 ppt). DNA will be extracted for the molecular quantification of *Bd* and the skin microbiome. *Bd* prevalence and intensity will be assessed with quantitative PCR, while bacterial community composition will be evaluated by amplifying the V4-V5 region of the 16S rRNA gene using the Illumina Miseq platform. Statistical analyses, including Adonis method, Kruskal-Wallis test, and PERMANOVA test, will evaluate the interaction between *Bd* presence/absence, salinity, and microbial diversity. Spearman rank correlation and Mantel test will explore correlations between *Bd* infection intensity, salinity, and bacterial community structure. These results will provide valuable insight for amphibian conservation efforts where environmental conditions continue to change.

Presenters: Ben Knoll, John Taylor, David Parker, Lilly Fetzer, Caleb Steinman
Department: Computer Science
Faculty Mentor: Dr. Sanmeet Kaur
Title: SecurIoTy: An Internet of Things Security Lab Platform
Presentation Type: Poster
Abstract: As the Internet of Things (IoT) continues to expand, the demand for cybersecurity professionals capable of securing these devices escalates. However, many cybersecurity students lack practical experience in addressing the unique security challenges posed by IoT systems. To bridge this gap, we propose a Virtual Machine-based solution tailored for simulating IoT devices.
This senior project introduces a groundbreaking approach to educating students about IoT cybersecurity through the development of a comprehensive learning platform. The project team aims to create a dynamic website featuring an innovative in-browser virtual machine (VM) capable of simulating and executing various IoT cyber attacks. The primary goal is to empower students with practical, hands-on experience in identifying, understanding, and mitigating cybersecurity threats within IoT ecosystems.
The website provides a user-friendly interface for students to access the in-browser virtual environment, eliminating the need for complex setup processes and ensuring seamless integration into educational curricula.

The virtual machine is equipped with simulated IoT devices, networks, and vulnerabilities, offering a safe yet realistic space for learners to actively engage in practical exercises.
By combining theoretical knowledge with hands-on experience in a controlled environment, this project aims to equip students with the skills and insights needed to address the growing challenges in IoT cybersecurity. The innovative in-browser virtual machine provides a flexible and accessible platform for educators to integrate practical cybersecurity training into their curricula, preparing the next generation of professionals to safeguard the interconnected world of IoT.

Presenters: Tosha Kristensen, Ryan Tibbetts, Alejandro Torres, Ashley Johnson
Department: Biology
Faculty Mentor: Charlotte R. Milling
Title: Environmental Variables That Affect Wildlife Movement at Turnbull Laboratory for Ecological Studies
Presentation Type: Poster
Abstract: Turnbull National Wildlife Refuge (TNWR) is a 23,000-acre site established by the US Fish and Wildlife Serve to provide sanctuary for migratory birds and wildlife against habitat loss and degradation. Human activity in the Spokane Metropolitan Area might influence wildlife activity, and understanding how wildlife respond to environmental variables can inform management of refuges near major urban centers. Our objective was to evaluate environmental factors that influence wildlife visitation rates using game cameras at the Turnbull Laboratory for Ecological Studies (TLES) on the north side of TNWR. We measured percent canopy cover and percent vegetation ground cover at ten sites, which we assessed for a correlative relationship with visitation rate. We also recorded time of day and temperature for each independent animal detection, and we compared number of detections among biologically relevant times of day (dawn, day, dusk, and night) and temperature bins (above and below freezing) using a t-test. The results indicated no significant effect of time of day ($p = 0.37$) or temperature ($p = 0.88$) on the number of animal visitations at each site. We did, however detect a significant negative correlation between both the proportion of canopy cover ($p = 0.009$) and the proportion of vegetation cover ($p = 0.008$) on visitation rate. Our results suggest that habitat features affect wildlife activity levels, with greater activity occurring where habitat structure is sparse. This can help managers anticipate animal movement in relation to gradients of human use on Turnbull and in the surrounding landscape and manage habitat accordingly.

Presenters: Meg Lake, Stephen Sharrett, Elaine Larsen, Julianna Paulsen, Jessica Allen
Department: Biology
Faculty Mentor: Jessica Allen
Title: Deconstructing White Imperialist Paradigms in Science: Integrating Interdisciplinary Frameworks into Biological Research
Presentation Type: Oral Presentation
Abstract: The value-laden ideological frameworks characteristic of western science limit our ability to explore the intricacies of natural phenomena by prioritizing ideas based on linearity, binaries, anthropocentric hierarchies, and emphasis on productivity. Here, we present alternative frameworks that aim to access scientific discovery from a systems perspective and incorporate interdisciplinary concepts. Drawing from concepts in philosophy and social sciences, we illustrate the application of sympoiesis, process ontology, emergence, and narratives that evoke a ‘nude’—rather than ‘naked’—perception for reframing perspectives on natural systems. We synthesize these ideas to deconstruct topical literature in ecology, health science, and education and make recommendations for use of language established outside of the western scientific lexicon. As white western scientists working towards broadening scientific perspectives, we recognize communities and cultures that the imperialist white supremacist capitalist patriarchy has attempted to marginalize have long presented ways of being that reflect these approaches or are contrary to dominant ideologies. We aim to encourage flexibility and multiplicity of perspectives, highlight and maneuver biases, and emphasize the value of alternative frameworks

and their applicability to research, ultimately fostering a dialogue that undermines oppressive systems attempting to suppress diversity of people and ideas in STEM spaces.

Presenters: Meg Lake, Jeff Diez, Mark Schulze, Bruce McCune, Posy Busby, Sofia Green, Krisztian Magori, Jessi Allen
Department: Biology
Faculty Mentor: Dr. Jessi Allen
Title: Differential water holding capacity in bryophyte species and organizational levels
Presentation Type: Oral Presentation
Abstract: A species' ecological role and distribution is driven by its functional traits. As non-vascular, poikilohydric plants, bryophytes present a nuanced response to changes in water availability and offer a unique opportunity to understand the relationship between traits and environmental properties on a microclimate level. Water holding capacity (WHC) is a key functional trait that influences ecosystem hydrology. In this study we investigated variation in WHC among species, at different elevations, and at different organizational levels (individual shoots vs. intact moss mats). We expected to find that high elevation populations have higher WHC than low elevation populations of the same species and that mats would be better indicators of overall WHC of a given species. Our study focused on four species found across an elevational gradient at HJ Andrews experimental forest: *Rhytidioposis robusta*, *Kindbergia oregana*, *Hylocomium splendens* and *Rhytidiadelphus triquetrus*. Samples were gathered from three sites representing high and low elevation populations of each species where possible. Specimens were exposed to a rehydration and desiccation experiment. Oven dry weights and weights taken intermittently during the drying process were used to calculate WHC. Mean WHC capacity differed among species (p

Presenters: Micah Lamb
Department: Chemistry and Biochemistry
Faculty Mentor: Dr. Ashley Lamm
Title: Hydrolysis Kinetics of Trimeric Benzodiazaborole
Presentation Type: Poster
Abstract: Boron-nitrogen based compounds are currently under investigation for their potential application in the development of degradable polymers. This study focuses on the synthesis and hydrolysis of trimeric benzodiazaborole in buffered aqueous solutions across a pH range of 4 to 12. The results indicate that the hydrolysis rate of this compound is significantly influenced by the pH level of the solution. Observations show accelerated hydrolysis rates at the extremes of the pH spectrum, particularly in buffer solutions at pH 4 and pH 12, suggesting enhanced degradation under strongly acidic and basic conditions. Conversely, the hydrolysis rates observed at pH 6 demonstrated no notable deviation from those at pH 7, indicating a plateau in degradation rate under these mildly acidic to neutral conditions. Notably, the compound exhibited increased degradation rates in buffer solutions at pH 9 compared to those in neutral conditions, albeit at a slower pace than observed at pH 12. This pH-dependent behavior underscores the importance of environmental pH in the degradation process of boron-nitrogen containing polymers, offering valuable insights for the development of environmentally responsive degradable materials.

Presenters: Marianne Lane
Department: Social Work
Faculty Mentor: Rie Kobayashi
Title: The Use of Technology in Addressing Gaps in Care for Older Adults Living with Dementia.
Presentation Type: Poster
Abstract: The number of older adults in the United States, including those with dementia, is steadily increasing. The rise in the population of older adults with dementia intersects with changes in the family structure, workforce, and reliance on post-Covid technological relations. Of note, estimates predict older adults

having fewer relatives and, thus, available family caregivers. Family caregivers have been a significant resource in the care and companionship of older adults with dementia. Less reliance on family for the care of older adults, especially those living with dementia, increases the need for caregivers, case managers, care coordinators, and other supports. However, the job market and healthcare industry have not adapted well or promptly to these increased needs. New approaches, then, are urgently needed to address the gaps in the care of older adults living with dementia. Technology, including artificial technology, can be used not only as tools in addressing care and safety but also in addressing the isolation and loneliness of older adults living with dementia. This poster will discuss the technology already being used to address the health, safety, and well-being of older adults living with dementia, as well as future uses and directions, and it will argue for the mainstream implementation and accessibility of technology for older adults living with dementia.

Presenters: Gretchen Larmer
Department: Gender, Women's & Sexuality Studies
Faculty Mentor: Dr. Judy Rohrer
Title: Anti-Transgender Care Bans: The Weaponization of Disinformation and the Political Ploy to Erase Transgender Youth
Presentation Type: Oral Presentation
Abstract: Since 2021, the United States has seen the introduction of over 1,000 bills targeting transgender rights and in 2024 alone, 133 bills have been introduced that aim to deny healthcare for transgender individuals. Such bills often prevent access to necessary healthcare, particularly gender-affirming care (GAC) for transgender youth. GAC for transgender youth can include care for mental wellness and puberty blockers which temporarily pause the puberty process. Legislators aim to deny transgender youth access to GAC by criminalizing any support given to youth accessing GAC as well as the medical or psychiatric provision of such care. GAC has been negatively and inaccurately portrayed in public discourse and further weaponized by legislators as a political ploy to erase transgender identity. The recent bans on GAC aimed at transgender youth are rooted in disinformation and have serious implications, including the spread of transphobia for the estimated 1.3 million transgender youth in the U.S. Research has shown that GAC is medically necessary for the health and wellbeing of transgender individuals, and is supported by most of the major and well-respected medical associations. This paper shows that, contrary to the purported aim of "protecting children," bans on GAC actually produce harm for transgender youth and fuel transphobia. This paper also aims to shed light on how these bans negatively impact the lives of millions of transgender youths across the U.S., and importantly, what is being done to fight back against the harmful disinformation and the bans.

Presenters: Elaine Larsen, Carissa Morrison
Department: Biology
Faculty Mentor: Jessica L Allen
Title: Nostoc Genome Announcement
Presentation Type: Oral Presentation
Abstract: Cyanobacteria and their associated lichen fungi have been historically understudied, but their genomes often code for unique and potentially useful secondary metabolites due to the demands of their variable life strategies. In this paper we characterize a newly sequenced Nostoc genome. The sample was sequences as part of the metagenome of the critically endangered foliose lichen *Sticta deyana*. The genome is 7,150,624 base pairs long and encodes 7,494 genes. We annotated the genome using Prokka and compared it to 20 other lichen cyanobiont Nostoc genomes downloaded from the RefSeq library using Compute Pangenome in KBASE and OrthoFinder. We then assessed the potential bioactive contents of the genome by running analyses in antiSMASH and BIGFAM. The genome contains 12 gene regions predicted to be biosynthetic gene clusters (BCGs), one of which is a 100% match for a cluster that codes for heterocyst glycolipids. Approximately eighty percent of the genes in the genome, including the BCGs, are classified as 'putative' function, and are therefore dissimilar to any previously characterized genes. Twenty percent of the genes are classified as core, meaning

that they are somewhat structurally similar to previously characterized genes. None of the BGCs were considered to be very structurally similar to previously characterized BGCs. These results indicate that our Nostoc contains many novel genes performing as yet unidentified functions. More research is needed to further characterize the novel BGC structures and further investigate their secondary metabolites.

Presenters: Jessica Lawrence, Natalie Potter, Chad Pritchard
Department: Geosciences
Faculty Mentor: Chad Pritchard
Title: U/Pb zircon ages of Saltese Upland Conservation Area, Priest River Core Complex
Presentation Type: Poster
Abstract: The Saltese Upland Conservation Area provides a window into the Priest River Core Complex with Lake Hauser gneiss grading to migmatite, garnet-baring amphibolite juxtaposed with granitic to orthogneiss rocks. U/Pb ages from LA-ICP-MS of separated zircon grains show trends very similar to detrital 207Pb/206Pb ages of the Belt Supergroup. The amphibolite displays a much stronger peak at 1.4 to 1.5 Ga , possibly related to the emplacement of Mesoproterozoic dikes. The amphibolite and granitic rocks also contain a number of grains with 238U/206Pb around 60 Ma preserving events from the uplift of the Priest River Complex in the Spokane area. The Saltese Uplands are a very common location for sharing natural sciences to the public, so these results help decipher the history of a part of the Priest River Core Complex and also provide data and support to develop a story for the public to understand complex geologic areas.

Presenters: Jessica Lawrence
Department: Geosciences
Faculty Mentor: Lindsey MacKenzie
Title: Paleohydraulic Analysis of Megaripples from Outburst Floods in Omak, Washington
Presentation Type: Poster
Abstract: Giant Current Ripples were discovered on LIDAR in 2019 just 3 miles NEN of Omak, Okanogan County, Washington, by Geologist Jerome Lesemann and Nick Zienter. The use of minimum height indicators along the channel were used to calculate flow regimes responsible for producing megaripples using Manning's equation for discharge to find approximate velocity for finding Froude's number. A mean ripple index of 94.1 was calculated for megaripples oriented proximal and distal along a gravel point bar approximately 280 feet above the current river profile. Calculations were then computed against datasets for megaripples located throughout the Scablands of Washington to determine the possible correlation to glacial outburst floods of the Great Missoula Floods during the Pleistocene. Froude's Number for Omak ripple 1 and 2 using roughness coefficients for gravel (0.033 and 0.04) was 0.63 and 0.77, falling within a range of other giant current ripples associated with glacial outburst floods in Washington (0.5-0.9 for channel scablands). Without a complete understanding of the active environment during deposition, analysis of paleohydraulic conditions related to macroform and mesoforms can be used to classify other bedforms with similar characteristics.

Presenters: Jessica Lawrence, Kai Valentine, Annika Smith, Sydney Fergen
Department: Geosciences
Faculty Mentor: Richard Orndorff
Title: Geotechnical Analysis of Soil Sample PP-7 from EWU Palouse Prairie Restoration Site, Cheney, WA
Presentation Type: Poster
Abstract: The Eastern Washington University Palouse Prairie Restoration Project is a program set to restore 120 acres of Palouse Prairie to its native habitat, though currently leased as a no-till annual wheat field. The sand with silty fine soil lies atop 15,000-year-old Pleistocene loess and glaciofluvial deposits associated with the Channeled Scablands from the Great Missoula Floods. There were 9 different soil samples collected from the Palouse Prairie Restoration Project area. On Sept 21st, 2023, Group 7 collected soil sample PP-7 from 47.492747degreesN, -117.593442degreesW, and over 10 weeks, tested the specific gravity (ASTM D854),

particle size distribution (ASTM D422, D7928), soil plasticity (ASTM D4318), soil compaction (ASTM D698), and unconfined compressive strength (ASTM D2166), to designate the Unified Soil Classification System (USCS). These soils were tested to determine what areas could maintain infrastructure related to restoration. Soil sample PP-7 displayed quantitative characteristics associated with poor soil stability, due to its low liquid limit according to the USCS.

Presenters: Raegan Laycock
Department: Biology
Faculty Mentor: Judd A. Case
Title: The *Homo neanderthalensis* Diet and Lifestyle's Effect on Dental Anatomy in Comparison with *Homo sapiens*.
Presentation Type: Poster
Abstract: The anterior teeth of *Homo neanderthalensis* (Neanderthals) have been thoroughly studied and said to be larger than those of *Homo sapiens* (Modern Humans), with some researchers suggesting that they were utilized in food preparation. Neanderthals have also been found to have heavily worn anterior teeth and a thin enamel layer. This study investigated possible size differences between Neanderthals and Modern Humans in their posterior teeth as well as anterior teeth, to get a more complete picture of how the lifestyle of the Neanderthal time would have affected overall dental anatomy. Buccal-lingual and mesial-distal distances of posterior teeth, and mesial-distal distances of anterior teeth of two Neanderthal specimens (one adult and one child) and six Modern Human specimens were measured. After performing a series of one group t-tests comparing the averages of the Modern Human specimens' measurements against the measurements for each of the Neanderthal specimens, it was determined that the Neanderthal child had statistically significantly larger anterior teeth compared to Modern Humans while the adult Neanderthal had statistically significantly larger posterior teeth compared to Modern Humans. The Neanderthal specimens also both exhibited a uniform pattern of extreme wear. Neanderthal's thin enamel could likely be responsible for these extreme wear patterns, and in combination with the less advanced tools of the time may have forced mature Neanderthals to utilize larger posterior teeth to accommodate a more "less mechanically processed food" diet, consisting of meat from large mammals as well as plants and fungi.

Presenters: Victoria Layden
Department: Psychology
Faculty Mentor: Dr. Jillene Seiver
Title: Accelerating Education: Video Playback Speed and Memory Retention
Presentation Type: Oral Presentation
Abstract: This study delves into the effects of increased video playback speed on memory retention among undergraduate students in a group learning context. Analyzing data from 138 participants watching a psychology lecture at either 1.5x or 2x speed, along with demographic factors like age, GPA, and confidence ratings, the research found no significant difference in quiz scores between the two speed conditions. However, participants in the 2x speed condition expressed lower confidence than those in the 1.5x speed condition. Notably, higher GPA correlated with better quiz performance, emphasizing the role of academic achievement in memory retention. While faster video speeds didn't impair memory, they influenced confidence levels, gender differences adding a nuanced level to this finding. These findings provide insights for optimizing video-based instruction in educational settings, considering individual characteristics and potential effects on student experience.

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Presenters: Eric Leachman, Antonio Espinoza
Department: Computer Science
Faculty Mentor: Antonio M. Espinoza
Title: Twitch.tv: The Communities We Make and the Language We Use
Presentation Type: Poster
Abstract: in 2011 Twitch launched as an independent streaming platform before being acquired by Amazon in 2014. In its first year, twitch.tv achieved a viewership of 3.2 million users per month. Since then, Twitch has gone on to amass a monthly viewership of 240 million active users. Twitch is currently the defacto leader in the live streaming space, providing a large platform for content creators and content consumers to interact and collaborate. While Twitch was initially intended to cater to live gaming, its community has expanded their content to include topics e.g., ”just chatting”, political commentary, news, table top role playing games, etc. This produces a large amount of data that is organically organized by channels, their unique genres, and the viewers that contribute to their respective communities. For future analysis, we introduce an infrastructure engineered to collect and parse Twitch chat in real time, as well as store pertinent information in a SQL database. The core of this system is a Python bot that leverages the Twitch API to monitor and collect chat messages across designated channels. After retrieval of the logs, the bot processes them, extracting key pieces of information, then sends them to a SQL database for storage. Although our projects goal is data collection, our hope is that this framework and the information it gathers will enable future analysis by researchers to extract meta-information about channels and their viewers to include general sentiment, political leanings, and speech patterns (both in individuals and communities).

Presenters: Stephen Legg
Department: Biology
Faculty Mentor: Judd Case, PhD
Title: A Histological Exploration of Type I Diabetes
Presentation Type: Poster
Abstract: The purpose of this research project is to investigate the histological characteristics associated with Type I diabetes. Using microscopy and histological techniques, the study examines samples of pancreatic tissue from individuals known to have been diagnosed with Type I diabetes compared to samples from individuals known to have healthy pancreatic tissue.
Key histological features such as beta cell destruction and changes in islet morphology are being analyzed to understand the underlying pathological mechanisms of the disease. By measuring size and shape of islets and creating counts of the cells within islets, pathology of the disease can be quantified.
The findings aim to contribute to a deeper understanding of the histology and pathology of Type I diabetes, with the hope that any new knowledge could inform the development of new therapies for this condition.

Presenters: Max Leonard, Kevin Taylor, Natalie Potter

Department: Geosciences
Faculty Mentor: Chad Pritchard
Title: Age and geochemistry of sillimanite-bearing gneiss from a possible core complex near Cheney, WA
Presentation Type: Poster
Abstract: Northeast of Cheney, Washington a series of hills display various rock types from garnet-bearing granitic rocks to sillimanite bearing gneiss. Surrounding these high-grade metamorphic rocks are fine to medium grained sandstone and quartzites mapped as the Ravalli Group of the Belt Supergroup. The lower-grade metamorphosed Belt rocks are cross cut by pegmatite dikes and multiple normal faults intruded by foliated granitic dikes, which are generally 49 Ma. The contact between the metamorphic grades seems to be gradational as faulted rocks, grade to folding and crenulation, and then to mylonitic textures and gneiss. U/Pb ages of separated zircon grains from the gneiss are older than 1.1 Ma, generally agree with expected detrital zircon ages from the Belt Supergroup and are comparable to samples from the proximal Priest River core complex. This area has been generally referred to as the Needham Hill core complex, but is it a stand-alone structure, part of a larger core complex that has been masked by younger basalt and megaflood deposits, or a remnant from the uplift of the Priest River core complex? New U/Pb ages, geochemistry, and structural analyses are presented to evaluate this unique geologic feature.

Presenters: Emily Lewan
Department: English
Faculty Mentor: Dr. Lynn Briggs
Title: "Somehow Form a Family": Tony Earley's Assertion of Commonality to Highlight Difference
Presentation Type: Oral Presentation
Abstract: Tony Earley's essay "Somehow Form a Family" presents a unique exploration of family life in America via the lens of satire. This paper delves into Earley's adept use of exaggerated satire to illustrate the individual American family experience under the guise of complete commonality. Through employing formal analysis, television references, and biographical anecdotes, Earley develops a narrative that suggests universal experiences to be shared by all, only to reveal the diversity and complexity of every household. Insight from scholars Valentina Varinelli and Ayelet Kohn provides a deeper analysis of the implications of Tony Earley's satirical approach. Their assessment highlights Earley's use of humor as a coping mechanism, his navigation of personal hardships, and his use of satire to challenge naïve narratives of families shown in media. This paper demonstrates how Earley's essay stands as a thought-provoking commentary on the manifold nature of family dynamics. Ultimately, Earley's essay invites his audience to reassess how they perceive commonality and variance in the American family landscape.

Presenters: Brandon Lewis
Department: Engineering
Faculty Mentor: Dr. Jason Durfee
Title: Computer Modeling of Gaseous Species Transport and Combustion
Presentation Type: Oral Presentation
Abstract: Energy is a field that is constantly evolving. This study aims to begin the design of a solid waste combustor designed to harness the energy of combustion, in order to produce power. This is a preliminary study that develops the underlying CFD model simulation the combustion reaction inside the reactor. The study is aimed at simulating the startup parameters utilizing a fuel such as natural gas or propane that will create optimal conditions to begin the combustion of solid fuels.

Presenters: Citlali Lopez Pineda, Emma Eko, Andrew Dorgan, Benjamin Lundgren
Department: Chemistry and Biochemistry
Faculty Mentor: Benjamin R. Lundgren

Title: Is Two Better Than One? Comparing Expression of *Pseudomonas aeruginosa* and *Pseudomonas putida* in the Presence of Alternate Sulfur Sources
Presentation Type: Poster
Abstract: As the fifth most abundant element on earth, sulfur is naturally occurring and widely distributed throughout the environment. This element is required for the survival of bacteria but is not often available in a ready-to-use source. As there are many different forms of sulfur compounds, the bacteria must have the ability to convert them into a usable energy source to thrive. Their ability to process these sulfur compounds comes from the protein SfnR which regulates gene expression in response to sulfur starvation. Among *Pseudomonads*, two species were observed, *Pseudomonas aeruginosa*, with two SfnR proteins, and *Pseudomonas putida* with only one. *P. aeruginosa* is a multi-drug resistant pathogen and highly versatile. The pathogen is often found to cause illnesses, such as pneumonia, in immunocompromised individuals. The study's goal was to determine if the SfnR1-SfnR2 system of *P. aeruginosa* is advantageous over *P. putida*. To determine this, the growth rates were measured and compared in non-preferred sulfur environments. The two systems were further compared by setting up a β-galactosidase (LacZ) reporter assay to measure the expression levels of the gene *sfnG*. The resulting response time of the SfnR1-SfnR2 system of P. aeruginosa can be compared to the SfnR1 system of P. putida. The expected result is that *P. aeruginosa's* utilization of nonpreferred sulfur sources will be greater than that of *P. putida*, due to *P. putida's* single SfnR gene systems. Overall, we hope to better understand why *P. aeruginosa* is highly versatile and aid future studies with our results.

Presenters: Kenzington Mann, Eric Abbey
Department: Chemistry and Biochemistry
Faculty Mentor: Dr. Eric Abbey
Title: Dehydro Coupling of Organoborohydrides to Form BN-Heterocycles
Presentation Type: Poster
Abstract: Currently, there has not been a way to synthesize the potentially aromatic nitrogen-boron heterocycle (4-phenyl-1,2,3,6-tetrahydro-1,2,3,6-diazadiborine), which contains two carbons, two borons, and two nitrogen atoms. The goal of this project is to create a synthetic pathway that can be done in a "one-pot" synthesis as well as in a suitable environment to prevent the compound from degrading. There have been two procedures we have been following in efforts to produce our compound. The first procedure reacts styryl bis(BPin) with either LiAlH4 or NaAlH4 to create a styryl borohydride followed by adding hydrazine dihydrochloride. The second procedure uses styryl bis(BF3K) as the starting material rather than styryl bis(BPin) and follows the same additions. This reaction is a dehydro coupling, forming B-N bonds. The results from these reactions do not show an isolated compound in the expected 11B NMR range. Our goal going forward is to modify the step in the procedure where hydrazine dichloride is being added to hopefully permit the isolation of the compound so we can further study its properties.

Presenters: Kelly Mathews
Department: Urban and Regional Planning
Faculty Mentor: Jason Scully
Title: Updating the Parks and Recreation Plan for Medical Lake Using the City's Natural and Historical Resources Featuring Three Scenarios of Analysis: Ecology, Economic Development, and Multimodal Connectivity
Presentation Type: Oral Presentation
Abstract: Medical Lake partnered with the Eastern Washington University department of Urban and Regional Planning Studies in September of 2022 to gather data on the city's existing trails and parks in order to better assess and update their Parks and Recreation Plan. Dr. Jason Scully, Professor and Former Interim Planning Director Louis Mueler led a team of graduate students in the research that provided perspectives Medical Lake was seeking from EWU. The final report featured the methodology of using three main perspective scenarios of analysis for Medical Lake: Ecology, Economic Development, and Multimodal Connectivity. Research data for

the purpose of delving into each scenario was gathered in the field in person, as well as gathered from other sources including analysis of necessary research literature, and Geographic Information Systems (GIS). National, city and county databases were used to create GIS layers and map out the historical trails. These layers and maps helped illustrate graphically the opportunities for improvement in Medical Lake Parks and throughout the city. Before Medical Lake was a town even, it was a sacred place to the local tribes, "Skookum Lemichin Chuch," which translated roughly to "strong healing water" and gave Medical Lake its eventual name, as a place to go for tourists who wanted a spa experience, However, mining legend has it, stripped the water of its healing properties and tourists stop arriving to the Lake. Medical Lake is now striving for ways to improve its economy. This report was written and researched before the fires that devastated Medical Lake. It still explains the results of the research of the graduate students cohort that rely meaningfully on Medical Lake's rich historical, cultural and ecological heritage, and bring its transit into supporting economic growth with a positive outlook for the future.

Presenters: Andrew McCoy, Jack Albert, Stephanie Barr, Fahed Mehyar
Department: Physical Therapy
Faculty Mentor: Fahed Mehyar
Title: Initial Investigation of Blood Flow Restriction Training (BFR) Effect on Back Muscles
Presentation Type: Poster
Abstract: Blood flow restriction (BFR) increases muscle strength and muscle activity distal to BFR tourniquet location. Furthermore, some studies have reported increased strength and activity of muscles proximal to the tourniquet location (shoulder muscles after upper extremity BFR, and hip muscles after lower extremity BFR). However, no study has investigated the effect of lower extremity BFR on the activity of back muscles. The purpose of this study is to investigate the acute effect of lower extremity BFR on back muscle activity and endurance in healthy people. Number of subjects: Three healthy individuals were recruited and provided written informed consent for this study. Materials/methods: This study was approved by the local institutional review board. The study is a crossover study. Each subject participated in two training protocols (low-load training, and low-load training with BFR). The two training protocols were conducted 5-6 days apart and in random order. In both protocols, a cuff weight equal to 30% of 1RM was used. The training consisted of four bouts of hip extension (75 total repetitions) with one-minute rest between bouts. In the BFR protocol, the BFR tourniquet was applied at the proximal thigh and was inflated to 80% of the limb occlusion pressure. After the end of the training session, the subjects completed modified Biering-Sorenson test. The muscle activity during the test was captured using Noraxon Desktop DTS EMG system. Two EMG surface electrodes were used to capture the activity of Erector Spinae (ES) muscle (on both sides of L1), and two EMG surface electrodes were used to capture the activity Lumbar Muifidus (LM) muscle (on both sides of L5). EMG data were processed and analyzed using MyoResearch software (Noraxon). The outcome measurements used were the duration of maintaining back extension, the mean amplitude of EMG signals, and the slope of mean frequency during the modified Biering-Sorenson test. The paired samples t-test was used for statistical analysis. Results: There was a statistically significant difference in the duration of maintaining back extension between the two training protocols (mean = 75 seconds for low-load training with BFR, mean= 92 seconds for low-load training only, p=0.04). EMG outcomes comparisons between the two training protocols showed no significant differences. Conclusions: Although there were no significant differences in EMG outcomes between the two protocols, there was a significant difference in the duration of maintaining back extension. The findings suggest that lower extremity BFR targeting hip extensors may lower back muscles endurance immediately after the training. A larger sample size is needed to confirm these preliminary findings. Clinical relevance: There is limited information about the effects of BFR on muscles proximal to the applied BFR tourniquet. BFR may have desired/undesired effects on the proximal muscles. These effects need to be investigated to ensure the safe and therapeutic application of BFR training.

Presenters: Paxton McKee

Department: Chemistry and Biochemistry
Faculty Mentor: Ashley Lamm
Title: Synthesis and Kinetics of Triazatriborinotrisbenzazaborole
Presentation Type: Poster
Abstract: The exploration of boron-nitrogen interactions has been extensively studied in organic chemistry, with a considerable body of research dedicated to the chemistry and synthesis of both substituted and unsubstituted borazine derivatives. The synthesis of triazatriborinotrisbenzazaborole through the reaction of *o*--aminophenol with boron trichloride will be discussed as well as the subsequent kinetic behavior of triazatriborinotrisbenzazaborole across varying pH conditions, UV/Visible spectroscopy was used for analytical assessment.

Presenters: Roxanne McPeck, Olivia Morgan, Andrea Castillo
Department: Biology
Faculty Mentor: Andrea Castillo, PhD
Title: Identifying Targets of Small Regulatory RNAs: Transcriptomics in the Carcinogenic Pathogen, Helicobacter pylori
Presentation Type: Oral Presentation
Abstract: The carcinogenic bacterial pathogen *Helicobacter pylori* infects half of humankind, leaving the infected at risk of symptomatic diseases like ulcers and gastritis (10-15%) or cancers like gastric adenocarcinoma (1-2%). Infection of the inhospitable stomach using virulence factors that worsen disease may be regulated in part by *H. pylori's* many small RNAs (sRNAs). These short, noncoding RNA molecules bind other RNAs, resulting in increased or decreased gene expression. Because few of *H. pylori*'s >900 small RNAs are studied, including only one transcribed from a disease/cancer-worsening nonessential chromosomal region (pathogenicity island), we aim to identify target(s) of two sRNAs from the *cag* pathogenicity island (*cag*PAI). We developed two mutant strains of *H. pylori*, each overexpressing (excessively producing) one of two *cag*PAI sRNAs. To identify which RNA molecule(s) these sRNAs may target, we examine shifts in the *H. pylori* total transcriptome (all RNA molecules) using next-generation RNA sequencing, supplemented with quantification of changes in putative target abundance using reverse transcription quantitative polymerase chain reaction (RT-qPCR). When compared to the unmodified parent strain's transcriptome, an sRNA-overexpression mutant strain demonstrating significantly increased/decreased frequency of a given RNA suggests the affected molecule was targeted for regulation by the overexpressed sRNA. Thus, through transcriptomic analysis of these overexpression mutant strains, we hope to identify RNA molecule(s) targeted by two sRNAs from the disease/cancer-worsening *cag*PAI chromosomal region, informing our understanding of how this bacterium regulates the genetics that make it a formidable carcinogenic pathogen.

Presenters: Devlin Mee, Carmen Nezat, Robin O'Quinn
Department: Biology
Faculty Mentor: Carmen Nezat PhD
Title: Synergistic Effects of EDTA and Biochar on Phytoextraction of Lead by the native annual sunflower, Helianthus annuus
Presentation Type: Oral Presentation
Abstract: Lead is persistent and accumulates, remaining trapped in surface soils for centuries. Legacy sources of lead include lead-based paint, combustion of leaded gasoline, and in the manufacturing of batteries. Unfortunately, there is no safe lead level for humans as lead damages the brain and nervous system. However, some plants can remove these pollutants from the soil in a process called phytoextraction. Hyperaccumulators, such as the native annual sunflower (*Helianthus* annuus), are plants capable of taking up a large concentration of heavy metals from contaminated environments. While promising, hyperaccumulators cannot effectively mitigate the vast concentration of pollution humans have introduced to soils. Biochar and ethylenediaminetetraacetic acid (EDTA) are compounds that can facilitate the phytoextraction process. Biochar

can prevent the leaching of lead in soils; EDTA increases the availability of lead. In this study, we aim to test the hypothesis that combining biochar and EDTA will synergistically enhance lead uptake in *H*. annuus compared to individually applied treatments of biochar and EDTA alone. *Helianthus* annuus plants will be grown hydroponically. Treatments include control groups without lead, biochar, and EDTA, groups with each treatment alone as well as all possible combination of these treatments at low and high lead levels. Plant biomass will be measured for lead concentration using inductively coupled optical emission spectroscopy (ICPOES). Data will be analyzed using Analysis of Variance (ANOVA) to detect significant differences in the lead levels between treatments. Our results may allow treatments to be tested in a field application to help ameliorate lead contamination in soils.

Presenters: Michaela Meek
Department: International Affairs
Faculty Mentor: Majid Sharifi
Title: Free Trade Isn't Free: Implications for Food Security, A Case Study on Mexican Maize
Presentation Type: Oral Presentation
Abstract: This research analyzes the importance of the food crop maize to food security and how its genetic diversity is crucial to maintaining a future supply of maize. This essay describes the role of NAFTA in commercializing agriculture in Mexico and how this shift caused an increase in genetically modified seeds and a decrease in landrace farmers. Consequently, the introduction of NAFTA encouraged commercialized agriculture, causing many Mexican maize farmers to decrease cultivation of landraces. This threatens future food security, as diverse landraces of maize are necessary for crop sustainability.

Presenters: Margot Mejia
Department: Social Work
Faculty Mentor: Dr. Rie Kobayashi
Title: Understanding the Immigrant Experience and Reducing Social Isolation Among Older Immigrant Adults in the U.S.
Presentation Type: Poster
Abstract: The United States has the highest number of immigrants globally, with 50,661,149 people as of 2019, representing 19.1% of the 244 million international migrants worldwide and 14.4% of the United States population. Many are forcibly displaced from their home countries, and their age group ranges from infants to older adults. While many American older adults face social isolation, it happens at a much higher rate among immigrant older adults due to language barriers, loss of identity, and, at times, transnational grief. Yet, more research is needed on older immigrant experiences and their unique challenges. The research method for this project was a literature review of available journal articles in the EWU database. I also attended an aging conference and concentrated on presentations focused on immigrant/migrant older adult's experiences. While there is much more research to be done to understand the immigrant experience and reduce social isolation among older immigrant adults, research suggested that incorporating a trauma-informed approach and implementing culturally responsive programs and policies, such as multilingual staff or the use of interpreters, can aid in reducing social isolation and create social support among this population.

Presenters: Helen Melake
Department: Biology
Faculty Mentor: Suzanne Bassett
Title: A Soil Analysis of Bacterial Antibiotic Producers
Presentation Type: Poster
Abstract: Antibiotics are a very important medical resource as are the bacteria from which they are derived. While antibiotics have treated various infections and have saved many lives, over the years, the widespread use of antibiotics has led to its decrease in production. Additionally, the overuse of antibiotics has resulted in

numerous resistant strains causing a serious threat to public health. Given the importance of antibiotics in treating diseases and the subsequent development of antibiotic resistance, a more diverse selection of antibiotics is required. For this reason, we are participating in the “Tiny Earth Research Project”. During our research we tested 47 bacterial isolates that were screened for antibiotic production. The Gram-positive tester strains were *Staphylococcus epidermidis* and *Staphylococcus aureus*, and the Gram-negative tester strain was *Escherichia coli*. A method of turtle tracks was used to screen for the most promising antibiotic producers among the original isolates. The identification of the top isolates was performed using the 16S rRNA sequencing of polymerase chain reaction products.

Presenters: Ranne Meloy
Department: Film
Faculty Mentor: Pete Porter
Title: Weezer Sucks (As Told By A Weezer Fan)
Presentation Type: Creative Work
Abstract: Weezer is an alternative rock band formed in 1992 and currently consists of lead singer Rivers Cuomo, drummer Patrick Wilson, lead guitarist Brian Bell, and bassist Scott Shriner. Perhaps most well known for their 1994 self-titled album, known by most as "The Blue Album", Weezer has continued to see popularity into the modern era, still releasing albums as recently as 2022. However, their continued success is not without its backlash.
The band Weezer is one of those bands that even their own fanbase loves to hate. Debatably, for as long as the band has been around, there has been a steady stream of backlash targeted toward them. This is typical for any band, but in Weezer's case, it strikes a strange balance between ironic jokes and genuine hatred. Where does this backlash stem from? Is it at all justified? As a Weezer fan, these questions always illuded me. In this video essay, I attempt to find answers to these questions while also raising my love of Weezer into concern.

Presenters: Ranne Meloy Benjamin Chasse, Nathan Powell, Aiden Maher, Zachery Barron
Department: Film
Faculty Mentor: Pete Porter
Title: Where The F*** Are We?
Presentation Type: Creative Work
Abstract: September 11th, 2001 irrevocably changed the lives of many Americans. In particular, the effect these attacks had on those in the armed forces cannot be understated, especially those who saw combat. What is explored less often, however, is how events like these affected even those in the armed forces who never saw combat. Despite not ever stepping foot on a battlefield, Retired Master Sergeant Jon Chasse and Retired E5 Sergeant Adam "Disco" Descoteaux went through many escapades, ranging from comical to scary, all the while having a helping hand in shaping what would soon become the War on Terror. This lighthearted documentary explores the journies that these two men had during this period and how it shaped both their lives and American history.

Presenters: Marisa Meneses
Department: Art
Faculty Mentor: Marc LaPointe
Title: Mourning
Presentation Type: Creative Work
Abstract: The photographs presented are inspired by my experience: From June to December of 2023 I was in a manic episode that resulted in an ER visit. Many things were running through my mind while in this episode. I was feeling things more intensely then one should. It started out by me not taking my meds like I had done for the past five years. I thought I was better off without them and didn’t realize what was actually going on until I was diagnosed with Type 1 Bipolar disorder. After looking back, I know realize that many things have

contributed to this episode. Whether it was things that happened last school year, this summer, or these past couple of months. I know now that in order to be the "normal" me I need to be medicated. The whole time during this episode I felt like my time was running out on this earth. These photographs are inspired by my experience.

Presenters: Katie Miller
Department: Social Work
Faculty Mentor: Rie (Leeay) Kobayashi, Ph.D., LMSW
Title: Developing Affordable Affirmative Housing for Older Adults in Spokane, Washington
Presentation Type: Oral Presentation
Abstract: An estimated 1.5 million adults age 65+ are lesbian, gay or bisexual (LGB). This presentation will discuss San Francisco models and supports for LGBTQIA+ housing specifically available for the aging population. As a secondary topic, the importance of resilience and understanding the coexisting dynamics of personhood and selfhood to foster community support for those living with dementia will also be discussed. The proposed stages of development will be broken down into the following steps: collecting data and analyzing statistics to understand needs, enlisting funding and ally support, implementation of creating a culture of care and affirming space, continued training and maintaining the program, and continued advocacy for policy change. The presentation will review information collected at the American Society on Aging conference from speakers in the field of aging.

Presenters: Olivia Morgan, Roxanne McPeck, Andrea Castillo
Department: Biology
Faculty Mentor: Dr. Andrea Castillo
Title: Quantifying Relative Abundance of a *Helicobacter pylori* mRNA (flgE) Putatively Targeted by a Small RNA
Presentation Type: Poster
Abstract: The bacterial stomach pathogen *Helicobacter pylori* infects half the global population and causes symptomatic diseases, like stomach ulcers and gastric cancer, in 10-15% of those infected. *Helicobacter pylori* uses variable gene expression to adapt to its hostile, ever-changing environment using small noncoding RNAs (sRNAs) that regulate other RNAs. The presence of the nonessential *cytotoxin-associated gene* pathogenicity island (*cag*PAI) region in the *H. pylori* genome correlates with greater symptom severity. Our goal is to learn if virulence-related or other mRNAs are regulated by an sRNA (*sRNA2540*) from the *cag*PAI region by comparing RNA gene expression in an unmodified parent strain to a strain overexpressing (making an overabundance of) *sRNA2540*. An sRNA binds to target mRNAs to change their expression, so overexpressing an sRNA should result in measurable intensification of any resulting increases or decreases in the abundance of targets. Putative targets of *sRNA2540* with predicted sRNA–target binding include mRNAs *HP1061*, *flgE*, and *cagI*. Current work focuses on *flgE*, which codes for part of the bacterial flagellum. We are measuring *flgE* relative abundance with reverse transcription quantitative polymerase chain reaction (RT-qPCR). Relative abundances of *flgE* will be calculated by comparing its abundance in the strain overexpressing *sRNA2540* to an always-expressed "baseline" molecule (16S rRNA). This will be followed by comparison to *flgE* in the parent strain. Significant changes in its relative abundance within the *H. pylori* overexpression strain would indicate direct or indirect targeting of *flgE* by *sRNA2540*.

Presenters: Shaena Morgan
Department: Political Science
Faculty Mentor: Thomas Hawley
Title: Big Oil Corporations' and Conservation Organizations' Effect on Generation Z's Attitude Towards Climate Change
Presentation Type: Oral Presentation

Abstract: How do the inconsistencies in big oil corporations and conservation organizations affect Gen Z's attitude toward climate change? The differences between public statements and actions that are taken by big oil corporations and conservation organizations are furthering generational divides and affecting Generation Z's attitude towards climate change by bringing to question who is responsible for addressing the issue. Previous research has primarily focused on individual aspects of the problem such as Generation Z's attitude towards climate change, big oil companies or conservation organizations and the inconsistencies of their actions and statements, the differences between generations, and finally the idea of who is responsible for addressing the issue. What previous research has lacked is a horizontal approach that integrates all the different aspects mentioned in a cohesive argument to further explore solutions to climate policy. This research paper uses a variety of sources that draw from different areas of study to bring forward a full conclusion of the many factors. The importance of this research is to show some of the barriers to addressing climate change as a whole in the United States. It also shows how generational divides play a role in the inaction on climate change. The primary goal of this research paper is to identify how all of these different factors not only play a role in Gen Z's advocacy towards climate change but also the utter inaction in enacting climate change policy and a potential reason for that.

Presenters: Carissa Morrison
Department: Chemistry and Biochemistry
Faculty Mentor: Ashley Lamm
Title: Boron-Nitrogen-Carbon Polymers
Presentation Type: Poster
Abstract: Plastics persistently permeate our global and local ecosystems and resist degradation. Boron-nitrogen-carbon (BNC) polymers (aka plastics) are composed of boron-nitrogen bonds that mimic carbon-carbon double bonds. However, the lone pair on nitrogen and the empty orbital on boron allows these to be structurally similar but electronically different. The history, and synthesis of BNC monomers and polymers, as well as future directions, will be discussed.

Presenters: Carissa Morrison
Department: Biology
Faculty Mentor: Jessica Allen
Title: For the Love of Enlichenment
Presentation Type: Poster
Abstract: This painting is a testament to the symbioses permeating our environment and making life possible. The frame is covered in lichens, a special class of exquisite organisms formed by the symbiosis between fungi, algae, and/or cyanobacteria. When these pieces come together in a symbiosis, they form a new, more intricate, and complex being that is greater than the sum of its parts. Even to the most knowledgeable academics, lichens challenge our ideas of dichotomy, and our ability to distinguish between individuals and communities. Thus, in this painting, I blend the lines between where one life ends, and one life begins. Life is a beautiful stream of DNA and biochemistry sustained by myriad symbioses. Nothing can live alone. Without our symbioses, there is no we, and there is no I. As a STEM student, I incorporated many aspects of science into my painting as well. I invite the viewer to look for evidence of cellular signaling, the equation for photosynthesis and cellular respiration, ovaries with sperm, DNA mushrooms, nucleic acid labels, embryo formation, a neuronal network, and an RNA molecule with a secret code. Overall, the theme is connection. Each of the biological phenomena shown on the canvas represents something that unites nearly all known life forms together. Even the genetic code drawn on the rungs of the DNA ladder was taken from repetitive sequences in centromeres. This painting is a reminder that it is impossible to ever be truly alone.

Presenters: Devin Mumey, Jessica Allen
Department: Biology

Faculty Mentor: Dr. Jessica Allen
Title: Genome Architecture, Secondary Metabolite Profiles, and Morphological Diversity in the *Cladonia chlorophaea* Group
Presentation Type: Poster
Abstract: The charismatic, abundant, and ecologically important genus *Cladonia* includes more than 500 accepted species and has a global distribution. The species-level taxonomy in *Cladonia* has long proved challenging, partially due to the extensive phenotypic plasticity displayed by many taxa. Some plasticity has recently been shown to be attributable to photobiont identity. In *Cladonia*, examples of essential morphological features used in species delimitation include podetia structure and size, soredia or apothecia presence, and squamule duration. The *Cladonia chlorophaea* group, composed of a variety of sorediate, cup forming *Cladonia*, poses a particular taxonomic challenge. Delimitation schemes range from many different stand-alone species with sharp delineations to a few broad, inclusive species under whose umbrella fall various chemotypes and morphological variants. We hypothesize that more robust species delineations lie somewhere in the middle and can be supported with comprehensive analyses of morphological measurements, secondary metabolite profiles, and whole genomes. The purpose of this inquiry into *Cladonia chlorophaea* is to provide an integrative analysis among three data types, with a special emphasis on comparative genomics. Using the Oxford Nanopore MinION platform, we sequenced full genomes of two *Cladonia chlorophaea* specimens, which were then assembled and annotated using standard protocols. Secondary metabolites were identified via thin-layer chromatography in solvent C. Scanning electron and light microscopy were used to characterize and quantify morphological traits. This study provides one piece of the taxonomic puzzle that is *Cladonia chlorophaea* and presents a clear path to providing a complete species description, not just for *Cladonia*, but for all lichens.

Presenters: Margo Murphy
Department: Biology
Faculty Mentor: Judd Case
Title: Impacts of Body Mass on Mammalian Microstructures and Cells Found in Compact Bone
Presentation Type: Oral Presentation
Abstract: Variations in size and diameter of femoral bones are commonly observed when comparing mammalian species of different body sizes. Previous research has supported a positive correlation between body mass and bone size, but less research has been done to explore the relationship between body mass and the size of structural components and cells within bones. The main structural element of cortical bone is the osteon. At the center of each osteon is a central canal, through which red blood cells flow. This research focuses on examining the relationship between body mass and average measurements of osteons, central canals, and red blood cells from various mammalian species, ranging in size from mouse to horse. It is predicted that a positive correlation will be observed between body mass and the cells and structural components of each species examined. Identifying and analyzing these structural and cellular elements and how their measurements relate to body mass may improve studies of mammalian anatomy and enhance current understandings of how factors such as body size, locomotion patterns, and bone-loading can influence morphologies.
Histological samples are being prepared using cross-sectional slices taken from the diaphysis, or shaft, of each femur. Measurements of cells and structures of interest are being recorded for the taxa included in this study. Analysis of collected data will be conducted to determine any correlational significance and detect any results that may be outside of anticipated outcomes. Further studies could explore potential physiological benefits that may be linked to any observed variations.

Presenters: Sawyer Nagle
Department: Biology
Faculty Mentor: Dr. Camille McNeely
Title: The Roles of Dam Dimensions and Surface Porosity on the Water Storing Capacity of Beaver Dam Analogs Compared to Natural Beaver Dams

Presentation Type: Oral Presentation
Abstract: Widespread stream incision in the Western United States, exacerbated by climate change and anthropogenic activities, necessitates effective restoration strategies. This study aims to compare water retention by Beaver Dam Analogs (BDAs) to natural beaver dams and undammed control reaches. We compared how dam dimensions affect the hydraulic performance of both BDAs and natural beaver dams, revealing gaps in research on their comparative effectiveness. The study was conducted across eight watersheds in Washington state and two in Idaho. Hydraulic retention time (HRT), water travel time, and pool volume were response variables used to determine dam effectiveness. Dam height, thickness, length and porosity were the predictor variables. While BDA water travel times were significantly longer than control sites, natural beaver sites exhibited significantly higher HRT than BDA sites. Beaver dams were also significantly thicker and longer than BDAs. Dam thickness, height, and dam type were identified as the most influential factors in determining HRT for both types. For BDAs, height and porosity significantly affected HRT, and among beaver dams, there were no significant predictors. Beaver dams also held a significantly larger volume of water than BDAs, with height and discharge as significant predictors. For BDAs, height significantly affected pool volume. Findings suggest that, that while BDAs have a shorter water retention time compared to beaver dams, they do slow water compared to their control sites. The study highlights the need to consider dam dimensions and surface porosity in the design of BDAs to enhance their effectiveness.

Presenters: Caleb Nass, Brennen Bazaldua, Matthew Mason, Dylan Cummings, Derek Ren
Department: Engineering
Faculty Mentor: Dr. Bae
Title: eVTOL Delivery Drone
Presentation Type: Poster
Abstract: The creation of online food ordering and delivery is an invention that has introduced a completely new market with the potential for innovation. Traditional methods of delivery currently focus on individual delivery drivers. But this method depends on variables like traffic and road conditions and uses considerable amounts of fuel while incurring prohibitive costs to employers, which may be impractical for small businesses. To that end, our team's project seeks to design and fabricate a 3D printed eVTOL delivery drone capable of vertical takeoff and landing along with transition to horizontal flight. We believe that our design will be lightweight, will use no fuel due to using a battery for power, will not be reliant on traffic due to its flight capabilities and will be time efficient due to its forward flight option.
Our team began by doing some initial research and analysis to decide what type of drone to use. Two types of drones evaluated were a tail sitter and a quad plane drone. It was decided that a quad plane with rotating forward motors would be used. A quadcopter was determined to be the most practical because its vertical flight portions will be simple, and the tilting motors will allow it to have a simple transition to forward flight and keep the food/payload secure.
Our team designed all our original parts in SOLIDWORKS and then created several subassemblies before combining them into a final assembly. We performed several calculations to determine final specifications and estimated performance. Also performed was FEA and flow simulations to verify our design will meet our needs. Our final design specifications include a maximum payload limit of 4.3 pounds and thrust-to-weight ratio of 2.115. All final design specifications will be included in the further sections of this report. After this report, our team will move into the testing and manufacturing portion, culminating in a final product along with demonstration and Expo.

Presenters: Melanie Novak
Department: Biology
Faculty Mentor: Camille McNeely
Title: Storage of Soil Carbon by Beaver Dams and Beaver Dam Analogs
Presentation Type: Poster

Abstract: Beaver dams are an important means of soil buildup and carbon storage in streams and wetlands, as well as the storage of fresh water. This is important because the amount of carbon that is stored in the soil is an indicator of soil health and quality and counteracts the anthropogenic emissions of inorganic carbon into the atmosphere. However, the culling of beavers over time has decimated their populations and contributed to the loss of wetlands. In such cases where there are no beavers to dam streams, we can turn to beaver dam analogs, known as BDAs, which are human engineered dams that seek to function with the same purpose as natural dams. The purpose of this research is to study how much organic carbon is able to be sequestered by soils over time, and by proxy, how effective BDAs are at carbon and water storage. This can be studied by method of loss on ignition, meaning that soil samples are taken and burned, and the final weight of the sample is compared to the initial weight, seeking to solve the questions of which landform, i.e., stream bank or upland, has the most carbon. My hypothesis on this matter is that beaver dam sites on the floodplain will have more carbon storage compared to sites with no beavers, due to the general shape of the floodplain and streams themselves.

Presenters: Ashley Ogle, Robin O'Quinn
Department: Biology
Faculty Mentor: Robin O'Quinn
Title: The Role of Exogenous Gibberellic Acid (GA3) Application in Breaking Seed Dormancy in *Clematis hirsutissima*
Presentation Type: Poster
Abstract: Seed germination in plants is controlled by several mechanisms, including the presence of phytohormones like gibberellins, as well as environmental conditions, such as temperature, light, and moisture. Germination of dormant seeds can be promoted by the exogenous application of Gibberellic Acid (GA3). GA3 acts as a natural endogenous regulator of dormancy. *Clematis hirsutissima*, commonly known as Sugarbowls, in the plant family *Ranunculaceae*, is an important perennial species that contributes to biodiversity in western prairie ecosystems by providing habitat for pollinators and wildlife. This native to Washington, has been used for its medicinal properties by Indigenous peoples for thousands of years, and it is also used in contemporary horticulture for its distinct beauty. Here we report on the effect of exogenous GA3 application on germination in *C. hirsutissima* seeds across a cold stratification time gradient. We subjected GA3 treated and untreated (control) *C. hirsutissima* seeds to a cold moist stratification (4° C) for 14, 28, 56, and 84 days. Our hypotheses are that the application of GA3 will 1) decrease the length of cold stratification by helping to break dormancy earlier, and 2) increase the rate of germination. Treatment group averages will be compared using analysis of variance (ANOVA).

Presenters: Hayley Olson
Department: History
Faculty Mentor: Ann Le Barr
Title: The Sexuality of James the I and VI of England and Scotland: The Debate over the Nature of His Relationships with His Favorites
Presentation Type: Oral Presentation
Abstract: Since the repeal of the 1533 Buggery Act in 1967, sexual relationships between men in the United Kingdom have been legal. However, historical records indicate that such relationships existed long before then, albeit in secrecy due to societal stigma. One particularly notable case within the British monarchy is that of James VI of Scotland and I of England and Scotland. Despite James' listing of sodomy as a "horrible crime" in his *Basilikón Dōron*, historians have debated his sexuality, with some suggesting he was homosexual or bisexual based on contemporary sources, including letters between James and his male lovers.
This essay delves into the historical narrative surrounding James' relationships, challenging previous interpretations that either ignored or dismissed the depth of his connections with his male favorites. By examining James' personality, contemporaneous accounts, and writings, this study presents a reevaluation of his romantic and sexual inclinations.

Furthermore, the essay explores James' reign as a monarch, highlighting his intellectual pursuits, lavish court expenditures, and pacifist foreign policy. It analyzes James' unique approach to governance and his patronage of literature and the arts, shedding light on his legacy as a different kind of king.
Drawing upon a range of primary sources and recent discoveries, including a secret passageway between James' and his favorite George Villiers' rooms, this essay provides evidence to support the notion that James likely engaged in sexual relationships with his male companions.

Presenters: Duff Overstreet
Department: Music
Faculty Mentor: Jonathan Middleton
Title: Sunshine
Presentation Type: Creative Work
Abstract: "Sunshine" is a music composition based on a poem of the same title written by my friend Grace Wang. The poem conveys a struggle between light and dark, day and night; really, it is about a complicated companionship. The lyrics are sung by a mezzo soprano voice accompanied by two cellos and a vibraphone. The vibraphone gives the music an ethereal quality bringing out the celestial connotations of phrases such as "beam of light," "sun's arms," and "moon's gaze." The soulful timbre of the cellos complements the sound of the human voice, which helps to convey the deeper meaning behind the poem. Additionally, the sudden key changes and overlapping chords create dissonance which helps to express the story of a complex friendship written between the lines.

Presenters: Jasmine Joy Paloma
Department: Sociology and Justice Studies
Faculty Mentor: Kassahun Kebede
Title: “I’m Not Going To Be One”: Second Generation Thai-Taiwanese American
Presentation Type: Oral Presentation
Abstract: This paper delves into the experiences of a second-generation Thai-Taiwanese American identity development. According to the United States Census Bureau, the multiracial population increased from 9 million in 2010 to 33.8 million in 2020. With this increasing number of multiracial people in the US, I examine one person's experience with being a Thai-Taiwanese American and how her parental background, life experience from youth to the present, and experiences visiting her parental homeland helped shape her identity. This paper will investigate the interviewee's mixed heritage and how her upbringing created multiple and overlapping identities, utilizing the theory of identity, hybrid identities, and pan-ethnicity. Although my interviewee didn't struggle with her various identities, it did not confuse her about her ethnicity; societal expectations and reactions from her peers resulted in her conforming to an identity. Hence, I discuss my interviewee's sense of belonging as Thai and Taiwanese in America.

Presenters: Kelly Parke
Department: Disability Studies and Universal Access
Faculty Mentor: Ryan Parrey
Title: Atmospheres of Ableism: A Phenomenological Exploration of Everyday Encounters
Presentation Type: Poster
Abstract: Campbell and Nario-Redmond explain that ableism entails explicit and implicit biases that manifest at every level of social life. At the same time, Taussig describes ableism as "the atmosphere we breathe." Disability Studies scholarship has done much to identify how ableism operates in the everyday lives of disabled and non-disabled people alike; however, little work has been done to articulate it in terms of the atmospheric quality that Taussig discusses.
Building on Taussig's assessment of ableism in conjunction with Casey's similar articulation of the atmosphere of emotion, this paper addresses the findings of an online qualitative survey distributed to adults with physical

disabilities. Participants answered a series of open-ended questions designed to identify the types of ableist encounters experienced in everyday life and the emotions that these encounters generate. This research employs a phenomenological lens to provide a more nuanced and in-depth description of ableism as a part of disabled people's everyday lived experience. This research contributes to the study of ableism, mainly how it operates within ongoing rhetoric and practices of inclusion, access, and support.

Presenters: Julianna Paulsen, Stephen Sharrett, Devin Mumey, James Lendemer, Lalita Calabria, Jordan Hoffman, Eli Balderas, Jessica Allen
Department: Biology
Faculty Mentor: Jessica Allen
Title: Mobile Genetic Elements in Rare, Threatened, and Range-Restricted Lichenized Fungi
Presentation Type: Oral Presentation
Abstract: Mobile Genetic Elements (MGEs) are sequence features whose movement within a genome modulates gene expression and generates novel genetic diversity. They can have both positive and negative effects on host organisms. We hypothesize that population dynamics and environmental stressors in species with small, declining populations impact defense mechanisms developed by Eukaryotes to curb the proliferation of deleterious MGEs. We used comparative genomics to contrast the MGE content in rare, threatened, and range-restricted species of lichenized fungi with species that have large, stable populations. Twenty new reference genomes were generated and six previously published long-read genomes were gathered from online data repositories. New genomes were generated with standard laboratory workflows and MGEs were annotated using RepeatModeler2. MGEs accounted for 1.53–68.85% of the genome content in the species sampled, with a total of 596–103,790 elements recovered in a given genome. Retrotransposons were the most abundant type of MGE, averaging 16.76% (±5.21) of the genome content in rare species and 12.84% (±2.86) in common species. Total MGE content followed a similar pattern, with means of 25.71% (±8.69) and 20.32% (±3.56) recovered for rare and common species, respectively. The disproportionate distribution of MGEs, particularly retrotransposons, in rare, threatened, and range-restricted species may disrupt genomic stability, yet also create novel genetic diversity in isolated populations with limited gene flow. Investigation of associations between increased extinction risks and MGE expansions is essential to understand the potential implications that these genes have for species conservation.

Presenters: Kaitlin Perrin
Department: Social Work
Faculty Mentor: Rie Kobayashi, Ph.D., LMSW
Title: Support Needed at End-of-Life: Death Doulas are Here to Help
Presentation Type: Oral Presentation
Abstract: With the older adult population increasing at a faster rate due to the *Baby Boomer* era, additional support is needed to assist older adults with the “agenda” that comes with death and dying. Death doulas are an option for non-medical support to help guide individuals through this process. As being a death doula is a somewhat newer defined role, understanding what a death doula is and what support they can provide is crucial. Information was located through research databases and a presentation session during the 2024 American Society on Aging Conference.
I recommend the inclusion of a death doula as they provide support that others cannot offer. Death doulas provide a range of services, such as emotional care/support, logistics support, end-of-life planning, and more. It’s to be noted that the doulas are not regulated through palliative care services. However, a model of care and code of ethics is designated for this unique work. This presentation will discuss the role of a death doula within end-of-life services and the potential implications of this newer profession.

Presenters: Elliana Petrin, Brendan Kendall, Michael Sinclair, Hunter Allen, Calvin Crawford
Department: Computer Science

Faculty Mentor: Sanmeet Kaur
Title: Magic Queries
Presentation Type: Poster
Abstract: Merlyn's is a local game store (LGS) in Spokane with online ordering for Magic the Gathering (MTG) cards. Merlyn's ordering page lacks useful features that users expect to see in modern online retail, such as a search bar for finding products. Some customers may get frustrated with the limited ordering experience and take their business elsewhere. Our goal is to update the website so it meets modern UI/UX standards, makes use of modern database management, and eases ordering for customers. We will also implement a search bar and filters for finding cards, a shopping cart, and new interfaces to bring the changes together. Our changes to the website should improve sales and customer traffic for Merlyn's by greatly improving the online user experience.

Presenters: Nolan Posey, Tanner Stephenson, Timothy Nelson, Daniel Palmer, Matthew Matriciano
Department: Computer Science
Faculty Mentor: Sanmeet Kaur
Title: Welcome To Cheney Mobile App
Presentation Type: Poster
Abstract: Welcome to Cheney is a non-profit organization committed to fostering communication, connection, and action within the city of Cheney. Their primary purpose is to provide timely and accurate information to the residents of Cheney. Welcome to Cheney has tried utilizing other forms of social media such as Facebook and Instagram to share information, but their presence is being overshadowed amidst the noise on those platforms. Therefore, the intention of this project is to develop a mobile app with the sole purpose of being a reliable means of sharing important information with the residents of Cheney.
The information being shared on this mobile app will include but is not limited to: road closures, weather alerts, public events, school activities, jobs and volunteer opportunities. To prioritize accuracy of information, the app will feature tiered account levels, allowing reliable information directly from a verified source. Since only certain accounts can make posts, accounts without the ability to post will still be able to directly share information with admins. Using this strategy, admins will be able to curate information that is being shared in order to give the most accurate and credible information to the residents of Cheney.

Presenters: Natalie Potter, Chad Pritchard
Department: Geosciences
Faculty Mentor: Chad Pritchard
Title: U/Pb ages of isolated buttes in Spokane, Washington area to help project deformation in the subsurface
Presentation Type: Oral Presentation
Abstract: The Cambrian to Mesoproterozoic isolated buttes in the Spokane, Washington area provide great insight into Cretaceous fold and thrust deformation as well as Eocene uplift. Multiple different cross sections were made prior to using U/Pb age determination to explore possible variations of the deformation in eastern Washington, which now may be revisited after age determination. Of the 10 samples which were analyzed, three buttes contained detrital zircon (DZ) signatures similar to Cambrian units from northeast Washington found to be Cambrian, three samples had similar DZ signatures to Neoproterozoic Deer Trail Group, and four samples had a similar DZ distribution to Mesoproterozoic Belt Supergroup rocks. Mapping of sample locations coupled with cross sectional analysis will provide useful information about the understudied basement rock in the Spokane region.

Presenters: Natalie Potter, Chad Pritchard
Department: Geosciences
Faculty Mentor: Chad Pritchard

Title: Deciphering the Shedroof Formation, a Proterozoic conglomerate structurally (?) overlying the Belt Supergroup in N Idaho and NE Washington
Presentation Type: Poster
Abstract: Nestled in northeastern Washington, the Shedroof Formation is very poorly constrained geologic unit. This project focuses on defining the unit, deciphering its structural history, and discover its connection to an inland temperate rainforest that grows within its fractures and soils. Additionally, it will assist in further constraining the age of the Neoproterozoic rifting event of Columbia, in which the Mawson Continent (now possibly southern Australia) presumably separated from western Laurentia (Box et al, 2020). Preliminary mapping has identified a pyrite rich metaconglomerate most closely corresponding with the Neoproterozoic Monk Formation based off of general rock descriptions. A two-meter-thick metaconglomerate to ultra mylonite cross-cutting a southerly dipping conglomerate follows the general contact of the Neoproterozoic Monk and Shedroof Formations, which may correlate to the severely understudied Newport fault (Harms and Price, 1992). The Newport fault is potentially a source of said massive mylonite zone and further age determination of these formations and structures will answer a number of basic stratigraphic and complex structural questions. The Shedroof Formation was previously presented as equivalent to the Deer Trail Group (Miller, 1994), however may now be a Buffalo Hump equivalent of the Windermere Supergroup(Box et al., 2020; Brennan et al. 2020).

Presenters: Mekynzie Prescott
Department: Sociology and Justice Studies
Faculty Mentor: Kassahun Kebede
Title: “Italians Count”: A Look into the Italian American Population and Identity
Presentation Type: Oral Presentation
Abstract: Ethnic identities, whether symbolic or not, significantly impact society, shaping how people perceive others and themselves. This paper focuses on the experiences of Italian-Americans in the United States. The decision in 2010 to remove 'Italian-American' as an ethnic option in the US Census sparked a cultural and social awakening among people of Italian descent. Using the census event as a pivotal moment, this paper examines the challenges and history of Italian-Americans and their integration experiences. Using qualitative analysis, it traces the experiences of forced assimilation, especially during the immigration boom of 1880-1930. Due to their darker skin, family-oriented culture, and the pervasive stereotype that they are all criminals, the Italian-American population has struggled to find a voice or resonate with a true Italian-American ethnic identity; it has always been one or the other. The 'Show your pride and identify as Italian-American' campaign, societal integration, and the continuity of ethnic lineage are focal points in this paper. By analyzing published literature such as books, articles, and documentaries, this paper discusses the history of the Italian-American population and its challenges, integration, and contributions.

Presenters: Anna Pugh
Department: Anthropology
Faculty Mentor: Dr. Julia Smith
Title: The Unstable Start of the Japanese Internment Experience: Reconstructing the Puyallup Assembly Center
Presentation Type: Poster
Abstract: Between April and September 1942, over 7,500 Japanese Americans from western Washington were assembled and incarcerated in hastily erected buildings at the site of the State Fairgrounds in Puyallup. The State Fair resumed in 1946 on the just-as-quickly-deconstructed camp grounds. The Puyallup Assembly Center—and assembly centers altogether—are underrepresented in the Japanese Internment experience in large part because they were transitory spaces. Digital reconstruction of the center’s hastily built facilities using ArcGIS and historical aerial images provides a glimpse into the incarcerees’ experience, including their access to vital but limited resources such as food, lavatories/cleaning facilities, and healthcare. Assembly Centers started the internment process, placing Japanese Americans into an ephemeral emotional and physical state on unstable grounds unfit for housing them. The Puyallup Assembly Center was intended to be a transient holding

place in preparation for permanent facilities, but it was wholly inadequate for doubling the population of Puyallup overnight. In a space that today receives over 2 million visitors annually, it is important to remember the lives of those deeply affected by their time held here. This research contributes to the narrative of assembly centers' role in the Japanese Internment experience. By utilizing ArcGIS and aerial imagery to reconstruct a transformed historical landscape, we gain a greater comprehension into the first stepping stone of the incarcerees' daily lives in incarceration, a neglected piece of PNW history.

Presenters: Eric Rada, Brenden Johnson
Department: Engineering
Faculty Mentor: Heechang (Alex) Bae
Title: Exploring the Influence of Acetone Vapor Processing and Subsequent Drying Methods on the Fatigue Performance of 3D Printed ABS Parts
Presentation Type: Poster
Abstract: Additive manufacturing is a rapidly expanding field of engineering that is accessible to a wide base of people through the process of 3D printing. This process is imperfect as it introduces a series of faults including discontinuities, voids and anisotropic layer adhesion. With the widespread adoption of 3D printing it is imperative to develop methods to mitigate these weaknesses. One such process is Acetone Vapor Smoothing (AVS). This is a surface treatment method that has been shown to be effective in reducing surface roughness of Acrylonitrile Butadiene Styrene (ABS) material. This study is focused on exploring the effect AVS treatment has on the fatigue life of 3D printed ABS components in an effort to increase the effectiveness and scope of these products. To test the AVS process, samples were printed in various layup orientations and were then exposed to an acetone vapor treatment. Drying procedures were varied between different groups, and the fatigue characteristics of the samples were tested on a rotating beam fatigue machine. Our findings indicate that the AVS method can mitigate stress concentrations on the surface and structural uncertainty in the 3D printed ABS components, thereby amplifying fatigue strength under certain conditions. This study also details optimal drying procedures for ABS components, which has been determined to be a combination of air and heat drying. This research has shown that AVS is an effective method to improve the material strengths of ABS material and outlines the optimal conditions for vapor exposure time and drying procedures.

Presenters: Diana Ramos Sanchez
Department: Chicano Education
Faculty Mentor: Dr. Martin Meraz Garcia
Title: Niños en la Oscuridad
Presentation Type: Oral Presentation
Abstract: The United States Immigration system has had no mercy for immigrant children arriving at the U.S. border. Instead of protecting these children's rights, they lock them up and treat them like criminals. These children have their human rights violated when they are separated from their families and put into detention centers with improper living conditions. Not only do these kids face discrimination, but they suffer tremendously at the hands of the U.S. Border Patrol. The United States fails to protect and provide resources for these kids. Instead, immigration puts them in the hands of officers who have no experience in dealing with these kinds of issues. Unaccompanied minors are running away, thinking they will find relief and freedom in the U.S., but instead, they end up becoming victims of the immigration system. The purpose of this research is to uncover all the abuse and rights that are being violated at the United States-Mexico border. I will explore peer reviewed journal articles and discuss how serious this issue is. To conclude, I will explore solutions in which the rights of immigrant children can be protected.

Presenters: Bailee Romaker
Department: Biology
Faculty Mentor: Dr. Bo Idsardi

Title: Factors Affecting Instructional Practices in Course-based Undergraduate Research Experiences
Presentation Type: Poster
Abstract: Course-based undergraduate research experiences, also known as CUREs, integrate authentic scientific investigations into STEM curriculum. These experiences prioritize scientific practices, discovery, real-world relevance, collaboration, and iterative experimentation. CUREs offer a more accessible approach in engaging diverse student populations compared to traditional internships. However, CUREs often place heavy demands on instructors, presenting challenges, such as time availability, scalability, and resource limitations. This research focuses on (1) the importance instructors place on implementing CURE characteristics and (2) the factors influencing their planning and implementation of CUREs. Using the teacher-centered systematic reform model as a guiding framework, this study will focus on teacher-thinking, contextual factors, and personal factors that impact instructors. This multiple-case study will use qualitative data from observations and interviews to identify challenges and gather detailed instructor perspectives on what influences CURE design. Research findings will help identify opportunities to better support instructors in planning and implementing CUREs, ultimately enhancing both the teaching experience for instructors and the learning experience for students.

Presenters: Justin Roosma
Department: Biology
Faculty Mentor: Jason Ashley
Title: Notch Signaling Drives Pathological Osteoclastogenesis in Multiple Myeloma
Presentation Type: Oral Presentation
Abstract: Multiple myeloma (MM) is a blood cancer of plasma cells which are mature, antibody-secreting B lymphocytes. In the US, 32,000 new diagnoses of MM and 13,000 deaths associated with MM occur annually. Despite advances in modern oncology, MM remains incurable, demanding further investigation into the underlying biology of the disease. Malignant MM cells migrate to the bone marrow where they dysregulate the normal balance of bone formation and degradation in favor of the latter. This excess degradation of bone leads to higher risk for fragility fracture and further tumor growth through the release of growth factors embedded within mineralized bone. Osteoclasts—cells responsible for bone resorption—become overstimulated in the presence of MM cells. However, the intercellular signaling mechanisms between MM cells and osteoclasts are yet to be thoroughly defined. Of potential consequence is the cell-to-cell signaling pathway, Notch, which is a contact-dependent pathway that requires a ligand-presenting cell and receptor presenting cell. Numerous Notch ligands and receptors exist however the molecular machinery required for allowing all Notch ligands to transmit signal and to receive signal are largely similar. On independent accounts, Notch ligands and receptors have been shown to be overexpressed in malignant MM cells and Notch signaling has been shown to amplify the differentiation and activity of osteoclasts. Herein, using a lentiviral genetic system, we will investigate both the genotypic and phenotypic consequences on osteoclasts when knocking down the genes Mindbomb1—a gene necessary for allowing all Notch ligands to transmit signal—and Mastermind1—a gene necessary for allowing activation of the Notch transcriptional complex—in cocultured MM cells.

Presenters: Gracie Rosenbaum, Darren Ginder, Mitchell Gainer, David Daberkow
Department: Biology
Faculty Mentor: David Daberkow
Title: The Influence of Anesthesia on Dopamine Signaling in the Rat Dorsal Striatum
Presentation Type: Poster
Abstract: The striatum is a brain structure involved in reward learning and motor control. It receives input from the neurotransmitter dopamine (DA). Fast-scan cyclic voltammetry (FSCV) is a technique that uses microelectrodes (diameter ~5 μm, length ~150 μm) to monitor DA signaling in the striatum. FSCV studies with anesthetized rodents commonly use urethane or isoflurane anesthesia; however, the possible influence of isoflurane anesthesia under control conditions (i.e., saline treatment) on DA signaling has not been investigated.

Male Sprague-Dawley rats (*Rattus norvegicus*) 300-500 grams were anesthetized with urethane or isoflurane anesthesia. Once fully anesthetized, rats were secured in a stereotaxic apparatus where their skin and fascia were removed to allow for the drilling of small holes (1-2 mm in diameter) for electrode placement. The reference electrode, coated with Ag/AgCl, was placed just below dura, the FSCV electrode was placed in the dorsal striatum (+1.2 AP, +2.0 ML, -5.0 DV), and the stimulating electrode was placed above the medial forebrain bundle (-4.6 AP, +1.4 ML, -7.5 DV). Biphasic pulses (60 Hz, 60 pulses, 300 μA) were sent through the bipolar stimulating electrode to evoke DA release. Once consistent DA signals were observed, DA signals were stimulated and recorded every 5 min for 1 hour after an intraperitoneal injection of saline. Preliminary data suggest an attenuation of DA signals under isoflurane anesthesia. Conversely, under urethane anesthesia, when temperature was carefully monitored and kept stable, DA signals remain relatively stable. Future directions involve investigating the influence of nicotine on DA signaling in the dorsal striatum.

Presenters: Samantha-Garcia Sanchez-Garcia
Department: Social Work
Faculty Mentor: Dr. Rie Kobayashi
Title: Improving elder's overall well-being.
Presentation Type: Poster
Abstract: Identifying risk factors for social isolation is essential to determine the potential solutions to improve older adults' overall well-being. Therefore, implementing an intervention (e.g., befriending services) that supports the development of social skills, increases access to social interactions and social support, and helps people change unhelpful thoughts about social situations through Cognitive Behavioral Therapy, or CBT, is an evidence-based psychotherapy that is successful in assisting people to change unhelpful social cognitions; all these components can contribute in increasing the likelihood that it will lessen social isolation and loneliness within this demographic. Until recently, there is no reliable information on the effectiveness of comparable interventions in reducing social isolation. Nonetheless, "the Revised UCLA Loneliness Scale, the gold standard and most widely used measure of loneliness with older adults before the intervention," can help record progress through pre-post scores to determine the intervention's effectiveness (Suicide Prevention Resource Center, 2022).

Presenters: Nicasio Santos
Department: Psychology
Faculty Mentor: Kayleen Islam-Zwart
Title: Alcohol and the Resulting Consequences of Delirium Tremens
Presentation Type: Poster
Abstract: Alcohol is a depressant drug that inhibits the function of the central nervous system (CNS) and neurons in the mind. This results in physiological effects typical of an inhibited CNS, slowing the heartbeat and breathing and decreasing blood pressure. However, this inhibition of both the CNS and the neural chemistry develops a tolerance and, in turn, withdrawal symptoms. These withdrawal symptoms are the inverse of the inhibition caused by the depressant effects of alcohol. In extreme cases, one can develop delirium tremens (DT). DT is a debilitating condition caused by a sudden cut in alcohol after consistent, intense drinking. Because their CNS and neural chemistry have adapted to the fierce drinking, this sudden decrease in alcohol consumption results in violent withdrawal symptoms found a significant increase in the risk of cultivating DT if individuals had a daily alcohol intake of at least 20 alcoholic drinks.
Additionally, drinking spirits were found to be more impactful in the development of DT, contrary to mixed alcohol. Finally, males were more susceptible to the risk of developing DT. Further attention to the precipitating factors (e.g., age of starting consumption, comorbidity with other substance use, etc.) involved in the development of DT is necessary and will be proposed.

Presenters: Jeff Schell, Charlotte Milling

Department: Biology
Faculty Mentor: Charlotte Milling
Title: The Effect of Moon Phase on Predator and Prey Activity Levels on Turnbull National Wildlife Refuge
Presentation Type: Poster
Abstract: Variation in nighttime illumination linked to moon phase has been demonstrated to affect the activity patterns of both prey and predator species. However, evidence of lunarphobia in ungulates is mixed. Turnbull National Wildlife Refuge (TNWR) in Spokane County spans 23,000 acres; features a diverse landscape of channeled scablands, wetlands, and Ponderosa pine (*Pinus ponderosa*); and is situated within 20 km of the second largest city in Washington. Our objective was to assess the influence of nighttime illumination on activity levels of common mammals on TNWR by quantifying the relationship between moon phase and visitation rate at trail cameras during biologically significant times of day for coyotes (*Canis latrans*) and deer (*Odocoileus spp*.). We hypothesized that visitation rate would be influenced by moon phase, with greater visitation by deer during new moons and by coyotes during full moons. We detected at least one species of deer or coyote at 100% and 60% of our trap sites, respectively; however, we did not detect an effect of moon phase on visitation rate of coyote ($p = 0.51$) or deer ($p=0.49$) during the period of observation. Additional research utilizing increased observation area, number of trap cameras, and length of monitoring time is suggested for future examination of moon phase and its relationship to predator and prey behavior. This research is important for clarifying the relationship between natural nighttime illumination and wildlife activity – knowledge that will be consequential as wildland-urban matrices continue to shift.

Presenters: Alexander Scoles, Aaron Fuzak, Natalie Potter, Marilyn Smith, Erin Toulou, Chad Pritchard, Ethan Rychart, Alida Flores, Danial Aghassi
Department: Geosciences
Faculty Mentor: Dr. Chad Pritchard
Title: EWU Hydrogeologic Experience in Saltese Basin, eastern Washington
Presentation Type: Poster
Abstract: Eight regional community college and 4-year college students explored the geology and hydrogeology of the Saltese Basin, Spokane County, Washington. The goal of this project was to provide students that are early in their career to field work and different applications of geology and develop new skills. The first two days were devoted to mapping the bedrock around the basin. The basin is comprised of Lake Hauser Gneiss, amphibolite, granitic orthogneiss, pegmatite (Priest River Core Complex) with proximal Pleistocene megaflood sand and gravel, erratics, and Miocene Columbia River Basalt. Bedrock mapping was aimed at identifying zones of higher hydraulic conductivity, such as fault and planes of foliation. The third day introduced soils and auguring to identify hydraulic restrictive zones. Students measured the water table and measured stratigraphy and developed a history of streams, megafloods, Mt Mazama Ash, peat formation, and anthropogenic alterations to the basin. The fourth day was a tour of the WSU GeoAnalytical Lab to introduce how geochemical analyses are done. The final day we met to analyze data, discuss the week, make a poster for this meeting, and have a team building exercise (pizza party). Overall it was a positive experience where we learned about using a Brunton to measure strike and dips, organize field notes, describe outcrops/rocks/soil, using topographic maps and limitations on phone GPS units, as well as tectonic/sedimentary/ and hydrogeologic processes, and analytical methods such as ICP-MS, XRF, and microprobe analyses.

Presenters: Raul Segura, Sarah Johansson
Department: Psychology
Faculty Mentor: Sarah Johansson
Title: Teacher Self-Perception in multicultural student-teacher relationships, evaluating biases, and efforts to engage with students culture.
Presentation Type: Poster

Abstract: With the growing population of the United States, we have seen an increase in diverse and multicultural communities, which is reflected in many of our schools, which have seen a rise in the languages, ethnicities, and cultural backgrounds of students. However, the teacher population in the United States is not reflective of growing student diversity, which negatively affects student-teacher relationships and student academic achievement. This research aims to understand teacher strategies to eliminate these negative impacts and teachers' ability to recognize their own biases. How do teachers self-evaluate their own efforts to attend to students with culturally diverse backgrounds?

Presenters: Maggie Semmens, Ashley Lamm
Department: Chemistry and Biochemistry
Faculty Mentor: Dr. Ashley Lamm
Title: B-N-C Polymer Synthesis and Degradation
Presentation Type: Poster
Abstract: Many polymers (aka plastics) that are used today have slow degradation rates, allowing them to persist and have a chronic effect on the surrounding environment, potentially causing long-term adverse effects. Moreover, current plastic materials have the propensity to release pollutants into the soil and contribute to the overall increase in greenhouse gas emissions, exacerbating global climate change concerns. This project aims to explore the development of a novel boron-nitrogen-carbon (B-N-C) polymer, hypothesized to exhibit a more rapid degradation rate compared to conventional plastic materials. The focus of this study involves the synthesis of the B-N-C polymer and the examination of its degradation kinetics through UV/Visible spectroscopy analysis. The synthesis and results will be discussed.

Presenters: Kaylani Shah
Department: English
Faculty Mentor: Paul Lindholdt
Title: The Myth of Leda in Hozier's Lyricism
Presentation Type: Oral Presentation
Abstract: For ages, the myth of Leda has represented the oppression and sexual assault that women have had to endure at the hands of the patriarchy. In this myth, Leda, the Queen of Sparta, is raped by Zeus, the "King" of the Greek gods, in the form of a swan. Hozier, an Irish musician, uses this myth in combination with Ireland and its own mythology, along with current world problems to communicate the lack of rights women have. In his song "Swan Upon Leda," Hozier focuses on abortion, sexual assault, and reproductive laws for women. This combination creates an emotional narrative of vulnerability and false ownership. By using Zeus to represent modern patriarchy and the image of a gentle woman evading capture, Hozier has turned laws around motherhood and abortion into a story of great mistreatment. The first verse and chorus of the song create the image of Leda giving birth while Zeus takes advantage of the mother and children he sired. Hozier uses themes of gods and natural birth to say that women create a gateway that cannot be controlled or truly owned by man, thus further enticing the need man has to control women. The second verse and chorus go on to visualize the current events at the border of Ireland with the narrative of an older woman smuggling abortion- inducing drugs. Hozier gives voice to the vulnerable state women are in as they make life and death decisions by first giving voice to Leda, who Zeus had seen as nothing more than a mother and sexual object.

Presenters: Stephen Sharrett, Julianna Paulsen, James Lendemer, Krisztian Magori, Jesse Miller, Jessica Allen
Department: Biology
Faculty Mentor: Dr. Jessica L. Allen
Title: Rarity, cause or consequence: Comparative population genomics of six lichenized fungi with contrasting range sizes, life histories, and morphologies
Presentation Type: Oral Presentation

Abstract: Lichens are long-lived, sessile symbiotic assemblages often exhibiting a high incidence of rarity. As an emergent trait, rarity encompasses the complexities of a species' life-history traits and its environment. In this study, we used comparative population genomics to examine drivers and consequences of rarity in related widespread and range-restricted lichenized fungi sampled throughout the Appalachian Mountains of eastern North America. We generated robust population genomic datasets for the widespread species *Punctelia rudecta*, *Lepraria finkii*, and *Usnea strigosa*, and rare congeners *P. appalachensis*, *L. lanata*, and *U. subfusca*, totaling 924 individuals from 36 sites. Using long read sequences, we assembled high-quality reference genomes for each species. Whole-genome shotgun sequencing (WGS) short reads were aligned to reference genomes and filtered for quality before conducting downstream analyses. The pipeline we developed advances established workflows for assessing high-volume population-level WGS datasets from complex metagenomic data. Rare species populations show stronger geographic-driven genetic structure than common species, which is also reflected by reductions in signals of gene flow among those populations. Our data suggest that *Lepraria lanata* is highly clonal, supporting our hypothesis based on the lack of observed sexual reproductive structures throughout the genus *Lepraria*. Comparatively, *Lepraria finkii* shows high levels of recombination, suggesting a cryptic recombination mechanism. All four additional species displayed evidence of recombination. Finally, we investigate the impact of habitat quality and climate on observed genetic diversity. Our findings show that rarity is associated with similar patterns of population genetic structure across taxonomically and morphologically diverse fungi.

Presenters: Matthew Slater, Lauren Stachowiak
Department: Geosciences
Faculty Mentor: Lauren Stachowiak
Title: A Mixed Methods Approach to Dendroarchaeology: A Case Study in the Horse Heaven Hills
Presentation Type: Poster
Abstract: The Horse Heaven Hills are located in South Central Washington State and are home to many past homesteads and towns that no longer exist. One such location is Horse Heaven, an abandoned town near Prosser, Washington, which is now entirely on private property. The majority of the initial structures are now gone, with only building footprints and relic property treelines remaining. However, one structure remains; it appears to be the remnants of a small mill and storage house. In this project, we use a combination of dendrochronology and satellite imagery analysis in conjunction with historical records to reconstruct the town's history. While definitive cutting dates of the sole remaining structure could not be determined, we lay out a basic framework for future mixed methods dendroarchaeology projects. Combining remotely sensed, high-resolution satellite imagery with the data acquired from structures can provide a richer and more detailed site history than just tree rings alone.

Presenters: Marilyn Smith, Chad Pritchard, Richard Gaschnig
Department: Geosciences
Faculty Mentor: Chad Pritchard, PhD
Title: Refining Ages of Granitic Rocks at the Intersection of the Sevier Orogeny and Priest River Core Complex in the Spokane Area
Presentation Type: Poster
Abstract: Granitic outcrops in the Spokane area have commonly been mapped as Cretaceous to Tertiary. Recent U/Pb ages using LA-ICP-MS of separated zircon grains are presented from numerous granitic outcrops to help refine geochronology of the region. Ages measured from granitic rocks in the area reflect three time periods, Cretaceous (Sevier Orogeny), Paleocene and Eocene (Priest River core complex). The Cretaceous granite is west of the Priest River core complex. Paleocene granitic rocks show strong deformation textures that may be associated with the early ages of core complex formation. Small slivers of highly deformed orthogneiss and paragneiss west of the Priest River core complex could have been translated by normal faults from the upper part of the core complex, or are themselves small core complexes. Eocene granite along the eastern

margin of the core complex in the Spokane area is likely directly related to partial melting associated with the core complex. Economic deposits, such as Silver Hill, seem to be located at margins of Eocene intrusions and these defendable ages will be used to further understand the geologic history of the Spokane area.

Presenters: Bryan Snyder
Department: Computer Science
Faculty Mentor: Shamima Yasmin
Title: Enhancing Literary Understanding in Secondary Education through Role Playing Games
Presentation Type: Poster
Abstract: This project explores the idea of video games in secondary education. As part of our research in game-based learning, the classic epic poem *Beowulf*, widely taught in higher secondary schools, has been adapted into a role-playing game (RPG). The core objective is to refresh literary education by offering an engaging and interactive platform for a deeper understanding and appreciation of this classic work. The Unity game engine has been used as the implementation platform. In the game, players navigate the legendary village of Heorot as described in the original poem, engage with non-player-controlled (NPC) characters who offer insights and narrative progression, and confront challenges that mirror the poem's key events. The gameplay is enriched with boss fights and cutscenes that bring Beowulf's story to life.
This project stands at the intersection of literature, education, and gaming, offering a unique perspective on how traditional teaching of literary works is reimagined for modern learning environments and better engagement. Preliminary observations suggest a positive influence on student engagement and comprehension of the poem, as a local schoolteacher teaching *Beowulf* commented. The user study aims to evaluate the efficacy of game-based learning quantitatively and qualitatively in higher secondary education. This project represents a novel approach to teaching classic literature and contributes to the broader scope for innovative educational styles in the digital age.

Presenters: Bryan Snyder, Alysha McCullough, Clark Rabe, Curtis Melton, Nicholas Parkman
Department: Computer Science
Faculty Mentor: Sanmeet Kaur
Title: Erik Box Games
Presentation Type: Oral Presentation
Abstract: This project explores the integration of video games within high school education, focusing on the development of argumentative writing skills through game-based learning. Utilizing the engaging framework of multiplayer games, similar to the well known "JackBox Games" series, we have created an educational platform that intends to improve the teaching and learning of argumentative writing. The Unity game engine serves as our foundation in creating this game. In our game, students participate in a variety of minigames, each designed to foster the construction of logical, coherent, and persuasive arguments by defending or challenging positions on diverse topics. Acting as the game host, teachers facilitate gameplay, ensure appropriate content, and offer instantaneous feedback, enhancing the educational value of the game.
The game's narrative is structured around multiple minigames, where students adopt avatars to engage in debates, simulating real-world argumentative scenarios. This design is central to our way of merging educational objectives with interactive gaming elements, which will encourage exploration, discussion, and critical thinking among students within the subject of argumentative writing. Educational content is blended into gameplay, providing a narrative that guides students through constructing and deconstructing arguments, all within a collaborative and competitive online environment.
Positioned at the intersection of education, technology, and gaming, our project offers a novel lens to view and enhance traditional teaching methodologies. Preliminary feedback from educators and students hints at a significant rise in engagement and more comprehensive understanding of argumentative writing skills. By conducting user studies, we aim to both quantitatively and qualitatively assess the impact of our game on students' learning outcomes. This initiative not only charts a new course in high school education but also

contributes to the evolving landscape of digital pedagogy, suggesting broader implications for innovative educational practices in the 21st century.
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Presenters: Sarah Stone
Department: Chemistry and Biochemistry
Faculty Mentor: Dr. Ashley Lamm
Title: Applications of Cyclopentadiene for Cancer Treatment
Presentation Type: Poster
Abstract: Cyclopentadiene, a five-carbon ring with two double bonds, is reactive in a manner that makes it a valuable tool in cancer research. It’s very effective at forming new bonds between carbon molecules through a Diels–Alder reaction, with no other added reagents, allowing it to be easily and cheaply used in biosynthesis to create new organic molecules. One of the applications of this is the creation of new amino acids, referred to as noncanonical amino acids, which in turn can be used to create antibodies. New drugs can also be made in a similar manner, and the two can be combined to form antibody-drug conjugates (ADCs). ADCs have the precision of antibodies but the effectiveness of drugs, making them extremely deadly to cancer cells while causing less harm to surrounding cells. This paper combines research into both the characteristics of cyclopentadiene that have led to it being selected as the base for these syntheses and how it is being used with great effectiveness and efficiency.

Presenters: Sarah Stone
Department: Biology
Faculty Mentor: Paul Spruell
Title: Applications of CRISPR in the Treatment of Cataracts
Presentation Type: Poster
Abstract: Cataracts are caused by the degradation of the eye lens and the associated proteins. While it is often caused by age, children can inherit congenital cataracts that leads to childhood blindness. Repair is difficult as the lens acts as a barrier against regeneration and medical intervention is necessary. Gene editing, specifically CRISPR, has become a promising solution. It is frequently used to create animal models of the disease in order to determine which mutated genes are responsible, along with testing the effectiveness of new drugs and artificial lenses. CRISPR has then been used to correct these mutations and restore vision in mice. There is an emphasis on creating non-toxic, heritable, and highly specific alterations, and current methods have met these guidelines. While human applications are limited, there are currently ongoing clinical trials using CRISPR to correct degraded photoreceptors by injecting it into the retina, demonstrating the potential of future treatments. This paper reviews research concerning the developing role CRISPR is taking in the treatment of cataracts, along with the unique benefits of working in the eye and the challenges that come with it.

Presenters: Wen Sun
Department: Computer Science
Faculty Mentor: Dan Li
Title: Classification for Imbalanced Credit Card Transaction Data
Presentation Type: Poster
Abstract: It is important for the credit card companies to identify fraudulent transactions to avoid financial loss for the customers and the companies. The challenge of fraud detection lies in the imbalanced feature of transaction data which makes traditional classification algorithms infeasible. This research investigates the methodologies that are commonly employed to deal with imbalanced datasets. Specifically, over-sampling, under-sampling, and Synthetic Minority Over-sample Technique (SMOTE) are studied. In addition, to better understand the statistical features of the credit card transaction data, we implement a stream mining algorithm, DGIM, to analyze the occurrences of fraudulent transactions over sliding windows. This study contributes to the understanding of effective strategies for mitigating imbalanced datasets and enhancing fraud detection mechanisms in financial system.

Presenters: Kyle Swiderski
Department: Art
Faculty Mentor: Joshua Hobson
Title: Nature's Embrace
Presentation Type: Creative Work
Abstract: In this abstract, I introduce two handmade vases, each a testament to the marvels of nature's artistry. Crafted with meticulous attention to detail, these vases stand tall, enveloped in a mesmerizing blend of earth tones. Through a unique marbling technique, I capture the essence of natural formations, echoing the rugged elegance found in the depths of the earth. With each curve and contour, these vases embody the tranquility and strength of nature, inviting observers to immerse themselves in its timeless beauty. As light dances upon their glazed surfaces, intricate patterns emerge, reminiscent of winding rivers and weathered stone. These vessels not only serve as functional art but also as a poignant reminder of our connection to the natural world, infusing any space with a sense of reverence and harmony.

Presenters: Makenna Tabino
Department: Biology
Faculty Mentor: Dr. Rebecca Brown
Title: Determining the Long-Term Effectiveness of Seeding Post-Dam Removal in the Elwha River, WA, Through Soil Seed Bank Analysis
Presentation Type: Poster
Abstract: Located in Olympic National Park, the Elwha River is the site of the largest dam removal project in history. It is also the site of the second largest ecological restoration project in the history of the National Parks Service. Following dam removal, active restoration (seeding and planting) took place in terraces and valley walls, the two dominant landform types found in the former reservoir. While extensive research has been conducted surrounding the plant community in the former dam reservoirs, the soil seed bank remains an unexplored aspect of the area’s ecology.
The objective of this project is to use the composition of the soil seed bank to determine the long-term effectiveness of seeding post-dam removal in the former Lake Mills reservoir. In the summer of 2023, soil seed bank samples were collected from 40 locations within the former Lake Mills. Each sample consists of eight 10-cm soil cores collected approximately 1 meter away from the perimeter of revegetation sampling plots. Samples were grown in flats in the EWU greenhouse from December of 2023 to April of 2024. Once data collection and entry is complete, species richness and diversity will be calculated, and compared with observations from the 2023 revegetation survey.

Presenters: Makenna Tabino, Jackie Luna, Chelsea Schur
Department: Biology
Faculty Mentor: Dr. Krisztian Magori
Title: The Effect of Bat Microbiomes and Ectoparasite Presence on White Nose Syndrome
Presentation Type: Oral Presentation
Abstract: White Nose Syndrome is estimated to have killed millions of bats across the United States. Following the first recorded outbreak in 2006, it has since spread to 40 U.S. states and 8 Canadian provinces, including Washington State. The Washington State Department of Fish & Wildlife is conducting monitoring to determine if WNS is present in Eastern Washington, specifically in Lincoln County. In order to better understand the dynamics of WNS within a population, it's important to understand its interactions with other factors, such as a bat's protective microbiome, or the presence of ectoparasites. Understanding how microbiomes and ectoparasites affect WNS in bat populations will provide important information for future management decisions.
We plan to collaborate with the Washington State Department of Fish & Wildlife to observe and record the body condition of a colony of bats currently residing in an abandoned farmhouse in Lincoln County. Nose swabs will be taken to test for WNS, while wing swabs will be taken and stored for skin microbiome testing. Samples from the wing swabs will be grown on petri dishes and identified using visual identification, gram staining, and PCR. Ectoparasite type and presence will be recorded. We believe that if WNS is discovered within the flock, that it will be more likely to be discovered in bats with large amounts of ectoparasites and underdeveloped microbiomes.

Presenters: Kevin Taylor, Kylee Woodworth, Brittni Hastings
Department: Geosciences
Faculty Mentor: Dr. Richard Orndorff
Title: GEOTECHNICAL ANALYSIS OF SOIL SAMPLE PP-9: PALOUSE PRAIRIE RESTORATION PROJECT- CHENEY, WA
Presentation Type: Poster
Abstract: The Palouse Prairie Restoration Project is devoted to actively restoring 120 acres of the EWU campus to its natural state of Palouse prairie habitat. This sustainability initiative provides educational and research opportunities, as well as recreational and cultural connections for students, faculty, and the community. We collected soil sample PP-9 from the upper area of a loess hill along its north face near the EWU water tower, located at: 47.49385º N, -117.59299º W with an elevation of 2531ft. The rolling hills of the Palouse Prairie soil are composed of loess, a wind-blown silt that was deposited in Eastern Washington during the last Ice Age. We conducted ASTM standardized tests on soil sample PP-9 to determine its geotechnical properties including specific gravity, particle size distribution, Atterberg Limits, optimal water content for compaction, and unconfined compressive strength. This information is designed to help with site development and management of upcoming infrastructure initiatives including a visitor center, amphitheater, pathways, and parking areas.

Presenters: Rachel Thayer, Jenna Thomason
Department: Psychology
Faculty Mentor: Dannielle Sitzman
Title: Does Memory Trust Predict Confidence in Memory Performance?
Presentation Type: Poster
Abstract: Generally, people tend to believe that they are poor at remembering vital information while simultaneously displaying a tendency to overestimate their performance on memory tests. People display the usage of their metamemory, the control and awareness of memory, by monitoring and reporting how much information they have accurately remembered. Predicting the outcome of test scores is one way of testing metamemory, but this does not address how a person's trust in their memory relates to their perceptions of how

they performed on a test. The Squire Subjective Memory Questionnaire (SSMQ) measures beliefs about susceptibility to omission errors (excluding information), and the New Memory Distrust Scale (MDS) measures beliefs about susceptibility to commission errors (including wrong information). The SSMQ and MDS are usually used in relationship to eyewitness memory and focus purely on trust in memory. This study addresses the relationship between memory trust and performance perception, aiming to produce follow-up studies while expanding the understanding of metamemory. Participants in this study completed the MDS, the SSMQ, and a general knowledge test where they answered trivia questions and rated their confidence in the accuracy of their responses. Half of the participants filled out the memory distrust scales after answering the general knowledge questions, while the other half completed them before the general knowledge questions. It is hypothesized that people who do not trust their memory will be less confident of their answers during the general knowledge test than those who trust their memory.

Presenters: Nicole Thomas
Department: Social Work
Faculty Mentor: Rie Kobayashi
Title: Advocacy for the Older Population
Presentation Type: Poster
Abstract: With the older adult population increasing in the United States, people must be aware of the barriers and obstacles the older population faces. Many people need to be made aware they can play a massive part in advocating for older adults. Anyone can make a change and a difference in the older population, whether you are a student, middle-aged, approaching adulthood, or an older adult. You can make a change for this population! Through this poster presentation, there will be pathways the average person can advocate for older adults; whether someone wants to make a significant change through policy efforts or just small changes in their day-to-day life, anyone can make a change, and it can positively affect the way older adults are treated and recognized in society.

Presenters: Jenna Thomason, Marysa Rogozynski
Department: Psychology
Faculty Mentor: Dr. Amani El-Alayli
Title: The Application of the Dunning-Kruger Effect to Perceptions of One's Own Sexism
Presentation Type: Poster
Abstract: A large proportion of the general public believes that sexism against women no longer exists in America. Despite obstacles in the workplace and other areas of modern society, this belief persists. Misconceptions about the existence of sexism may be explained by the Dunning-Kruger effect or the inability of some individuals to recognize personal deficits (such as their own sexism) due to insufficient knowledge about a topic. Specifically, more sexist individuals may be less able to identify sexism in themselves because they do not fully understand what sexism is. We hypothesized that individuals ranked among the most sexist would underestimate their levels of sexism more than others and have the least amount of knowledge about sexism. College student participants completed measures of sexist attitudes, perceptions of their own level of sexism, and knowledge of sexist attitudes. Overall, results confirmed that the more sexist participants were, the more inaccurate their self-evaluations of sexism and the lower their level of knowledge about sexism. However, knowledge of sexism was not the reason why sexism estimations were less accurate among the most sexist participants. The significance of this study is that it exposes implicit biases and provides an opportunity to recognize and correct misconceptions about sexism.

Presenters: Alexa Thomson
Department: Film
Faculty Mentor: Pete Porter
Title: Continuity of Intensified Continuity

Presentation Type: Oral Presentation
Abstract: Overall, the YouTube aesthetic has had a profound impact on the world of filmmaking, from content creation to marketing strategies. With the rise of social media and algorithms driving content creation, filmmakers are adapting their techniques to cater to the demands of online audiences. The concept of intensified continuity has been reimagined in the context of the "YouTube aesthetic", reflecting a shift towards more frequent cuts and heavily visual effects. As filmmakers navigate this evolving landscape, the YouTube aesthetic continues to shape the trajectory of modern filmmaking, influencing storytelling techniques and marketing strategies. As the digital age continues to evolve, the influence of the YouTube aesthetic will likely continue to shape the future of filmmaking for years to come.

Presenters: Leya Thornton, Arianna Hunt, Thomas Cass
Department: Wellness & Movement Sciences
Faculty Mentor: Garth Babcock
Title: Low-Level Laser Therapy and Cryotherapy as Interventions for Muscle Recovery Following Strenuous Exercise
Presentation Type: Poster
Abstract: BACKGROUND AND PURPOSE: Cryotherapy is one of the most commonly used modalities for not only injuries but also postexercise recovery even though there is research challenging the effectiveness of its use. This modality decreases tissue metabolic rate, promotes vasoconstriction, decreases vascular permeability and can aid in the decrease of edema formation. Low-level laser therapy (LLLT) uses light to treat various pathologies and musculoskeletal injuries such as healing skin wounds and regeneration of tendons, muscle and nerve tissues and it also has positive effects on pain and inflammation. The primary objective of this study is to compare efficacy of LLLT and cryotherapy on muscle recovery after strenuous exercise and evaluate if laser therapy is an alternate or more beneficial modality than cryotherapy for post-exercise muscle soreness and recovery. DESIGN: Crossover randomized control trial. METHODS: Male athletes (18-24) who sustained muscle soreness or pain after strenuous exercises were randomized in a LLLT or cryotherapy group using cold tubs. All patients were engaged in similar workouts, during different times throughout the day. Hamstring and quadriceps muscles were treated with LLLT or cold tubs after exercise. A recovery-stress questionnaire was filled out by the participants at the beginning of the week on Monday and at the end of the week on Friday. A visual analog scale for muscle soreness was completed before treatment and 24 hours after treatments. This all occurred over a 4-week time period. RESULTS: 11 athletes began the treatments and started the surveys, and 10 (5 per group) completed the entirety of the study. The LLLT had on average a difference of 0 ± 0.25. Cryotherapy treatment had on average a difference of -0.22 ± 0.94. The offweek where no treatment took place, had on average a difference of 0.44 ± 2.27. The p-value for comparison of treatment groups was 0.485 where a p-value of < 0.05 is significant. CONCLUSIONS: LLLT as used in this study was not more effective than cryotherapy on the relief of pain and muscle soreness as there was no significant difference shown between the two treatments. Although there is current evidence that supports that using LLLT can decrease pain and inflammation, additional trials with larger sample sizes and a more concrete design should be conducted to determine if it may be a more effective modality than cryotherapy.

Presenters: Alejandro Torres
Department: Biology
Faculty Mentor: Justin Bastow
Title: Species Abundance and Richness of Native Bees in EWU's Prairie Restoration Site Compared to Adjacent Wheat Field and Natural Areas
Presentation Type: Poster
Abstract: Diverse grasslands historically covered much of eastern Washington to northwestern Idaho and parts of northern Oregon, but land conversion has made this prairie one of the most endangered ecosystems in the United States, with less than 0.1% of the historic prairie remaining. The loss of habitat has led to concerns for

native insect populations, including the more than 250 species of wild bees found in eastern Washington. Current conservation efforts are focused on restoring native plant communities to former agricultural lands. Eastern Washington University's (EWU) Prairie Restoration Project is restoring 52 hectares of wheat fields to native vegetation. Bee populations are important for the success of plant reproduction and dispersal, however, our understanding of the effects of restoring native vegetation on bee populations is limited. In our study, we collected bees using bee bowls to create a baseline of species found in restoration sites compared to wheat fields and undisturbed natural areas. We collected 839 bees, from 48 species. The majority were from the family *Halictidae* (91%), with smaller numbers of *Megachilidae* (5%), and *Apidae* (4%). Between June and August, both bee abundance (p

Presenters: Erin Toulou
Department: Geosciences
Faculty Mentor: Chad Pritchard
Title: A Theoretical Geophysical Analysis of a Subsurface Carbonatite Body at Mountain Pass, CA
Presentation Type: Poster
Abstract: The Mountain Pass mine in California is one of the world's largest mass producers of light rare earth elements (REEs). These REEs are essential components for green energy and defense technologies. Neodymium and praseodymium are currently the most economically important REEs extracted from the mine and are used in high-strength magnets. A carbonatite stock hosts the REE ore at Mountain Pass and is an irregularly shaped intrusion that generally strikes north and dips steeply (30-60 degrees) to the west. The ore body is dissected by faults, including a large N50W left-lateral fault (Celebration fault) that bisects the stock, displacing the southern part of the ore body to the southeast and the northern part of the ore body to the northwest. It is unknown whether the ore body is fault-repeated elsewhere in the subsurface, which is vital for identifying minable resources. We are determining if it is possible to detect the existence of possible fault-offset portions of the carbonatite body near the Mountain Pass mine using gravity data. If it is possible, this would allow us to detect additional subsurface carbonatite bodies within the same area. For simplicity, we model the irregular-shaped carbonatite body as a sphere and vary the sphere's size, depth, and density contrast with the surrounding country rock to understand relevant conditions for detection. Based on field experience, we estimate that a subsurface carbonatite body should be detectable if it produces a gravity anomaly with an amplitude of >+1 milligal (mGal). If the amplitude ranges between +0.5 to +1 mGal, it is possible but challenging to detect. Using estimates of the known carbonatite's density and volume, we determined that additional carbonatite bodies with a density contrast of +0.3 g/cm^3 and a radius of 200 m are detectable at a depth of 50 m, and possibly detectable at a depth of up to 150 m.

Presenters: Michael Trier
Department: Biology
Faculty Mentor: Rebecca Brown
Title: Active versus Passive Restoration of Drained Reservoirs on Elwha River Ten Years After Dam Removal
Presentation Type: Oral Presentation
Abstract: With the increasing frequency of large dam removals, understanding the impact of restoration practices on revegetation of the drained reservoirs is crucial. The removal of two large dams on the Elwha River between 2011 and 2014 provided a unique opportunity to investigate reservoir revegetation dynamics following active restoration through seeding and planting. My objective was to determine how the effects of active restoration have changed with time. I hypothesized that over time the effects of seeding and planting would intensify. To test this, I compared native and non-native plant species richness and cover in 100 m^2 quadrats from seeded only, seeded and planted, and control sites sampled in 2023. My results revealed that after ten years, native species richness in actively restored plots was 54% greater and non-native species richness was 25% lower than in passively restored plots. These findings show that active restoration can help facilitate

revegetation in drained reservoirs post-dam removal through the promotion of native species and inhibition of non-native species.

Presenters: Travis Truly
Department: Art
Faculty Mentor: Joshua Hobson
Title: Things Are Lovely
Presentation Type: Creative Work
Abstract: Things Are Lovely
While I was at work in the summer of 2023, my house burned down leaving nothing but ash. When I went back to where my home once stood everything was gone and it felt like more than just objects had burned but memories, histories, and emotions. Things are lovely, owning things, receiving things, holding things, looking at things, items hold love. I wanted to create an art piece based on this concept and as a memorial for all my precious lost things.
I collected several large jars of ash from where my room once was, hoping to scoop up some of the hundreds of art pieces and objects I had before. I used this ash to create five hundred drawings from memory of all the things I once owned. Due to the number of drawings needed all were done in less than twenty minutes. This speed helped to capture the items quickly and because my memory is not exact these rough sketches felt like they showed the spirit of the objects rather than the exact image.
After all the drawings were done, I cut them out and delicately pinned them to a red matte wall vinyl with the page they had been cut from still around them. I was once very selfish with my art and all my work covered my bedroom floor-to-ceiling, well no longer. With this piece, I wanted to spread my art far and wide by asking all those who came to the gallery to unpin an object from the wall and take it home with them. This would reveal the red behind the paper leaving only the negative space of the original pages behind. By the end of the show, I'll be left with nothing but red silhouettes but this time it will be on my terms and all my drawings can go home with people who will place them amongst their own lovely things.

Presenters: Grace Van Blaricom
Department: Art
Faculty Mentor: Joshua Hobson
Title: Women
Presentation Type: Creative Work
Abstract: This piece symbolizes the exact moment when a woman accepts their body for what it is, and what it is meant to be. The feeling of relief and love for the body that they were given.

Presenters: Thomas Walters
Department: Film
Faculty Mentor: Peter Porter
Title: Monsters and Fools: Gay Suppression in James Whale's The Invisible Man
Presentation Type: Oral Presentation
Abstract: For my research paper, I will analyze whether James Whale's The Invisible Man (1933) is symptomatic of gay suppression and the pressure to pass as straight in a hegemonic society. Whale was one of the most renowned directors to grace the golden age of Hollywood cinema, and his monster films have had an especially great impact on the American horror landscape, culminating in triumphs such as Frankenstein (1931), its sequel, Bride of Frankenstein (1935), and The Old Dark House (1932). He was also openly gay throughout his entire career, which is intrinsic to his cinematic oeuvre. He was well aware of his status as "The Queen of Hollywood," and he was intentional in portraying his gay sensibility in his films.
His adaptation of H.G. Wells' The Invisible Man (1897) portrays its lead character, Jack Griffin, as a victim of circumstance. His subsequent inability to be fully expressive to the outside world while invisible reflects the

fears and frustrations of expressing homosexuality in 1930s America, a setting where systemic suppression and persecution of gay voices was an unfortunate reality. Understanding the queer coding of The Invisible Man (1933) is a significant study for film history because it may lead to a deeper understanding of how Universal's monster films were symptomatic of gay stigmatization and the alienation queer people faced as a result.

Presenters: Eric Wamsley
Department: Physical Education, Health and Recreation
Faculty Mentor: Nate Lawton
Title: The Ethical Considerations of Cardiopulmonary Resuscitation
Presentation Type: Poster
Abstract: Cardiopulmonary Resuscitation (CPR) is an indispensable tool for prolonging and saving the lives of those experiencing a cardiac event. Public understanding of the physically traumatic nature of CPR is limited, and successful CPR often means the patient will still spend the rest of their life failing to recover in a hospital (Girotra et al., 2012). Of the 51% of elderly patients (65yo+) who survive CPR after in-hospital cardiac arrests, two-thirds die before they are discharged and of the remaining third, more than half will suffer from moderate to severe neurologic disability (Peberdy et al., 2003). The lack of public understanding of the realities of CPR causes many families to request resuscitative care in situations with little to no likelihood of success, often resulting in a distressful and drawn-out death. The first encounter with CPR for most people comes in the form of Tv and movies (Diem et al., 1996). Although this often imparts the importance of CPR, it also often displays a vastly incorrect version of the procedure, its effectiveness, and its ramifications (Puri, 2023). This leads to important end-of-life decisions being made on false pretenses. The aim of this literature review is to outline the failings of the current use of CPR and how an improved public awareness about these failings may improve them.

Presenters: Morgan Whapeles
Department: Design
Faculty Mentor: P. Colin Manikoth
Title: Exploring the Social and Educational Dynamics of the Apple Vision Pro
Presentation Type: Poster
Abstract: This project explores the impact of incorporating the Apple Vision Pro into the daily life activities of a college student, including classroom activities, homework, and social interactions. The study is designed to delve into the integration, usability, and social implications of this emerging technology. The objective is to comprehend how the Apple Vision Pro could potentially transform the educational landscape, influence social dynamics, and interact with cognitive processes within a collegiate environment. The course aims to provide a comprehensive understanding of the technology's practicality and its potential effects on academic and social aspects of college life.

Presenters: Devon Wilson
Department: Anthropology
Faculty Mentor: Julia Smith
Title: A Language Unwritten
Presentation Type: Poster
Abstract: Linguistic reconstruction is the practice of recreating the features of an unattested ancestor language by examining its daughter languages. This allows us not only to hear the sounds of long dead languages, but to examine the culture of the peoples who spoke it. It is through linguistic reconstruction that linguists have "discovered" Proto-Indo-European. This language was spoken on the Pontic-Caspian steppe of Eastern Europe some 6,000 years ago and was never attested in any meaningful way. Despite this it was not lost to the sands of time, through thorough examination of Proto-Indo-European's daughter languages – which include languages as

far-flung as English, Hindi, Russian, and Greek – Linguists have recreated the sounds and meanings of Proto-Indo-European.
This research explores an example of the ways in which we reconstruct Proto-Indo-European – and what that reconstruction tells us about the development of words in modern daughter languages like English. To do this, we have to look at phonetic changes, but also the social processes that create meaning shift over the years. I will be looking at, specifically, the Proto-Indo-European root *$g^{h}ostis$, which meant both guest and host. This word is fascinating, because it has evolved into the modern English words “guest”, “host”, “ghost”, “hospital”, and “hotel.” This study allows us to consider both the ways in which sounds change, but also the ways in which historical linguistics reveals important ideas about ancient cultures and how they might have functioned.

Presenters: Hannah Wilson
Department: Art
Faculty Mentor: Marc LaPointe
Title: Neon Nostalgia
Presentation Type: Creative Work
Abstract: I am submitting one ceramic piece, and one photograph print.
POG, 2023, Ceramic 11" x 4" x 4"
Candy Chaos, 2024, Archival Pigment Print (Dimensions TBD)
Both of these pieces are studies in nostalgia of youth and feature highly vivid colors and are intended to be fun and eye-catching.

Presenters: Sarah Wilson
Department: Art
Faculty Mentor: Chris Tyllia
Title: Looking Deeper
Presentation Type: Creative Work
Abstract: 1. On the Inside: Anxious, 2024, 28.5 x 21 x 24”, Paper clay, wire, and acrylic medium
2. The Mind of a Stoner, 2023, 36 x 39”, Digital Photocollage
3. MiSTEAKin Identity, 2024, 20 x 24”, Gelatin Silver Print
My work is based on perception. In life, it is important to take a deeper look into a subject rather than relying on what is perceived or previously gathered information. Often, only a small part of the story lies on the surface.

Presenters: Luke Zagar
Department: Philosophy
Faculty Mentor: Dr. Terrance MacMullan
Title: Crafting a Moral Response to Climate Disaster & Consumerism
Presentation Type: Oral Presentation
Abstract: Climate destruction has been carried out by humankind and the thorough overpopulation of our planet over the last 250 years by the release of millions of tons of carbon emissions, destroying biodiversity. Our response has been to generally ignore the issue of climate change, or assume the status quo of society - resorting to a dark state of ignorance and imitation. However, if we were to frame climate change as an individual problem, then our response from local groups and individuals might change drastically. This turn to individualism is largely sparked from consistent failure by nation-states and international organizations to effectively combat the climate crisis. By using insights from Ralph Waldo Emerson, the American transcendentalist philosopher, and Laozi, the author of the *Dao de Jing*, crafting a moral response to climate disaster and consumerism is possible. The philosophy of self-reliance as instructed by Emerson, when taken in light of the *dao* and our human inclinations, gives all individuals the ability to transform their relationship to the earth, shed the shackles of consumerist pressure and combat the climate crisis.

Presenters: Zac Ziegler
Department: Biology
Faculty Mentor: Andrea Castillo
Title: Elucidating the Genetic Basis of Hydrogen Sulfide Production in *Desulfovibrio piger*
Presentation Type: Poster
Abstract: The metabolic byproducts of organisms within the human gut microbiome can have both beneficial and deleterious effects on human health. Sulfur-reducing bacteria make up a significant amount of the gut microbiota, and of these organisms, *Desulfovibrio* piger is the most abundant. *D. piger* reduces exogenous sources of sulfur to form its primary metabolite, hydrogen sulfide (H_2S), which is implicated in a range of diseases due to its pro-inflammatory and cytotoxic capabilities within the human body. Overgrowth of *D. piger* has been strongly correlated to multiple sclerosis, Chron's disease, and several other inflammatory diseases, through fecal studies which compare the microbiota composition of healthy and diseased individuals, suggesting a link between high levels of H_2S and disease severity. However, there exists little information on the genetic foundation of H_2S production in *D. piger*. I aim to determine which genes are required for sulfur reduction in this organism to provide insights into potential therapeutic targets for these diseases. Through sequential cloning, putative H_2S producing genes from *D. piger* will be introduced into the model organism, *Escherichia coli*, and the resulting mutants will be screened for H_2S production to determine which genes are essential for sulfur reduction. Selected genes include those that code for the dissimilatory sulfite reductase enzyme, as well as genes that code for prerequisite enzymes in the sulfur reduction process. If the presence of these genes confers H_2S production in *E. coli*, a more concrete understanding of the genetic control of this metabolic process can be inferred.