

# STUDENT RESEARCH & CREATIVE WORKS SYMPOSIUM LEARNING IS NOT A SPECTATOR SPORT

# MAY 9th & 10th, 2023

**Creative Works** 

**Student Research** 



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

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# DAY ONE: STUDENT CREATIVE WORKS Tuesday May 9<sup>th</sup>, 2023

### **Fine Arts Complex – Art Building**

4:30 p.m.	Welcome & Presenters Check-In Be	egins: Art Building, Lobby
4:30 – 7:00 p.m.	Appetizers and Refreshments:	Art Building, Lobby
4:30 – 7:00 p.m.	Art and Design Exhibits:	Art Building, Gallery & Lobby
5:20 – 6:00 p.m.	Music Composition Presentations:	Art Building Gallery
5:20 – 6:00 p.m.	Theater Presentations:	Studio, Theatre Building

# **DAY TWO: STUDENT RESEARCH**

Wednesday May 10th, 2023

### **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.	Welcome Address	NCR
9:30 a.m. – 2:00 pm.	Oral Presentations	PUB 3rd Floor
9:30 a.m. – 1:10 p.m.	OS1: Mathematics and Biolog	gy PUB
9:30 a.m. – 2:00 p.m.	OS2: Biology, Chemistry & B Engineering and Geosciences	iochemistry, PUB
9:30 a.m. – 1:10 p.m.	OS3: Chicano Education, Creat Gender & Women's Studies, Int Music, Psychology, Social Work Wellness and Movement Science	tive Writing, PUB ernational Studies, and es
9:30 a.m. – 1:10 p.m.	OS4: English, Philosophy, Socio	logy and Theatre PUB
8:45 a.m. – 1:00 p.m.	Poster Presentations	PUB NCR

## **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

Dean of CAHSS: Dr. Nydia Martinez

And from CAHSS, special thanks to Jazmine Jackson

Dean of CSTEM: Dr. David Bowman, special thanks to Dr. Jackie Coomes

Multi-Media Commons: Carl Combs and his Team

University Advancement: Barb Richey and her Team

Transportation Services: The whole Team

Event Services: Tom Shaffer

PUB: Michelle Schultz

**McNair Scholars Program** 

**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 <a href="mailto:symposium@ewu.edu">symposium@ewu.edu</a>

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.

# 2023 Symposium Committee Chair: Julia Smith

# **2023 Symposium Committee Members**

- 1. Drew Ayers
- 2. Lynn Briggs
- 3. Rebecca Clark
- 4. Erin Dascher
- 5. Kevin Decker
- 6. Greg duMonthier
- 7. David Early
- 8. Gail Forsgreen
- 9. Robert Gerlick
- 10. Thomas Hawley
- 11. Awlad Hossain
- 12. Ginelle Hustrulid
- 13. Jonathan Johnson

- 14. Taylor Kensel
- 15. Krizstian Magori
- 16. Jonathan Middleton
- 17. Justin Otto
- 18. Chad Pritchard
- 19. Michelle Schultz
- 20. Thomas Shaffer
- 21. Julia Smith
- 22. Leslie Swannack
- 23. Christina Valeo
- 24. Heather Veeder
- 25. Kristyne Wiegand





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 academic internships, tutoring, counseling, seminars, and other educational activities designed to assist participants in securing admission to and

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

Fostering Excellence and Inspiring Awesome

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 between partnership 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.

After the near-death experience of COVID, the Symposium returned last year thanks to the work of Dr. Julia Smith and many supporters. We're happy to welcome you back in 2023 as the Symposium grows again.

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.

# STUDENT CREATIVE WORKS SCHEDULE

Tuesday May 9th, 2023

4:30 p.m. - 7:00 p.m.

4:30 p.m.	Welcome & Presenters Check-In Begins:	Art Building Lobby
4:30 – 7:00 p.m.	Appetizers and Refreshments:	Art Building Lobby
4:30 – 7:00 p.m.	Art, Design and Film Exhibits:	Art Building Gallery & Lobby
5:20 – 6:00 p.m.	Music Composition Presentations:	Art Building Gallery
5:20 – 6:00 p.m.	Theater Presentations:	Theater Building Studio

# STUDENT CREATIVE WORKS SCHEDULE

#### Art:

Brabec, Sophie, A Stitch in Time and Table to Trash Brando, Calvin, Bound and Happy Time Brisbin, Katrina, Eco-Printing: Crafting with a Conscience Caverly, Madyssen, Healing Frost, Amanda, Distant Memories Gordon, Ash, Mismatched Baggage Henderson, Lilyanna, Amazon Coming Soon Hove, Rachel, In Memory Johnson, Hope, Disturb the Comfortable Kannberg, Katherine, Beach Lamp Kneafsey, Katherine, Acceptance Sanchez, Alexander, Galactic Haze Schwendiman, Larissa, Human Nature Smith, Dominic, A Life Journey Williams, Mykey, Stitches

#### Film:

Petersen, Caden, Cataract Jack Promotional Video

#### **Music:**

Ahola, Grace, with Gloria Miller, Vignettes on a Premonition Arguello, Jonathan, with David Alvarado, Sunflower Fields Baird, Hilary, The Keys to The Kingdom and To a Land of Sleep and Dreams Folger-Vent, Rosalie, Lucky Girls Nall, Grace, with Ruby Gibford, Floating Neumann, Connor, Enchanted Echoes

#### **Theater:**

Cullen, Aspen, Stevie Astudillo, and Melissa Wilson, Everything and Nothing

# **Fine Arts Complex Map**



# **STUDENT RESEARCH**

# **ORAL & POSTER SESSIONS**

*Wednesday May 10th, 2023* 9:00 a.m. – 2:00 p.m.

### PUB NCR & 3rd Floor

9:30 a.m. – 2:05 p.m.	<b>OS1: Mathematics and Biology</b>	PUB
9:30 a.m. – 1:40 p.m.	OS2: Biology, Chemistry & Biochemistry, Engineering and Geosciences	PUB
9:30 a.m. – 1:40 p.m.	OS3: Chicano Education, Creative Writing, Gender & Women's Studies, International Studie Music, Psychology, Social Work and Wellness and Movement Sciences	PUB es,
9:30 a.m. – 1:40 p.m.	OS4: English, Philosophy, and Theatre	PUB
9:00 a.m. – 1:10 p.m.	Poster Presentations	PUB NCR

### Oral Session 1: PUB 317

## **Mathematics and Biology**

9:30am	Criswell, Ryan (Mathematics), Xiuqin Bai Classification using Logistic Regression and Support Vector Machines
9:55am	Costinett, Dylan (Mathematics), Xiuqin Bai Student Retention and Graduation at EWU Before and After the Pandemic
10:20am	Quindlen, Michael (Mathematics), Frank Lynch Calculus of Variations: Important Results and Using the Euler-Lagrange Equation
10:45am	Levora, Sage, Mychael Henry, and Jake Hillyard (Biology), Krisztian Magori Homeopathic and Allopathic Repellents Efficiency With Deterring Ticks
11:10am	Flores, Sarah, Ben Wulfestieg, Madilyn Odiorne, Daniel Huizar, and Eric Greene (Biology), Krisztian Magori Identification of <i>Contracaecum multipapillatum</i> at Turnbull National Wildlife Refuge within the components of its life cycle in the initial phases of infection
11:35am	Perez, Jennifer (Biology), Bo Idsardi and Jenifer Walke An effective multi-site course-based undergraduate research experience (CURE) implemented by early adopters
12:00pm	Arrasmith, Natasha, Natalie Barton, Cari Keyser, Clayton Schneider, and Abbigail White (Biology), Krisztian Magori Ectoparasites Among the Small Mammal Population on the Eastern Washington Prairie Restoration
12:50pm	Deshazer, Sarah (Biology), Krisztian Magori and Paul Spruell Investigation of small mammal abundance, diversity, and dispersal on and around the Eastern Washington University Prairie Restoration Site
1:15pm	Nguyen, Nguyen, and Ramanpreet Singh (Biology), Charles Herr Canine testes thin section culture
1:40pm	Novak, Melanie, Emily Tyner, Autumn Grove, Blake Zimmermann (Biology), Krisztian Magori Varying Disease Density of <i>Myotis lucifugus</i>
2:05pm	Collins, Kathryn (Biology), Luis Matos Production and characterization of a phage endolysin with putative anti-microbial activity against Cutibacterium acnes

## **Biology, Chemistry & Biochemistry, Engineering, and Geosciences**

9:30am	Jost, Talon (Biology), Jenifer Walke Understanding the Role of Tetrodotoxin on Skin Microbiome Composition and Chytrid Fungal Infection in Rough-skinned Newts ( <i>Taricha granulosa</i> )
9:55am	Holley, Autumn (Biology), Jenifer Walke Evaluating efficacy of anti-Batrachochytrium dendrobatidis probiotic treatment on Pacific chorus frogs (Pseudacris regilla) at current and modeled climate change temperatures
10:20am	Rosenbaum, Gracie (Biology), David Daberkow Investigating the influence of isoflurane and urethane anesthesia on dopamine signaling
10:45am	Pfeffer, Bubba (Biology), Jessica Allen Comparative population genomics of the leprose asexual lichenized fungi <i>Lepraria spp</i> .
11:10am	Johnson, Thurman (Biology), Rebecca Brown Palouse Prairie Restoration in Eastern Washington: First-year Plant Cover and Richness Driven by Topographic Variation, Not Seed Mix Diversity composition for each treatment across three aspects: hilltop/south, north, and swale using mixed linear
11:35am	Beaulaurier, Eric (Biology), Jason Ashley Effects of α2,3 Sialylation on CSF1R Signal Potency
12:00pm	Kennedy, Kailani (Chemistry & Biochemistry), Jamie Manson Neutron Diffraction Study and Magnetic Properties of NiF2(H2O)2(3-CN-py)2
12:25pm	Fischer, Marianna, Brandon Lewis, and Avary Zachary (Engineering), Philip Appel Solid Waste Fuel For Combustion in Energy Recovery System
12:50pm	Scheff, Tyler, and Mickenzie Kinney (Engineering), Awlad Hossain and Heechang (Alex) Bae Correlating the Mechanical Properties of Fiberglass Composites for Different Flaw Defects
1:15pm	Kinney, Mickenzie, and Tyler Scheff (Engineering), Heechang (Alex) Bae and Matthew Michaelis Investigating the Effects of Acetone Vapor Treatment Conditions and Post Drying Methods on Surface Roughness and Tensile Strength of 3D Printed ABS Components
	Scoles, Alexander (Geosciences), Stephen Tsikalas

	Exploring the Changing Climate of Inland Washington and Northern Idaho, 1993 to 2022
1:40pm	

#### Oral Session 3: PUB 321

#### <u>Chicano Education, Creative Writing, Gender & Women's Studies, International Studies, Music,</u> <u>Psychology, Social Work and Wellness and Movement Sciences</u>

9:30am	Balderas, Sabrina (Chicano Education), Martin Meraz Garcia Chicanos and Mexican Americans in Higher Education
9:55am	Dahlin, Connor (Creative Writing), Jonathan Johnson Humanity's Poetic Relationship with Reality: A Discourse on Ancient Allegory & the Relationship Between Poetry & Mythology
10:20am	Stegall, Annastacia (Creative Writing), Jonathan Johnson The Forgotten Poet, Elsa Von Freytag-Loringhoven, and Her Contribution to Modernism
10:45am	Garcia, Erika (Gender and Women's Studies), Judy Rohrer Behind Bars and Beyond Binaries: Examining the Ongoing Oppression and Abuse of Transgender Detainees in ICE Custody
11:10am	Murphy, Richard (International Affairs), Thomas Hawley Neoliberalism's Effect on Society: An Analysis of the Internalization of Neoliberalism on Freedoms and Democracy
11:35am	Amdahl, Kathryn (Music), Jonathan Middleton Florence Price: Forgotten No More
12:00pm	Hines, Koby (Psychology), Jillene Seiver Effects of Procrastination and Intrinsic Motivation on Academic Performance and Life Satisfaction in Upper Division Courses
12:25pm	Ssebanakitta, Bakima (Psychology), Jillene Seiver Post Traumatic Growth after COVID-19 as a Function of Cognitive Emotional Regulation and Emotional Intelligence
12:50pm	Kent, Joshua (Social Work), ManChui Leung The Impact of School-Based Student Support Services, Creating Positive Change to Mental Health and Academic Success
1:15pm	Garcia, Arcelia, Dionna Cox, and Eric Gomez (Wellness and Movement Sciences), John Gerber Difficulty in Diagnosis and Treatment of a Navicular Fracture and Talar Osteochondral Fracture in an Adolescent Dancer: A Case Study

1:40pm	O'Bryan, William, and Kodie Counsell (Wellness and Movement Sciences), Garth Babcock and Otto Buchholz The Effect of Total Motion Release on Functional Movement Screen Scores in Female Collegiate Volleyball Players
1:40pm	The Effect of Total Motion Release on Functional Movement Screen Scores in Female Collegiate Volleyball Players

### Oral Session 4: PUB 323

## English, Philosophy, and Theatre

9:30am	Roof, Brendan (English), Paul Lindholdt Individualism and Nonconformity in Ralph Waldo Emerson's "Self-Reliance"
9:55am	Campbell, Richard (English), Max Hohner Machiavelli as Literary Theory
10:20am	Zagar, Luke (Philosophy), Kevin S. Decker and Christopher Kirby Hume's Ethics on the Acceptability of Suicide in the Modern World
10:45am	Cyphers, Thomas (Philosophy), Chris Kirby Epistemic injustice and Elimination of Bias
11:10am	Hokanson, Noah (Philosophy), Kevin S. Decker On the Intersection of Augustine and Descartes in the Work of Nicolas Malebranche Augustine, and Descartes, which is of interest as the modern period is not necessarily known for this
11:35am	Browning, Irie (Philosophy), Christopher Kirby The Telos of a Table: An Aristotelian Reflection on the Meaning of Crafted Objects
12:00pm	Kunde, Mason (Philosophy), Terrance Macmullan An interpretation and application of Paulo Freire's <i>Pedagogy of the Oppressed</i> : how we can educate ourselves against oppression.
12:25pm	Trejo-Bernal, Lizette (Sociology), Kassahun Kebede The New Generation: The Experience of Second-Generation Mexican Immigrants
12:50pm	Cullen, Aspen (Theatre), William Ledbetter A Lack of Leading Ladies: Understanding the Absence of Queer Women in Musical Theatre
1:15pm	Belton, Mary (English), Christina Valeo How do the feminist themes of Mrs. Dalloway influence the feminist themes of The Hours? (the film adaptation of Michael Cunningham's The Hours directed by Stephen Daldry)

### Poster Presentation Session One: PUB NCR 9:00 a.m. - 10:45 a.m.

Ayala, Kristina and Laci Johnson Health Services Administration Rosalee Allan Headed for Extinction: Is the current American Diet causing infertility in US Women?

Baber, Rebecca Psychology Philip Watkins Spirituality During COVID-19

Baker, Lyric and Zac Zeigler Biology Andrea Castillo Determining if the Natural Antimicrobial Manuka Honey Induces Antibiotic Resistant Viable But Not Culturable Bacteria

Boyes, Kennedy, Shelby Rowley, Mark Phillips, and Harper Williams Social Work Ed Byrnes The Use of Research for Evidence-Informed Practice

Bustos, Benjamin and Mason Matera Biology Luis Matos Supplementing *Manduca sexta* Artificial Diet with Extra Vitamins Does Not Increase Growth Rate or Final Weight

Cummings, Lilijanna Biology Jason Ashley Sexually-divergent differentiation and inflammatory response of osteoclast precursors

Desimone. Carson Environmental Science Carmen Nezat Evaluating the Accuracy of Elemental Analysis of Soil and Rock Prepared by Microwave Acid Digestion

Dyess, Elizabeth and T. Heil Anthropology Michael Zukosky Estimating the Minimum Number of Individuals (MNI) For Skeletal Collections – With Consideration to the Introduction of Procurement Bias

Frago, Jonah Biology Jenifer Walke Strain variation in competency induction of the core honey bee gut bacterium, *Snodgrassella alvi*  Gamache, Katlin Geology Richard Orndorff Climate, Soil, and Wine in Washington State

Gamache, Katlin, Jalyn Osgood, and Hannah Queen Geology Richard Orndorff Geotechnical Analysis of Soil Sample PP-1 from the Palouse Prairie Restoration Project, Cheney, WA

Garcia, Laurie, Anthony Cortez-Morales, Betzi Bruno Aguilar Psychology Kevin Criswell Examining the Interaction between Online Coursework and Internalized Stigma in Undergraduate Students with Chronic Health Conditions Across 2020, 2021, and 2022

Gray, Aric Biology Jenifer Walke and Paul Spruell Identification of *Batrachochytrium dendrobatidis* lineage in Turnbull National Wildlife Refuge

Hays, Alexa Environmental Science Richard Orndorff The Johnstown Flood and its Impact on Dam Construction and Ownership in the United States

Holman, Sophie and Pamela OrdonaPsychologyKevin CriswellAdaptive and Maladaptive Coping Strategies Predict Health and Academic Resilience in UndergraduateStudents with and without Chronic Health Conditions: A Longitudinal Study

Hopkins, Brandon Geography Richard Orndorff Inland Washington Drought and the Effect on Wildfire

Ives Keagan and Matt Price Geology Richard Orndorff The Importance of Snowpack as a Water Source for California

Kaddoura, Mohammad, and Shayan Shahrabadi Biology Luis Matos *Drosophila melanogaster* Potential as a Model System for Human Succinic Semialdehyde Dehydrogenase (SSADH) Deficiency

Kappes, Cayden, Paulson Thompson, Ray Tanner, and Arthur Wallace Computer Science Sanmeet Kaur Quartzy Inventory Management App

Keith, Collin and Gale Kamp Health Services Administration Rosalee Allan Becoming a Different Person with No Control

Kenison, Kiler Biology Ross Black and Camille McNeely The Sources and Fates of Nutrients in the Deep Lake Watershed

Killian, Suzanne Mathematics Hyung Sook Lee Mathematical Art Exhibit

Krisyuk, Zlata, Tristen Naval, Kaity Paz, and Megan Pickett Psychology Kevin Criswell Depression and Anxiety Symptom Severity in Students with Physical or Mental Chronic Health Conditions during 2020-21 Academic Year: A Longitudinal Study

Lake, Meg and Elaine Larsen Biology Jessica Allen Impact of secondary metabolites and primary reproductive mode on *Parmotrema* distribution in the Southeastern United States

Legg, Betsy Geosciences Chad Pritchard Fancher Butte, Steptoe of Eastern Washington: Witness to Weapons of War 1858 and 1958

Leonard, Max, Seth Morris, and Logan Becker Geology Richard Orndorff Geotechnical Analysis of Soil Sample PP-2 from the Palouse Prairie Restoration Project, Cheney, WA

Long, Logan, Will Montgomery, and Mitchel Stefonowicz Environmental Science Richard Orndorff Geotechnical Engineering Analysis of Soil Sample PP-4 from the EWU Palouse Prairie Restoration Project, Cheney, WA

Lutz, Adam Geology Richard Orndorff The Importance of Snowpack to Water Availability in the Western United States McGillicuddy, Jake Computer Science Yun Tian Real-Time Video Analysis for Automated Attendance: An Amazon Web Service Solution

McPeck, Roxanne, Olivia Morgan, and Andrea Castillo, PhD Biology Andrea Castillo Overexpressing two *Helicobacter pylori* small RNAs from a bacterial pathogenicity-related chromosomal region to investigate their regulation of virulence genes

Miranda, Monica Psychology Shanna Davis Effects of English Language Instruction in the K-12 system: A Retrospective Study

Montejano, Katie and Ian Campuzano Psychology Danielle Sitzman How do we effectively correct health misinformation?

Morgan, Olivia, RN McPeck, and AR Castillo, PhD Biology Andrea Castillo Overexpressing sRNA in *Helicobacter pylori* with Cloning and Transformation

Morris, Seth Geology Chad Pritchard Interactive Presentation Groundwater Flow Simulation Model

Morrison, Carissa Biology Jessica Allen Survey of Lichens at Eastern Washington University as Bioindicators of Air Quality and Nitrogen Deposition

Moua, Amy, Irina Isianov, and Yalda Mohmand Health Services Administration Rosalee Allan Rap music and its correlation with the mental health of young adults

Mumey, Devin Biology Jessica Allen Lichens of Iller Creek: A Checklist for the Iller Creek Unit, a Division of Dishman Hills Conservation Area, Spokane Valley, WA

Nguyen, Nhat, John Plimpton, and Hope Storro Engineering

Uri Rogers Modeling a Step Response Using Quadcopters

Norman, Mark and Justin Liebert Engineering Arindam Das Distributed Smart Camera System

Odiorne, Madilyn, Ruby Hammond, and Brynn Richey Environmental Science Ruby Hammond A Baseline Assessment of Migratory and Resident bird use of a Prairie Restoration Site in eastern Washington

Ollero, Marley Geology Stacy Warren and Chad Pritchard Mining of Red Marble Quarry, Washington

Osgood, Jalyn and Hannah Queen Geology Richard Orndorff History and Impacts of Grand Coulee Dam, Washington

Paulsen, Julianna Biology Jessica Allen Geography, Climate, and Habitat Shape the Microbiome of the Endangered Rock Gnome Lichen (*Cetradonia linearis*)

Sangster, Tianah and Andrea Orozco Health Services Administration Rosalee Allan Period. An End to Menstrual Stigma

Powers, Evan, Joshua Stermer, and Tsion Yohannes Engineering Michael Meyer Using an embedded system for a quality cup of coffee

Richardson, Claire and Carson Desimone Environmental Science Carmen Nezat Elemental Concentrations in Urban and Rural Dust in Spokane County, WA

Scoles, Alexander Geography Richard Orndorff The History of Lake Tulare, California: Past and Present

Singh, Ramanpreet, Nguyen Nguyen, and Taylor Matteucci Biology

Charles Herr Developing Cryopreservation Methods of Wheat Roots

Snyder, Mariah Physical Education, Health & Recreation Katrina Taylor and Christi Brewer The Physical and Psychological Effects of Multi-Ingredient Pre-Workout Supplements in Females During Resistance Training

Springer, Elena and Cora Malcom Health Services Administration Rosalee Allen The Price Insulin Truly Has On American Lives

Stockslager, Jamison Physical Education, Health & Recreation Katie Taylor and Carri Kreider The Impact of Single-Gendered vs Coeducational Physical Education on Female Adolescent Body Image and Self-Esteem

Taylor, Kevin Geology Richard Orndorff Historic Failure of the Teton Dam, Idaho and its Impacts on Future Dam Construction

Toulou, Erin, and Marley Ollero Geology Richard Orndorff The Water Crisis of Lake Mead, Nevada

Woodworth, Kylee Geology Richard Orndorff History and Development of Hanford Reservation, Washington

Zepp, Hunter Design Colin Manikoth Interactive Presentation Déjà vu

### Poster Presentation Session Two: PUB NCR 11:15 a.m. - 1:00 p.m.

Alvarez, JJ Biology David Daberkow Investigating the Effects of Pretreatment Intraperitoneal Oxytocin on Signs of Trauma

Amante, Julianna History Larry Cebula The Legacy of Redlining in Spokane: How Redlining Has and Continues to Affect East Central Spokane

Barr, Seth Biology Paul Spruell Aggregative predation responses from Walleye on White Sturgeon in Lake Roosevelt, WA.

Bautista, Saul History Joseph Lenti El Indio Desplazado: The Systematic Displacement of Native People in the Collective Memory of Honduras Through Mayanisation

Betz, Elizabeth Biology Luis Matos Inserting phosphatase genes into an inducible plasmid vector for *Lactococcus lactis* farnesol production

Biedscheid, Zachary Economics Mark Holmgren Exploring the Adoption and Impact of Bitcoin: A Comparative Analysis

Boley, Adam Physics Andres Aragoneses The Most Beautiful Experiment in Physics: How the Double Slit Remained Relevant for Over Two Centuries

Brandt, Jodi, and Judd Case Biology Judd Case Relationship between Sickle cell trait and effects of Sickle cell disease

Busch, Conner History Larry Cebula The Origins of Segregated Neighborhoods in Spokane

Cardenas, Jenna Chemistry & Biochemistry Yao Houndonougbo Silico docking studies of ITPA mutants: the analysis of protein-ligand interactions Carlson, Rayna Biology Andrea Castillo Labile Antimicrobial Mechanisms of Manuka Honey Differentially Impact Pathogenic Bacteria Chavez, Ehriza History Larry Cebula Airway Heights, Washington's Unknown Sundown Town DeFehr, Terreca M. Psychology Jillene Seiver WorkLlife balance is imperative to how we spend our time at work and with family Dodson, Rae **Environmental Science** Carmen Nezat Lead in Soils at the EWU Palouse Prairie Restoration Site Escalante, Claudio, Nicholas Gilchrist, and Amalia Farias Biology David Daberkow The effects of fructose and caffeine on novel object recognition in male Sprague Dawley rats Garcia, Analicia and Christine Macharia Public Health Katie Taylor Modifying the American Fitness Index Toolkit to Assess the Health of a Campus: Healthy Campus, Healthy Eagles Garvey, Megan Biology Camille McNeely Fairy Shrimp (Anostraca) Hatching in the Vernal Pools of Eastern Washington Hansen, Allisen Geology **Richard Orndorff** A Confluence of Cultural and Water History with the Seli's Ksanka Qlispe' Dam, Montana Hedt, Elizabeth History Larry Cebula

Historically Black Neighborhoods in Spokane

Ives, Keagan Geology Richard Orndorff Analysis of the PP-3 Soil Sample From the Palouse Prairie Restoration Project Site, Cheney, WA

Kennerly, Sylvia Biology Jason Ashley Overexpression of Fringe Protein in Osteoclast Macrophages

Killian, Suzanne Mathematics Hyung Sook Lee What is Inquiry-based Mathematical Learning?

Lambert, Miranda Chemistry & Biochemistry Ashley Lamm Synthesis of a Degradable BN Polymer

Legg, Betsy Geosciences Richard Orndorff The Life-Giving Nile: The Central Role of the Nile River in the Development and Sustainability of Ancient Egyptian Civilization

Leonard, Max and Lucas Robert Geology Richard Orndorff History and Environmental Impacts of the Salton Sea, California

Long, Logan, and Issac Dunmore Environmental Science Richard Orndorff The Effects of the Indonesian Water Crisis on Rural Populations

Low, Rachael History Lawrence Cebula Spokane's Debates of 1968 for Fair Housing

Madrigal, Arcelia Psychology Susan Ruby Impacts of Cultural Identity and Experience on Perception of Social Emotional Learning

Mason, CJ History Larry Cebula The Segregated South Hill Mathias, Anthony Chemistry & Biochemistry Yao Houndonougbo Simulation of the Adsorption of Methane in ZIF-93 using the Universal Force Field

Minlletes, Megan, Pamela Ordona, and Emily Collins Psychology Julie Swets Potential Associations with Nostalgia Proneness

Mueller, Sydney Chemistry & Biochemistry Yao Houndonougbo Molecular Simulation of the Adsorption of Carbon Dioxide in ZIF-93 using the Universal Force Field

Nagle, Sawyer Biology Camille McNeely The Role of Porosity on the Efficacy of Beaver Dam Analogs

Nguyen, Nguyen Biology Charles Herr Bacteria chitinase production and activity

Nguyen, Nhat Physics Andres Aragoneses TARDYS Quantifier

Novak, Benjamin Physics Andres Aragoneses Ordinal Analysis of Complexity in 2D Chaotic Maps

Ollero, Marley, Jalyn Osgood, and Matthew Slater Geography Lauren Stachowiak Spatial Reconstruction of Historical Fires in the Pine Rocklands on Big Pine Key, Florida

Parke, Kelly Disability Studies & Universal Access Ryan Parrey Atmospheres of Ableism: A Phenomenological Exploration of Everyday Encounters

Plimpton, John Engineering Thomas Walsh Interactive Presentation PLC Directed Studies by John Plimpton

Potter, Natalie Geology **Chad Pritchard** Projecting variations of deformation in the Spokane, WA area based on isolated buttes. Reiner, Kai Geology **Chad Pritchard** Deciphering Anthropogenic VS. Natural Fulgurites Rogers, Camille Economics Mark Holmgren Effects of Unemployment on Service Industry Employment Sanchez, Citlalli Biology Jason Ashley Knockout of LFNG gene using Di-Cas7-11 system in RAW264.7 macrophages Schaaf, Brooks Economics Mark Holmgren Wealthy and wanting: What the wealthy miss out on through income segregation Schuller, Elyssa Geology **Richard Orndorff** Sea Level Rise and Coastal Erosion in the United States Schultz, Matthew **Political Science** Majid Sharifi Contested Lands and Waters: The Political Forces Surrounding Northern Dynasty's Proposed Mine Near Bristol Bay, Alaska Simmons, Taylor Psychology Michael Zukosky The Effect of Familismo on the Mental Health of Mexican Immigrants to the United States and their Children Simpson, Jocelyn and Tatum Dickison Physical Education, Health & Recreation Kailyn Gunning Confidence and Exercise: Is There a Link Between Exercise and Perceived Confidence? Smith, Annika Geology **Richard Orndorff** Relationship Between Wildfires and Flooding in the Western United States

Streeter, Cole Chemistry & Biochemistry Ashley Lamm Crystal structure of Triazatriborino[1,2-a:3,4-a':5,6-a'']tris[1,3,2]benzodiazaborole

Tabino, Makenna Biology Rebecca Brown Mowing Cattail Cover to Increase Aquatic Vegetation Diversity on the Coeur D'Alene River Floodplain in Cataldo, Idaho

Toulou, Erin Geology Chad Pritchard Preliminary Groundwater modeling of the West Plains, Spokane County, Washington: Deciphering erratic trends in PFAS contamination

Trier, Michael Biology Rebecca Brown Using deep learning to understand and map the impact of large-scale dam removals on plant communities and fluvial landforms

Worrell, Emerson Biology Camille McNeely Carbon Storage and Uptake in Woody Riparian Ecosystems in Eastern Washington

# **Abstracts & Project Descriptions**

Ahola, Grace, with Gloria Miller Music Jonathan Middleton Creative Work Vignettes on a Premonition

Vignettes on a Premonition is a collection of short pieces for cello duo, inspired by an unpleasant experience involving a spider and relational conflict. This experience instigated a dream which held significant meaning to the composer, warning of a painful ending and revealing the inward source of conflict. The Prelude was written using 2 different 12-tone rows and the rhythms were chosen by chance through the rolling of dice. The themes from Vignette I: "Arachnid" derived from 2 matrices made from the tone rows in the Prelude. This vignette describes the experience with the spider, twisting and turning gently in the beginning, as the spider crawls along the wall, and ending with one cello playing double stops in a very high register and the other cello adding rhythmic interest, while using ponticello technique to create a scream-like sound. Vignette II: "Shadow" is a variation of one of the themes from Vignette I, but takes a slower pulse since it is an exhalation of the preceding emotional buildup. This vignette transitions directly into Vignette III: "Nightmare," which explicitly describes the resulting dream using repeated ostinato patterns that continue relentlessly throughout the movement, as well as the fear created through the use of surprising rhythmic accents and registeral shifts. The last movement, Vignette IV: "Translator of Dreams," contains many extended techniques which create strange and uncomfortable sounds on the cello, describing the significance and influence of dreams and the mind's process of interpreting them.

Alvarez, JJ Biology David Daberkow Poster Investigating the Effects of Pretreatment Intraperitoneal Oxytocin on Signs of Trauma Introduction: Oxytocin has been used as a post-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. To further this research, we investigated the specific dose of oxytocin, administered (i.p), that will also alleviate signs of fear in rats. Methods: Male Sprague-Dawley rats, were split into five experimental groups (n=8 per group); 1.) control group treated with vehicle and no foot shock, 2.) shock group treated with vehicle and received foot shock, 3.) low dose group that received 0.03 mg/kg oxytocin and foot shock, 4.) medium dose group that received 0.3 mg/kg oxytocin and foot shock, and 5.) high dose group that received 1.0 mg/kg oxytocin and foot shock. Rats were treated with oxytocin (or vehicle) 30 min prior to exposure to fear conditioning. Rats were put into a Colbourn Precision fear-conditioning shock chamber, a plexiglass box with a metal grate floor, which delivered five foot shocks at an intensity of 0.6 mA. Twenty-four hours later, the rats were re-exposed to the chamber for 5 minutes, not shocked, and the freezing time was recorded via a motion detector. Results: Preliminary data suggests that the low dose of oxytocin (0.03mg/kg) decreases freezing relative to the untreated shock group. Conclusion: These data suggests that a specific dose of oxytocin (0.03mg/kg), administered i.p., can be used as a prophylactic pre-treatment to mitigate signs of fear.

Amante, Julianna History Larry Cebula Poster

The Legacy of Redlining in Spokane: How Redlining Has and Continues to Affect East Central Spokane HOLC maps were created by the FHA in the 1920s to define a neighborhood's quality in order for banks to know which houses they should insure. The red areas of the map were marked hazardous and were denied insured mortgages. Areas would become red if more than a few Black residents moved in, so realtors and residents prevented Black people from moving out of red areas by using racial covenants, legal restrictions, and violence. Redlining, as it is now called, shaped cities by confining Black people to a few areas and became a form of easily hidden de jure segregation.

Spokane WA has not seen the effects of segregation to the extent that other regions in the U.S have. However, inhabitants assume that there are no lingering effects regarding segregation. Spokane has its own HOLC map which indicates the same pattern of marking areas with a population of Black residents as red zones. The HOLC map impacts East Central, the neighborhood which historically housed Spokane's Black population, despite its discontinuation in 1968.

By comparing maps of Spokane since the installation of HOLC maps, a pattern of poor conditions appear in East Central. Maps of urban tree canopy, Heat islands, unemployment rates, I-90 placement, and Spokane's diversification over time were used in this research.

The construction of I-90 bisected East Central in 1968. 18 acres of Liberty Park was sold and used for construction along with many of the homes surrounding it. Other redlined neighborhoods throughout the U.S. met similar fates. More results showed that East Central had a tree canopy of around 14-17% while the highest percentage in Spokane was 40%. Less trees mean more heat, and East Central was up to 13.9 degrees hotter than other areas of Spokane. Additionally, a 1990s map of Spokane's unemployment rate showed that East Central had an unemployment rate of >20%. Despite the conditions of East Central, Black residents did not begin to disperse from this neighborhood until the 1980s.

Amdahl, Kathryn Music Jonathan Middleton Oral Presentation Florence Price: Forgotten No More Florence Price was a composer and except for opera The music of Flor

Florence Price was a composer and musician who lived from 1887 to 1953. She composed music in every genre except for opera. The music of Florence Price traveled practically everywhere; from the radio to the concert halls to the church. Throughout her life, she became well-known as the first African American female composer who was featured by a major symphony. Florence Price was tenacious, brave, and courageous during her era which contributed to the level of acceptance that society now holds for African American composers. Despite the challenges she faced during her lifetime, she never gave up or collapsed due to the pressures. However, she was erased from history until a recent discovery of her unpublished manuscripts were found in 2009. Due to that discovery, both scholars and the public alike have realized that her music transcends classical music norms because she also included African American spirituals and other motifs within her compositions. Price's music intrigues both performers and audiences which has contributed to her rise in current popularity. From the way Price subtly alluded to struggles in her own life in her compositions, one can easily be transported into another realm and contemplate life from her perspective. Overall, the life of Florence Price presents much that can be learned both on a personal and musical level.

Arguello, Jonathan Music Jonathan Middleton Creative Work Sunflower Fields The lyrics of "Sunflower Fields" by David Alvarado express a sense of peace and clarity in the present moment, with the singer not being burdened by worries or past memories. Despite appearing cool on the outside, the  $\sim 29 \sim$  singer admits to being mentally tuned out at school, as their mind is always in a different place. The chorus describes a dream-like state in sunflower fields where hope and dreams come alive, and pain from the past is left behind. The second chorus emphasizes the singer's real love and the need to heal from pain, while still cruising through the day in a "garden of hope" and dreams, with "good vibrations" that last forever.

Arrasmith, Natasha, Natalie Barton, Cari Keyser, Clayton Schneider, and Abbigail White Biology

Krisztian Magori

Poster

Ectoparasites Among the Small Mammal Population on the Eastern Washington Prairie Restoration Eastern Washington University is actively working on a prairie restoration project to restore multiple acres of farmland back to a prairie ecosystem, eventually adding walking paths for the general public. Previous tracking at the prairie restoration project shows an established small mammal population. Our study aims to look at whether there is an ectoparasite population among small mammals and the hosts they prefer. The ecological importance of this project lies within the lack of knowledge surrounding the newly renovated prairie restoration and the ectoparasites that could be present. We plan to set multiple Sherman traps out during midday and check for small mammals the following day early in morning. The small mammals will be searched for ectoparasites in accordance with IACUC protocol then released. We will use statistical analysis to identify which small mammal is the preferred host for the ectoparasites. We will also monitor the large mammals that go through the prairie restoration site that could be bringing ectoparasites. It has been shown in previous literature that deer, moose, and elk, and other large mammals, often provide transportation to new areas and host for ectoparasites. We hope this study provides new information on any ectoparasites that inhabit the prairie restoration, and their hosts, which can help further ecological knowledge of the Eastern Washington area. It will also provide information for when the walking paths are created for the general public to know what type of ectoparasites they could encounter and how best to prepare for them.

Ayala, Kristina, and Laci Johnson Health Services Administration Rosalee Allan Poster Headed for Extinction: Is the current American Diet causing infertility in US Women?

It is critical to the survival of the human species to reproduce. Depreciated birth rates are an increasing issue in the United States. Currently, 19% of women aged 15-49 are unable to get pregnant due to infertility. With this trend on the rise, people are forced to investigate what is within their abilities to better the survival of humanity. One such factor is nutrition. With nutrition considered, the Standard American Diet can be shown to be low in sustentative value, causing inflammation and overall lessened health. Mediterranean countries have lower infertility rates than their western counterparts. This project aims to evaluate diets of the average US citizen compared to the diets of the average citizen of the Mediterranean region. It is within the interest of this research to see if one supports a healthier reproductive system than the other. Research will be done using secondary research data from the Centers for Disease Control and Prevention (CDC), Census data, and existing research articles. The goal is to bring awareness to a controllable factor in the many uncontrollable factors surrounding infertility. For many women, diet alone will not bring solutions. This research may be a key component in understanding inflammatory foods that can affect reproduction negatively.

Baber, Rebecca Psychology Philip Watkins Poster Spirituality During COVID-19 We conducted a study of gratitude for God that was present during the COVID-19 pandemic. Gratitude towards God has been shown to be important to spiritual well-being. The purpose of this study was to determine how the confidence in the existence of God impacted the relationship between gratitude to God and spiritual struggles during the Pandemic. This study was conducted with online self-report questionnaires. 236 participants were randomly assigned to describe either a positive event or an important positive spiritual event. Participants either recalled "the three most important positive experiences in their lives" or "the most important spiritual experience in their life." They then wrote about the most important experience. The questionnaire also had items that queried participants' current emotions, one's disposition toward gratitude to God, and various aspects of emotional well-being. Participants also answered questions about their religious/spiritual struggles during the pandemic.

Results showed that the relationship between spiritual struggles and gratitude to God depended on their confidence in the existence of God. From the questionnaire we were able to break down the participants' confidence in the existence of God into three groups (little or none [0%-40%] moderate [50%-70%] and strong [80%-100%]). Individuals showing very little confidence in God's existence showed a positive association between spiritual struggles and gratitude to God. However, participants showing a strong belief in God showed significant negative correlation between gratitude to God and spiritual struggles, suggesting that for individuals who are confident in God's existence, gratitude to God may protect them from spiritual struggles.

Baird, Hilary Music Jonathan Middleton Creative Work The Keys to The Kingdom "Keys to The Kingdom" is bas

"Keys to The Kingdom" is based on the Bible story in the book of Matthew in which the keys to the kingdom were given to St. Peter by Christ. Christ tells Peter, "You are my rock, and on this rock I will build my church." Peter comes from the Greek word "Petra," meaning rock. This piece was composed to convey the story in a way that catches the listener's ear. The piece tells the pivotal story in the history of the Catholic Church. The key signature of F sharp minor conveys the magnitude of the moment in the story.

Baird, Hilary Music Jonathan Middleton Creative Work To a Land of Sleep and Dreams "To a Land of Sleep and Dreams

"To a Land of Sleep and Dreams" (Nocturne) was composed for my youngest nephew Wyatt. The Nocturne was composed for him as a song that he can listen to at the end of the day before bed as a calming method. The Nocturne uses augmented chords with stable harmonic resolutions that bring a calm feeling to the evening bedtime experience. I wrote the Nocturne with neuroscience in mind, knowing that after babies listen to music, their prefrontal cortex activity looks different.

Baker, Lyric, and Zac Zeigler Biology Andrea Castillo Poster Determining if the Natural Antimicrobial Manuka Honey Induces Antibiotic Resistant Viable But Not Culturable Bacteria Bacterial development of antibiotic resistance is a serious threat to public health. Antibiotic resistance occurs through mutation, resistance gene acquisition, and entry into the Viable But Not Culturable (VBNC) dormancy state. VBNC bacteria are genetically identical to their antibiotic susceptible siblings but resist antibiotics

because the metabolic processes targeted by the antibiotics are not active. Environmental stresses, including

exposure to conventional antibiotics, trigger bacteria to enter the VBNC state; consequently, efforts to develop or identify antimicrobials that induce VBNCs are underway. Manuka Honey (MH) has proven to be a broad-spectrum antimicrobial with many antimicrobial mechanisms to which resistance has not yet been observed. MH is being explored as a treatment for skin and other infections. We hypothesize MH will induce fewer VNBC cells than a traditional antibiotic, tobramycin. To test this hypothesis, we are comparing non-VBNC and VBNCs *Staphylococcus aureus* populations after treatment with MH or tobramycin. We will identify non-VBNC cells using the viable plate count (VPC) technique that is based on cells being metabolically active and therefore able to grow and produce visible colonies. We will also use a microscopic technique called live-dead (LD) staining that counts both non-VBNC and VBNC cells based on their uptake of a green dye. The VBNC population is determined by subtracting the VPC from the LD cell count. Preliminary results contradict our hypothesis by suggesting that MH induces more VNBCs than tobramycin. We will conduct additional refined experiments with *S. aureus* and extend our studies to additional skin microbes.

Balderas, Sabrina Chicano Education Martin Meraz Garcia Oral Presentation Chicanos and Mexican Americans in Higher Education Oppression and racism have manifested throughout marginalized communities by means of a lack of proper access to primary secondary and post secondary education. Due to racism and oppression from Angle socie

access to primary, secondary and post-secondary education. Due to racism and oppression from Anglo society, higher education has been depicted as an unattainable goal for minority communities. Chicanos and Mexican-Americans in higher education have been on the rise in recent years, yet they have continued to face obstacles that were originally put in place to prevent and limit access to higher education. Some of those limitations include the cost of attendance, the quality of primary and secondary education, and the accessibility of navigating the application process. Through the lens of a Mexican-American and first-generation college student, I aim to explore and identify the Chicano cultural conflicts and the obstacles used as a form of oppression.

Barr, Seth Biology Paul Spruell Poster

Aggregative predation responses from Walleye on White Sturgeon in Lake Roosevelt, WA.

Seasonal prey abundance can drive predatory fishes to aggregate in areas of high prey density. This project aims to determine whether Walleye (*Sander vitreus*) are exhibiting an aggregative predation response to larval White Sturgeon (*Acipenser transmontanus*) drifts in the Lake Roosevelt system, which is a reservoir of the Columbia River in Washington State. Sturgeon are a long-lived ancient species of anadromous fish that spawn in the summer months and are native to the Columbia River basin. Populations of sturgeon are threatened worldwide and have recreational, economic, historical, and intrinsic values wherever they are found. Walleye are a popular nonnative piscivorous game fish that were illegally introduced to Lake Roosevelt in the 1950's. Walleye in this study will be obtained through angling, electrofishing, and gillnetting. Samples will be taken during pre-spawn, peak spawn, and post-spawn time frames from May to October 2023. Stomachs from Walleye will be dissected and analyzed for presence of prey, using DNA barcoding to identify prey items to the species level. If a higher proportional presence of larval White Sturgeon is found within Walleye stomachs during the spawning season, it may indicate a shift in foraging behavior or prey selectivity as the Walleye aggregate to the upper Columbia arm of Lake Roosevelt where the larval drifts occur. Results from this research will be used to inform ongoing management decisions regarding populations of White Sturgeon in Lake Roosevelt.

Bautista, Saul History

#### Joseph Lenti

#### Poster

El Indio Desplazado: The Systematic Displacement of Native People in the Collective Memory of Honduras Through Mayanisation

The nation of Honduras has a rich and diverse historical culture of indigenous people from Lencas in the plains to Misquitos in the high mountains and to Garifunas in the coasts of Honduras, which has been underrepresented and dismissed by its political system. This research project assesses the problematic way in which the Honduran government has historically depicted the Indigenous communities. It contends that an intentional and active campaign waged by the Honduran government, using propaganda and misinformation, has actively perpetuated the idea that native peoples are inconsequential to the history of Honduras even when they represent up to 10 percent of the population. This form of misinformation and discrimination has succeeded in influencing generations of Hondurans, and it has led many of them to believe that indigenous people are not active participants in society today. The historical diminishment of the indigenous presence in Honduras has contributed to contemporary discrimination and repression of native people. Examination of public education and oral interviews conducted with educators and scholars, as well as primary sources of law changes and secondary sources have been used in order to support this investigation. The history of indigenous displacement in Honduras is a long one full of struggle, and their history needs to be told.

Beaulaurier, Eric Biology Jason Ashley Oral Presentation

Effects of α2,3 Sialylation on CSF1R Signal Potency

Increased bone resorption caused by excessive osteoclast activity contributes heavily to the occurrence of fragility fractures as well as the bone destruction caused by inflammatory pathologies such as rheumatoid arthritis. Osteoclastogenesis is dependent upon both survival and proliferation signaling provided by colony stimulating factor 1 (CSF1) and differentiation signals provided by receptor activator of nuclear factor kappa-B ligand (RANKL). There is evidence that CSF1 receptor (CSF1R) is decorated with polysaccharides that terminate in the sugar, sialic acid. I hypothesize that the sialylation status of CSF1R contributes to its signaling potency. To investigate these effects, we will culture primary bone marrow macrophages from mice in a medium containing CSF1 and RANKL to induce osteoclastogenesis. Once osteoclastogenesis is initiated we will treat the osteoclast precursors with either a negative control containing only the base medium, CSF1 and RANKL, or base medium and either a heat inactivated or active  $\alpha 2,3$  neuraminidase, which can remove terminal sialic acid residues in a stereo-selective manner. Resulting osteoclasts will be imaged via fluorescence microscopy after being stained with nuclear and cell membrane stains and osteoclast size and number will be measured. Following imaging, cells will be fixed and additionally colorimetrically stained for tartrate-resistant acid phosphatase (TRAP) activity and assessed for aberrant morphology. Differences between treatments will be assessed using a Student's t-test followed by Bonferroni multiple test correction.

Belton, Mary English Christina Valeo Oral Presentation How do the femin

How do the feminist themes of Mrs. Dalloway influence the feminist themes of The Hours? (the film adaptation of Michael Cunningham's *The Hours* directed by Stephen Daldry)

Fans of Virginia Woolf know that her literature, such as "A Room of One's Own" and *Mrs. Dalloway*, cover feminist themes. In adaptations of Virginia Woolf's work, the same feminist themes are present. For example, Michael Cunningham's *The Hours*, based on three women whose lives are connected through Virginia Woolf's novel *Mrs. Dalloway*, carries similar feminist themes. In the 2002 adaptation of *The Hours*, directed by Stephen Daldry, the relationships between men and women in the film illustrate how the patriarchy operates socially.  $\sim 33 \sim$ 

revealed.

To those who don't know Virginia Woolf's work well or are unaware of how Virginia's feminist theories bleed into other work, I will examine how the feminist themes of *Mrs. Dalloway* influenced the feminist themes present in the film adaptation of The Hours (2002).

As I examine the feminist themes of both works, I will discuss how the setting, character, and other literary devices illustrate how the patriarchy operates socially.

My method to examine how the feminist themes of *Mrs. Dalloway* influence the feminist themes of the 2002 film adaptation of The Hours includes looking at texts through a close lens, and researching what other scholars have found, all while looking through the lens of feminist theory.

Betz, Elizabeth

Biology

Luis Matos

Poster

Inserting phosphatase genes into an inducible plasmid vector for *Lactococcus lactis* farnesol production Farnesol (FOH), a molecule shown to reduce inflammation in the multiple sclerosis (MS) mouse model, has a precursor molecule called farnesyl pyrophosphate (FPP), that is produced in the mevalonate pathway (MVA). Certain phosphatases can catalyze the conversion of FPP to FOH. This metabolic pathway has been successfully engineered in E. coli. FOH production has not yet been studied in L. lactis, but the bacterium already contains the MVA and has application as an engineered probiotic far beyond the scope of *E. coli*. We hypothesize that *L*. lactis can be engineered to produce FOH by inserting genes for phosphatases (Pgpb, Phos15739, and YbjG) into a vector, and transforming it into the bacterium such that the bacterium will be able to convert FPP to FOH. Molecular cloning techniques are used to modify the vector plasmid and add the proper genes. Once these genes are added, the plasmid is transformed into L. lactis. Insertion is confirmed with selective media using antibiotics. The vectors pNZ7021 and pNZ8150 (Boca Scientific) will be used to introduce the phosphatase gene into L. lactis. As an additional selection measure, we are first introducing a second antibiotic resistance gene (erythromycin resistance) into these vectors. Subsequently, we will introduce a phosphatase gene from E. coli (EcoPhos) that catalyzes FPP to FOH. Successful integration of genes into respective vectors will be confirmed by PCR.At present, we have successfully ligated the ERM gene into pNZ7021. We are continuing work toward introducing the phosphatase gene into pNZ7021. Once these vectors have been successfully constructed, we will move to transform a ligation of PnZ+eRM+EcoPhos into L. lactis MG1363 cells to determine enzyme production efficiency and FOH production.

Biedscheid, Zachary Economics Mark Holmgren Poster

"Exploring the Adoption and Impact of Bitcoin: A Comparative Analysis"

Bitcoin, a decentralized digital currency, has gained significant attention recently as a potential alternative to traditional financial systems. This research project aims to explore the adoption and impact of Bitcoin by conducting a comparative analysis of its use in different countries and regions. The study will begin by examining the history and evolution of Bitcoin, its underlying technology, and its potential advantages and disadvantages compared to traditional financial systems. The project will then investigate Bitcoin's adoption in different regions, including North America, Europe, Asia, and Africa by analyzing data from relevant sources such as surveys, news articles, and academic research.

Furthermore, the study will explore the factors influencing Bitcoin adoption in different regions, such as economic conditions, regulatory frameworks, and cultural attitudes. The research will also investigate the impact of Bitcoin on traditional financial systems, including its potential role in promoting financial inclusion and reducing transaction costs.

The project will utilize quantitative and qualitative research methods, including data analysis, surveys, and

statements from Bitcoin users and industry experts. The research findings will contribute to the existing body of knowledge on Bitcoin and its potential impact on global financial systems. The study also aims to provide insights and recommendations for policymakers, industry professionals, and individuals interested in adopting or investing in Bitcoin.

Boley, Adam Physics Andres Aragoneses Poster

The Most Beautiful Experiment in Physics: How the Double Slit Remained Relevant for Over Two Centuries My senior thesis is a historical analysis of various double slit experiments performed between 1801 and 2023. Starting with Thomas Young's simple yet brilliant original in 1801 and culminating with a time dependent variation published in April 2023)in Nature, I look into the scientific impacts of these experiments as well as the ingenious methods required to complete them. In addition to the original and time dependent experiments, I will cover various other versions that represent breakthroughs or firsts concerning the particular media used to conduct the experiment. These include the first double slit using electrons, large molecule diffraction, single electron interference, and a controlled electron experiment that Richard Feynman had come up with as a thought experiment and dismissed as impossible a handful of decades earlier.

Boyes, Kennedy, Shelby Rowley, Mark Phillips, and Harper Williams

Social Work

Ed Byrnes

Poster

The Use of Research for Evidence-Informed Practice

Providing effective treatment is an ethical imperative for behavioral health practitioners and the Evidence Informed Practice (EIP) process is a vehicle for this purpose. The EIP decision-making process incorporates the best available research evidence with practitioner wisdom and client values, preferences, and needs. Steps in the EIP process include: (1) formulating an answerable EIP question; (2) Locating research evidence to answer the EIP question; (3) Critically evaluating the evidence based on it's quality and rigor; (4) Identifying treatment options that have the strongest research support; (5) Deciding with our clients which treatment best fits their values, preferences, and needs and engaging in it; and (5) Monitoring clients progress on their self-identified goals. A group of social work (BASW Program) students applied this process to a case scenario involving a 24-year-old adult male combat veteran who was suffering from Posttraumatic Stress and Alcohol Use Disorders. The BASW Program student presenters applied the EIP process and identified Prolonged Exposure Therapy (PET) as the treatment with the strongest research support for this client. In this poster presentation these students will illustrate how they applied each step of the EIP process to arrive at their decisions, and to plan for monitoring this client's progress. This presentation demonstrates a research-based method for students across behavioral health disciplines at EWU to use in making sound practice decisions throughout their careers.

Brabec, Sophie Art Josh Hobson Creative Work "A Stitch in Time" and "Table to Trash" Title: "A Stitch in Time" and "Table to Trash" Medium: Collage Dimensions: 12" x 18" Year: 2021 "A Stitch in Time" and "Table to Trash" both make up a collage diptych with each piece measuring 12" x 18". ~ 35 ~
"A Stitch in Time" is bordered by a measuring tape and is comprised of a sewing pattern, a needle, thread, buttons, safety pins and magazine cutouts of fabric. "Table to Trash" is comprised of a paper bag, produce netting, an apple sticker, a bread tag, an onion skin, and magazine cutouts of food. I created these collages to express my disdain at the amount of waste produced by consumerism in North America. Consumerism is fueled by our culture's desire for convenience, instant gratification, and overstimulation. We're always wanting something new, and getting the next best thing usually goes hand in hand with throwing out the thing it replaced. I felt that collage would be a fitting medium for this concept, because it uses recycled materials. I hope these collages bring awareness to the issue of consumerism and personally convict the viewer to take responsibility for their own waste and be proactive about living more sustainably.

Brando, Calvin Art Joshua Hobson Creative Work Bound Title: Bound Medium: Digital drawing Dimensions: 40" x 24" Year: 2023

"Bound" is a digital drawing print measuring 40" x 24". This image is an original character based on a close friend, a mysterious hybrid creature shackled and lost among the vast world that is the sky and space. Incorporating both realistic and idealized characteristics of my friend, there are also some personal interests mixed in to create this piece. As my specialty is fantasy character creation, I wanted to bring about a new character into a world inspired by an image and a color palette. Using movement, lighting, and details this allowed the piece to allude to a sense of wonder and have the viewer question the essence of the piece. This work will become a small series as I will create more characters based on close friends of mine. This allows me to challenge myself and expand my ideas based on characteristics I normally wouldn't work with.

Brando, Calvin Art Joshua Hobson Creative Work Happy Time Title: Happy Time Medium: Digital drawing Dimensions: 15" x 20" Year: 2023

"Happy Time" is a digital drawing print measuring 15' x 20'. This image is a cartoonish clown named Art, who is covered in blood and seen with a mysterious trash bag by his side. Comprising of loose childlike marks and brush strokes, mixing in with grotesque details, the oxymoron of a piece shows a subject matter that shouldn't go together. "Happy Time" represents an odd fascination with how people view media, and the way something is created changes your view of the subject itself. Having Art drawn in this cute cartoon style with traditionally childlike marks, while Art himself is a creepy serial killer clown, your brain is conflicted on how to perceive the work. Seeing him drawn so cutely has you focus on the overall feel, however taking your time and getting a closer look you see the details and the piece is suddenly not so friendly.

Brandt, Jodi, and Judd Case Biology Judd Case

# Poster

Relationship between Sickle cell trait and effects of Sickle cell disease

Sickle cell disease is the presence of two hemoglobin S alleles and results in sickle shaped red blood cells and other associated problems. Sickle cell trait only occurs in heterozygotes containing only one HbS allele and one normal allele (Hb). Individuals with sickle cell trait are usually asymptomatic. We aimed to assess if carriers of sickle cell trait are completely harmless from the effects of sickle cell disease. Individuals with sickle cell trait can develop sickled red blood cells through HbS polymerization. We found many different factors can contribute to sickling events occurring in individuals with sickle cell trait, such as intense physical activity and high elevations. Sickled red blood cells only carry a small portion of oxygen as normal red blood cells and because of their shape they can get stuck in the blood stream. Sickle cell trait and sickle cell disease have been known to cause acute renal failure. Sudden death syndrome can also occur in someone with the sickle cell trait. Awareness in both sickle cell disease and sickle cell trait can reduce misleading and unreliable information.

Brisbin, Katrina Design Ginelle Hustrulid Creative Work (with Posters) Eco-Printing: Crafting with a Conscience

Block printing is a traditional art form that involves using carved blocks to imprint designs onto fabric, paper, or other surfaces. While it can create beautiful and unique designs, the materials used in the process can have a significant impact on the environment. For example, if the blocks are made from non-renewable resources such as plastics or metals, or if the ink used contains harmful chemicals, it can contribute to waste and pollution. This project explores the use of eco-friendly block printing materials to reduce impact on the planet by reusing and recycling materials and considering the lifecycle of materials. In this project, printing blocks were made from recycled materials and found items such as scrap wood and linoleum/formica from new home builds, the pigments for the ink were made from plant and food scraps, and paper was created using scrap paper from recycle bins.

The result is a series of prints on hand-made paper, printed with homemade ink and blocks of recycled materials. The designs themselves are botanical in nature and often compliment the paper they are printed on. For instance, a grapefruit carving is placed on paper that was made with fragments of grapefruit. No "new" materials were used or are part of the finished work. This process was not easier, but it was worthwhile. Throughout this project, I reinforced the conclusion that it is possible to use eco-friendly materials for block printing which help reduce waste, conserve resources and minimize harm to the environment.

Browning, Irie Philosophy Christopher Kirby Oral Presentation The Telos of a Tab

The Telos of a Table: An Aristotelian Reflection on the Meaning of Crafted Objects Aristotle's four causes describe how a thing comes into being, with the fourth and final cause being an object's telos: the 'why' behind its creation. With the example of a dining table, the final cause is generally assumed to be dining. Yet this final cause is in some cases insufficient in describing the meaning of a dining table within the human experience. Aristotle's concept of eudaimonia, the idea of human flourishing, requires forethought, desires, and actions towards ends. In his Metaphysics, Aristotle sees the examination of the causes of crafted things as a starting point for understanding the causes of natural things. The causes of a dining table may just lead to a telos of dining, but the human experience may not find this sufficient to the sharpness of desire one may hold for an object. This desire towards the object drives one to action, with goals and plans set and pursued for the sake of the meaning represented by the object. Using my own experience regarding the particular object of the dining room table alongside the writings of Aristotle, I convey how human desire and action often impart a different and more meaningful telos onto an object than intended by the designer of that object.

Busch. Conner History Larry Cebula Poster The Origins of Segregated Neighborhoods in Spokane 1. Introduction - Segregated neighborhoods in Spokane first appeared as a result of racially restrictive property documents - Property documents contained "racial covenants" which restricted people of color from residing in the properties that had them - First known racial covenant in Spokane dates back to January 1920 in Fairmont Cemetery - Established for a crypt in Fairmont by "Inland Mausoleum Company" - Racial covenants at Fairmont paved the way for racial covenants in Spokane neighborhoods 2. First Segregated Spokane Neighborhood - First neighborhood in Spokane to institute a racial covenant was East Audubon Park Addition in August 1928 - Created by "Union Trust Company of Spokane" - Property document was written for new homebuyer Susan Smith - Smith was first person to purchase a home containing a racial covenant in Spokane 3. Height of Racial Covenants and Segregation in Spokane - 1940s was the height of segregation in Spokane's neighborhoods - Rockwood Pines Addition, Sunset View Addition, and other neighborhoods began using racial covenants in 1940s. - Racial covenants restricted opportunities for people of color in Spokane such as where they could live, go to school, etc. - Most Spokane neighborhoods never established racial covenants however 4. Conclusion - Contrary to popular belief, segregation that existed in Spokane from the 1920s to 1960s was supported by the federal government - Racial covenants were de jure segregation (government sponsored) rather than de facto segregation (natural segregation) - FHA discriminated against people of color in Spokane and across US for securing home loans, obtaining fair interest rates, and receiving fair property tax appraisals - Fair Housing Act of 1968 caused racial covenants and segregation to subside Bustos, Benjamin, and Mason Matera Biology

Luis Matos

Poster

Supplementing *Manduca sexta* Artificial Diet with Extra Vitamins Does Not Increase Growth Rate or Final Weight

Reptiles are popular as pets, and many reptile pet owners feed insects to these pets. Many owners would prefer to feed nutritionally-dense insects to their pets. *Manduca sexta* (AKA tobacco hornworm) is an insect commonly used as reptile food as they are a great source of fat and protein. In an attempt to increase the overall mass of the hornworms, we hypothesized that supplementing their artificial diet with a vitamin supplement (Vanderzant's) would improve their growth rate and final mass. We expected to observe a positively correlated dose response. To test this hypothesis, we made 3 treatments by adding increasing amounts of Vanderzant's mix to the base hornworm diet. A control group with no added Vanderzant's was included in the experiment. The food was poured into large plastic cups and set. The newly hatched hornworms were placed individually in the cups. Hornworms are grown at an average temperature of 81°F (27°C) with a 16:8 (L:D) photoperiod. The

hornworms were allowed to feed for 21 days. During that time we weighed each worm twice each week. The shed head capsules from each hornworm were collected throughout the experiment, and their width was measured. The frass produced was collected, dried, and weighed. The growth rate and final mass of hornworms raised on the control diet or the two lowest treatments were statistically indistinguishable. The hornworms grown on the highest vitamin diet were significantly lighter than control hornworms. These results were paralleled for the head capsule width of the 4th instar larvae. The frass masses were statistically indistinguishable among the treatments. These results reject our hypothesis and suggest that the base diet being offered by the hornworm sellers already contains the optimal vitamin concentration.

Campbell, Richard English Max Hohner Oral Presentation Machiavelli as Literary Theory The adoption of cultural and po Studies. This project aims to ca

The adoption of cultural and political theories and their application to texts is the standard practice of Literary Studies. This project aims to carry on this tradition by presenting Machiavelli's "The Prince" as the basis for a new literary theory. Machiavellian theory would fit into a crossroads between Marx and Foucault as well as build upon ideas described by Said. The overall project seeks to describe how one would do a Machiavellian reading at a character or textual level.

Cardenas, Jenna Chemistry & Biochemistry Yao Houndonougbo Poster

Silico docking studies of ITPA mutants: the analysis of protein-ligand interactions

Inosine triphosphate pyrophosphatase, also known as ITPA is an enzyme that plays an important role by preventing genetic instability. As proteins are built, non-canonical purines are made within the nucleotide base pairing that deviate from the standard set by Watson and Crick. ITPA is bound to Inosine Triphosphate (ITP) and ITPA-ITP complex provides genomic stability by hydrolyzing inosine triphosphate to a monophosphate nucleotide and deoxyinosine triphosphate to diphosphate which prevents genetic abnormality within our DNA/RNA. A common mutation in human ITPA is the proline to threonine substitution at position 32. About 15% of the world's population possesses the ITPA P32T mutant which is linked to poor outcomes in thiopurine drug therapy for autoimmune diseases, inflammatory bowel disease, and acute lymphoblastic leukemia. In silico docking method is widely used to study protein-ligand interactions which are important for understanding the mechanisms of biological regulation. In this study, we used Autodock 4 software to predict P32T-ITP complex. We report the binding energies and the similarity of the docked structures. The study provides the basis for understanding P32T-ITP interactions.

Carlson, Rayna Biology Andrea Castillo Poster

Labile Antimicrobial Mechanisms of Manuka Honey Differentially Impact Pathogenic Bacteria Manuka honey (MH) has been documented to possess powerful anti-microbial properties through multiple mechanisms. These mechanisms include a low pH, high osmolarity, iron chelation, and its unique manuka factor (UMF), methylglyoxal (MGO). Although MGO is purported to be a major pillar in the honey's antimicrobial properties, its activity is variable against different bacterial species. We hypothesize that MH's other antimicrobial mechanisms may also exhibit variable activity against different bacterial species. Preliminary experiments to determine the Manuka honey minimum inhibitory concentrations (MIC) for bacterial species, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*, suggested that some  $\sim 39 \sim$  Manukahhoney antimicrobial mechanisms change effectiveness over time, but only against some species. To investigate this further, I am conducting MIC experiments weekly with newly prepared MH and previously ("aged") prepared MH. I initially hypothesized that the aging MH MICs will increase for bacterial species that are affected by an antimicrobial mechanism that is degraded in the aged MH. However, initial MIC experiments indicate that aging MH is more effective against *S. aureus* and *P. aeruginosa* and is no different than new MH for *E. coli*. In future studies, we will endeavor to compare the chemical composition of the newly prepared and aged MH and determine if the conversion of dihydroxyacetone (DHA) to MGO within diluted MH is the cause of the discrepancy between new MH and aging MH MICs against the aforementioned bacterial species. This will inform which MH antimicrobial mechanisms are most effective against the three major pathogenic bacterial species, *E. coli*, *P. aeruginosa*, and *S. aureus*.

Caverly, Madyssen Art Jenny Hyde Creative Work Healing Series Name: Healing Piece One Name: Throw Up Piece Two Name: 1 Month Piece Three Name: Wanna Get Coffee? Medium: Collagraphy Print Dimensions: 11 x 16 in. Year: 2021 Healing is triad collagraphy print measur

Healing is triad collagraphy print measuring 11" x 16". These prints are a shattered heart slowly coming back together. Shattered like a broken mirror reflecting my heart after my last relationship. The betrayal I felt caused my heart to shatter and my self confidence with it. Healing uses textures and color to express the feeling I felt in those different moments. The visual effect shows pain and numbness in that moment of the betrayal to the growing and helping of my heart, even though we don't ever see it the same.

Chavez, Ehriza History Larry Cebula Poster Airway Heights, Washington's Unknown Sundown Town Introduction: The town of Airway Heights is a relatively new community, but has a racist past that does not seem to be widely known by the public. The town may not even be aware of the racist ideals on which the town was founded. After the Second World War, racial covenants began being attached to properties throughout Airway Heights.

After the Second World War, racial covenants began being attached to properties throughout Airway Heights. Carl Lundstrom, CEO of Rocket Investment and mayor and founder of Airway Heights, made the covenants attached to properties in Airway Heights. Lundstrom's actions can be seen as one of the defining reasons for why Airway Heights became a sundown town. This history affects the town to this very day: the racist history of Airway Heights during the Second World War and how negatively African American soldiers were treated at the time at Geiger Air Force Base.

The racist past of Airway Heights can still be seen to this very day, as evidence shows that the town has a very high white population and a low Black population.

Racist acts seem to be a regular occurrence in Airway Heights, and racist flyers being distributed by self proclaimed Nazis is just one example of this. Airway Heights is not recognized by the State of Washington as a sundown town, but the evidence is there to prove it. The town was founded on racist ideals, and this contributes to the town's history today. Without this history, Airway Heights could look completely different. The town should not ignore the horrible past, but should be aware of this racist past and acknowledge the harms done

towards African Americans. Without recognizing this history the town of Airway Heights can fail to grow and learn from the mistakes made in the past.

Collins, Kathryn Biology Luis Matos Oral Presentation Production and characterization of a phage endolysin with putative anti-microbial activity against

Cutibacterium acnes

*Acne vulgaris* (acne) is the eighth most common skin disorder worldwide. Because of the heterogeneous pathology of acne and the increasing antibiotic resistance of the causal agent (*Cutibacterium acnes*), novel therapeutics need to be developed to treat acne. One option is endolysins, highly conserved enzymes from bacteriophages that disrupt the bacterial cell wall. Endolysins retain bactericidal and bacteriostatic activity when applied to bacteria in vitro and are safe for topical application. We hypothesize that the endolysin (ENDL) from the P100.1 *C. acnes* bacteriophage will exhibit bacteriostatic activity against *C. acnes* in vitro. In this study, the ENDL gene was cloned into and expressed by *Escherichia coli* as a fusion protein to green fluorescent protein (GFP). The region responsible for binding to the bacterial cell wall (CBD) was expressed separately (by *E. coli*) as a fusion protein to GFP to visualize its binding activity to *C. acnes*. Expression of the recombinant proteins was successful, given that cultures induced for protein expression were fluorescent. Different lysis methods were tested, including bead beating, bead vortexing, and protein extraction buffer, to optimize yields of the fusion proteins by quantifying relative fluorescence output in the cell lysate. Next, we will compare the growth rates of *C. acnes* treated with ENDL-GFP to non-treatment controls to evaluate bactericidal effects. Finally, the off-target bactericidal effects of ENDL will be determined. This study aims to characterize the P100.1 endolysin's structure and activity to evaluate its potential as a novel anti-bacterial acne therapy.

Costinett, Dylan Mathematics Xiuqin Baine **Oral Presentation** Student Retention and Graduation at EWU Before and After the Pandemic The aim of this research is to identify key factors that contribute to the retention and graduation of students at Eastern Washington University (EWU), and attempt to see why EWU retention and graduation rates have been falling for the past several years. This is an issue that all colleges have faced since the pandemic but EWU has suffered more in the Spokane area and has been suffering since before the pandemic. The study will examine EWU student data from Summer 2006 to Fall 2023. The main method of analysis will be logistic regression to predict if a student will be retained, however the analysis will also be supplemented with statistical methods such as multiple linear regression, model selection, and principal component analysis. Initially, research was done on the prediction of student success as determined by meeting a GPA threshold. Results were exceptionally poor but in researching it, student retention was found to be a viable predictor. The findings will be presented in the conclusion, with the goal of assisting EWU to understand which student factors have the greatest impact on student retention and graduation rates.

Criswell, Ryan Other/Unsure Xiuqin Bai Oral Presentation Classification using Logistic Regression and Support Vector Machines Classification is a crucial tool in the fields of statistics and machine learning. The purpose of this research is to compare the classification results obtained through statistical methods and the support vector machine method (SVM). Logistic regression is a statistical method that uses probability theory to analyze binary variables or  $\sim 41 \sim$  variables with more than two categories. SVM classification, on the other hand, involves selecting different kernel functions and hyper-parameters to determine the classification. By comparing the classifications of the same dataset, the ACME insurance dataset, we aim to identify any differences between logistic regression and SVM. The data used is from ACME insurance including personal attributes as well as the amount charged to an individual's health insurance. We will use each classification technique to identify individuals who we believe have incorrectly reported their smoking status which leads to lower monthly insurance payments.

Cullen, Aspen Theatre William Ledbetter Oral Presentation A Lack of Leading Ladies: Understanding the Absence of Queer Women in Musical Theatre This presentation of a scholarly paper is about understanding the lack of queer women represented in musical theatre. There is a historical understanding, review of queer musicals, data presented, and an analysis of the data with a queer and feminist lens.

Cullen, Aspen, Stevie Astudillo, and Melissa Wilson Theatre Sara Goff Creative Work Everything and Nothing This 10-minute play interrupts a conversation between a couple, both queer and one being a person of color, as they discuss life-based topics. They talk about suicide, homophobia, violence against minorities, religion, and love. This poetic narrative provides social commentary on the challenges young people in our world face today.

Cummings, Lilijanna Biology Jason Ashley

Poster

Sexually-divergent differentiation and inflammatory response of osteoclast precursors

Osteoporosis is an inflammatory degenerative bone disease defined by the decrease in bone density resulting in an increased risk of fracture. Overactivity of osteoclasts, cells responsible for the breakdown of bone matrix, is a defining factor of osteoporosis. Previous studies found lipopolysaccharide (LPS), an inflammatory stimulus associated with bacterial infections, produces larger osteoclast in female derived precursor cells than in male derived cells. Cells that display a higher expression of the Toll-Like Receptor (TLR) signaling pathway are positively correlated to the larger osteoclasts in the female-derived committed osteoclast precursors. The purpose of this study is to investigate sexually-divergent responses to three inflammatory signals (LPS, zymosan, and double-stranded RNA) in naïve and committed osteoclast precursors with respect to osteoclast differentiation, induction of osteoclast and inflammatory genes, and production of the inflammatory cytokine TNF.

Primary cell cultures of macrophages are harvested from mouse femurs and tibia. Macrophages are pre-exposed to receptor activator of nuclear factor kappa-B ligand (RANKL) followed by three concentrations of LPS, zymosan and polyinosinic:polycytidylic acid (PolyI:C). Morphological assays are done using fluorescent microscopy. Genetic analysis is done using real-time quantitative polymerase chain reaction (RT-qPCR), and immune responses using enzyme linked immunoassay (ELISA). Preliminary results suggest that all three inflammatory signals can support the differentiation of osteoclast precursors. Future work will quantify and compare differentiation of osteoclasts under these conditions and ascertain whether female and male-derived cells exhibit altered sensitivity to these signals. Completion of this study may enhance mechanistic understanding of sex as a risk variable for bone loss.

Cyphers, Thomas Philosophy Chris Kirby Oral Presentation Epistemic injustice and elimination of bias The purpose of this project is identifying instances of epistemic injustice, especially testimonial injustice, in the public education system. What are the effects of these injustices on the cultural as well as intellectual development of those who are treated with injustice? How can critical models of education allow for a move away from these injustices that are occurring in contemporary models of education?

Dahlin, Connor **Creative Writing** Jonathan Johnson **Oral Presentation** Humanity's Poetic Relationship with Reality: A Discourse on Ancient Allegory & the Relationship Between Poetry & Mythology Regardless of era, mankind has naturally taken toward expression, whether this was to imbibe caves with wildcraft inks and bestial forms or to later take to parchment and transcribe one's own life experiences. Given this innate compulsion toward expression, what is mankind so compelled to express? By examining mythology's role as a central vehicle of humanity's historical expression, we can observe that humanity isn't solely interested in expressing the tangible. That is to say, human expression isn't satiated by mere mimicry of the material world. It would seem that expression itself is steeped in a healthy dose of that which is intangible or that of which isn't immediately observable to the senses, the imaginative and the sublime, such attributes that we can readily find in poetry. Poetry as a medium allows mankind to share portraitures of their inner life; poetry itself was created because humans wish to share their realities with each other no matter how tenuous. The most ancient of all written works are poetic-spiritual works, such are the epic myths and cosmogonies, Gilgamesh, the Enuma Elish, The Odyssey, The Theogony, etc., allegorically rich and seeking to elucidate and reconcile the intangible inner world and the tangible outer world; consequently, this work investigates humanity's fascination with expressing this intangible aspect. With this, we will approach these ancient stories with a mind for the inner allegory. This aim will provide us with ways to revitalize contemporary art with the lost art of ancient allegory. Lastly, and perhaps most importantly, in observing this trajectory, what does this tell us about humanity's relationship with reality?

M DeFehr, Terreca Psychology Jillene Seiver Poster Work life balance is imperative to how we spend our time at work and with family My research will delve deeper into an existing dataset from Seiver and Pope to examine the impact of role commitment, degree of custody of children, and viewing one's employment as a job versus career on core self-evaluation and sense of control over work demands. The sample consisted of 508 participants who were recruited through snowball sampling via undergraduate psychology students in two cohorts: 2018-2019 (n=351) and January-June 2021 (n=128). Eligible respondents were required to be parents with at least partial custody of children under 18, employees working at least 20 hours per week, and living with their romantic partner. Respondents who ranked the role of parent #1 reported the least control over their work demands, and those who had sole custody reported lower control over their work demands. Those who said their employment was a career experienced more control over their work and higher core self-evaluations (a combination of self-esteem, self-efficacy, locus of control, and neuroticism) than those whose employment was a job. Work-life balance is imperative to how we spend our time at work and with family, and it appears to matter whether we have a job

versus a career, which of our roles we value most, and our degree of responsibility for our children.

Deshazer, Sarah **Biology** Krisztian Magori and Paul Spruell **Oral Presentation** Investigation of small mammal abundance, diversity, and dispersal on and around the Eastern Washington University Prairie Restoration Site Small mammals are an ecologically important component of every landscape on Earth. They are a food source for higher trophic level animals, disperse plant seed and mycorrhizal fungi spore, engineer the landscape through burrowing and foraging activities, and alter plant community composition through selective predation of seed and grain. Small mammals have also been found to help facilitate the transition between successive stages in prairie restoration. Eastern Washington University has dedicated 120 acres of campus land to restoration of native prairie habitat. We conducted a baseline survey of resident small mammals on and around the Eastern Washington University Prairie Restoration Project site. Small mammals were live-trapped over a 16-week period during Spring and Fall of 2022 at ten sites within a 4 km radius of the restoration site in areas of agricultural wheatfield and natural vegetation. Trapping success was highest at sites located within the restoration site, where ground cover was the highest. The overall most common and abundant species collected was Peromyscus maniculatus (Deer mouse), both on and off the restoration site. Mus musculus (House mouse) and Microtus spp. (vole) were collected only at sites located within the restoration area. Sorex vagrans (Vagrant shrew) was collected at one site, within an agricultural area near a drainage ditch. Buccal epithelial cheek swabs were also collected for ongoing genetic analysis of population structure for *Peromyscus maniculatus* to analyze habitat connectivity on and around the restoration site.

Desimone. Carson Environmental Science

Carmen Nezat

Poster

Evaluating the Accuracy of Elemental Analysis of Soil and Rock Prepared by Microwave Acid Digestion The EWU Environmental Geochemistry Lab recently attained a microwave digestion system (CEM MARS 6) to transform solid samples (e.g., soil, crushed rock, plant material) into liquid form in order to be analyzed using current instrumentation in the lab. The microwave system provides a safer, faster, and consistent treatment of samples than the standard hot plate method of digestion. In this study, we evaluate the accuracy of these methods, especially the potential for contamination when analyzing trace amounts of metals. Certified reference materials (CRMs from USGS and NIST) were digested in Teflon vessels using concentrated, trace metal-grade nitric acid. The digests were diluted with ultrapure water, filtered through 0.45µm membranes, and analyzed for elements such as calcium (Ca), iron (Fe), potassium (K), lead (Pb) and zinc (Zn) using an Inductively Coupled Plasma - Optical Emission Spectrometer (ICP-OES). Procedural blanks were prepared using the same procedure as the samples. Results indicate insignificant Pb and Zn contamination: concentrations in the procedural blanks were less than 1% of those in heavy metal-contaminated soil references and were very low in the procedural blanks and heavy metal-poor rocks. Concentrations of Ca, Fe, Mg, and K in the procedural blanks were less than 1% of those in the naturally-occurring rock references; Na concentrations were higher and more variable (4-19%). The next step is to compare measured amounts of digested CRMs to their certified values.

Dodson, Rae Environmental Science Carmen Nezat Poster Lead in Soils at the EWU Palouse Prairie Restoration Site In the 1960's, EWU acquired a parcel of wheat farmland directly behind its campus. The land has mainly been used as farmland, but trapshooting occurred during the 1980s and again in the early 2000s. The land is now set to be restored into its native Palouse Prairie ecosystem in conjunction with public walking trails. Several student research projects have tested the elemental concentrations of the soil using a 1M nitric acid leach and found elevated lead concentrations corresponding with the trapshooting ranges. Eight samples were selected from the pool of previously collected soils for reanalysis, six selected with lead concentration of over 130 mg/kg, and two which have presumed background lead concentrations. These soils were digested in concentrated nitric acid using a microwave digestion system to provide a total lead analysis and to comply with EPA testing standards for soil analysis. Preliminary results indicate that the 1M HNO3 leach removed about 80% of the total soil lead (the portion removed by the high temperature, concentrated nitric acid digest). The lead in some soils (30 to 500 mg/kg) were higher than the background concentrations in non-trapshooting areas (7 to 10 mg/kg). Because some areas in the prairie exceed the EPA guideline for child play areas (400 mg/kg), delineation of areas with elevated lead concentrations encourages further investigation.

Dyess, Elizabeth, and T. Heil Anthropology Michael Zukosky Poster

Estimating the Minimum Number of Individuals (MNI) For Skeletal Collections – With Consideration to the Introduction of Procurement Bias

Of the competing methods for the estimation of the number of individuals represented within a skeletal assemblage, variations of the calculation of MNI (Minimum Number of Individuals) are most often employed. This presentation provides the preliminary results of an exhaustive study conducted to determine the minimum number of individuals represented within a collection of 1,065 skeletal elements. Established methods for the calculation of MNI often take into account the effects of taphonomic and depositional factors, as well as additional variables that may otherwise influence the estimation, such as the association of paired elements. Provided that the assemblage in question is largely disassociated and is comprised of remains sourced from numerous, unknown contexts, traditional methods of computation were altered to suit the needs of the study. Counts were collected for forty-two skeletal elements within the body representing both paired and singular elements. Separate counts were obtained for intact and fragmented remains under the OARD (Open Access Research Data) designation. In doing so, a noteworthy observation was made; there exists a strong bias toward "lefts". This was determined to be the result of procurement practices. Often, when remains are procured for university teaching collections, skeletal elements are purchased separately, or occasionally in pairs. Unless the body is articulated – such as in the case of 'standing skeletons' – it is unlikely that the remains of a single individual will be purchased in their entirety. The implications of the introduction of Procurement Bias in the calculation of MNI are further explored within this presentation.

Escalante, Claudio Biology David Daberkow Poster The effects of fructo

The effects of fructose and caffeine on novel object recognition in male Sprague Dawley rats Introduction: Numerous studies have demonstrated that caffeine enhances cognitive abilities such as attention, alertness, and memory in both human and animal models. Conversely, excessive consumption of fructose can trigger insulin resistance, inflammation, and oxidative stress, thereby impairing cognitive function. This study aims to investigate the effects of caffeine and fructose on cognitive function in rats. Specifically, we examined whether short-term exposure to these substances enhances or diminishes cognitive functions.

Methods: Rats were divided into three groups and received either plain tap water (control), water containing fructose (10%), or water containing caffeine (0.3 g/L) for two weeks. Novel object recognition (NOR) was used to test cognitive function. The rats were given five minutes to explore a novel object, and the interactions were  $\sim 45 \sim$ 

recorded on camera. Discrimination Indices (DI) and Preference Indices (PI) were calculated to compare novel and familiar object interaction time.

Results: Fructose-treated rats appeared to exhibit greater cognitive improvement compared to caffeine-treated rats and the control group, as demonstrated by the higher PI scores observed in this group. However, statistical analysis using ANOVA revealed no significant differences (p=0.217867) between the groups.

Conclusions: These findings suggest that further research is needed to obtain more definitive results. Long-term treatment (8-12 weeks) and repeated testing using NOR may yield more conclusive data.

Fischer, Marianna, Brandon Lewis, and Avary Zachary

Engineering

Philip Appel

**Oral Presentation** 

Solid Waste Fuel For Combustion in Energy Recovery System

Across the United States, there are two pressing problems: garbage disposal and electricity generation. Firstly, the infrastructure in place doesn't properly dispose of or reuse municipal solid waste. In addition, power insecurity is becoming more prominent as power grids are becoming outdated. This project aims to provide an alternative solution for both issues by using a Brayton cycle based waste-to-energy incinerator. The overall system efficiency relies heavily on the feedstock used for incineration. One way efficiency can be increased is through pelletizing trash, ensuring an even burn profile, providing the correct amount of feedstock, and ensuring adequate energy production. However, knowledge of the energy level per feedstock amount is needed. This project aims to use the money that was awarded to be able to purchase and test various feedstock: polypropylene, polyethylene, and mixed-wood pellets, as well as shredded packing paper. The testing uses a calorimeter to measure the amount of energy that is stored in each feedstock material. The data gained can provide information necessary for calculating the amount of electricity per specified volume of the above-mentioned materials. The first stage of this project involved gathering energy contents of the pure substances listed above through research papers. In the next few weeks, we will be continuing with our own experimentation that examines the energy released when combusting combinations of these substances. Our goal is to gather calorimetry data for the pelletized and shredded material listed above. The data will be used to design the waste-to-energy incinerator.

Flores, Sarah Biology Paul Spruell and Krisztian Magori Oral Presentation

*Contracaecum multipapillatum* prevalence and intensity of infection in the introduced brook stickleback as a case study of biotic resistance

The enemy release hypothesis suggests success of invasive species in initial phases of invasion is due to their ability to escape from native predators and pathogens. However, according to the biotic resistance hypothesis, this success of non-native species is time-dependent due to native predators and pathogen's ability to shift prey and hosts making use of introductions. Introduced species function as predators and resource competitors to native species. It is important to understand potential limiting factors of an individual's success and how it relates to large-scale ecosystem impacts. The brook stickleback is a newly introduced species in eastern Washington that has high population densities. These fish are parasitized by *Contracaecum multipapillatum*, a nematode in the Anisakidae family that has a complex life cycle targeting various species, including copepods, fish, piscivorous birds, and mammals. This study aims to calculate both prevalence and intensity of infection of *C. multipapillatum* by measuring the average number of nematodes found in Brook Stickleback. We collected fish at Middle Pine Lake within Turnbull National Wildlife Refuge in October 2017, 2019, and 2022. We performed fish necroscopy to identify nematode presence and quantity per host. The prevalence of infection of *C. multipapillatum* was significantly higher at 40% in 2019 versus 15% in 2017 and 2022. Intensity of infection was not different between years. This analysis demonstrates interannual variability in prevalence of *C.* 

*multipapillatum* infection in brook stickleback. Investigation into dynamics of this system provides insight into interspecific relationships and biotic resistance, providing a case study for this hypothesis.

Flores, Sarah, Ben Wulfestieg, Madilyn Odiorne, Daniel Huizar, and Eric Greene

Biology

Krisztian Magori

Oral Presentation

Identification of *Contracaecum multipapillatum* at Turnbull National Wildlife Refuge within the components of its lifecycle in the initial phases of infection

The initial success of non-native species is due to the lack of predators and pathogens targeting them. However, according to the biotic resistance hypothesis, over time native predators and pathogens will eventually make use of them. The brook stickleback is newly introduced to eastern Washington with high population densities. The diet of these fish overlaps by approximately 50% with waterfowl at Turnbull National Wildlife Refuge (TNWR), ultimately impacting the effectiveness of the refuge for its intended purpose. These fish are parasitized by Contracaecum multipapillatum, a resident nematode in the Anisakidae family that has a complex life cycle targeting various species, including copepods, fish, piscivorous birds, and mammals. C. multipapillatum has serious health implications, especially on that of the brook stickleback. This study aims to identify the early timeline of C. multipapillatum infection on brook stickleback and the surrounding ecosystem at TNWR, by analyzing fish, copepods, and sediment. This study will focus on 3 lakes: Middle Pine, Black Horse, and Kepple. Each lake will have 5 representative collection sites appropriately distributed. Fish necroscopy will be performed to identify presence or absence of the nematode and the number of nematodes per individual host will be recorded. PCR of both copepods and sediment will be utilized to identify the presence of C. multipapillatum DNA. These methods will help to identify the early components of C. multipapillatum infection during its lifecycle by identifying when and where it is first apparent in the system. This investigation provides insight into interspecific relationships and naturally occurring biotic resistance within TNWR, potentially reducing competition of this invasive fish with waterfowl.

Folger-Vent, Rosalie Music Jonathan Middleton Creative Work Lucky Girls

Lucky Girls is a contemporary song that explores the idea that life is easy for people who are lucky and one can become lucky with the right mindset. This view is present in the lyric segment "Lucky girls talk in prophecies / Maybe I should give that a try and see." This idea in my song is my step towards becoming a lucky girl and embracing positive affirmations in my life as a singer-songwriter.

Frago, Jonah Biology Jenifer Walke Poster Strain variation in competency induction of the core honey bee gut bacterium, *Snodgrassella alvi* Many diseases afflict the Western honey bee, *Apis mellifera*, an important pollinator in agriculture and ecosystems. One way to combat disease is implementation of genes that produce pro-immune response metabolites into bacteria native to the honey bee gut. One core bacterium in the honey bee gut microbial community is *Snodgrassella alvi*, which has potential to be modified to promote host health, yet research is limited on variability and methods for direct transformation, or uptake of free DNA, by this microbe. Through protocols for taxonomically similar microbes, I will induce competency in several strains of *S. alvi*, and test for strain variation in transformation efficiency by quantifying colony number compared to the amount of plasmid DNA used, and colony size. To obtain bacterial strains for this study, 46 *S. alvi* strains were isolated from honey  $\sim 47 \sim$  bee guts, and their 16S rRNA genes were sequenced. All strains had >99% 16S rRNA sequence similarity, but may vary in other aspects of their genome, which may influence competency induction. Results will indicate whether selected competency protocols were successful through the growth of transformed *S. alvi* cells with a kanamycin resistance gene on selective kanamycin plates. Current results show the successful transformation of one strain, *S. alvi* Y2k\_A, with pBBR1MCS-2 vector via heat shock transformation. The development of reliable competency protocols for *S. alvi* and the selection of the highest transformation efficiency strains will give researchers a necessary tool to further study potential solutions to honey bee disease through symbiont genetic engineering.

Frost, Amanda Art Joshua Hobson Creative Work Distant Memories Title: Distant Memories Medium: Ink, Charcoal, Watercolor and Acrylic Markers on Blue Toned Paper Dimensions: 5" x 7" Year: 2022

Distant Memories is a short series of hand illustrated drawings that each measure out to 5" x 7" in both vertical and horizontal variations. These drawings are just nine of a larger ongoing series based on drawing from memory. Going through a mental walkthrough of an old house based in Tulare, California, the artist invites you to see what she does through her memories as a child. Using complex compositions and textures to ignite the viewers imagination and symbolize the simplistic view of structures through line drawing.

Gamache, Katlin Geology **Richard Orndorff** Poster Climate, Soil, and Wine in Washington State The Columbia River and its tributaries flow through a series of arid to semi-arid basins in Eastern and Central Washington state. This geographically broad area, which includes Walla Walla and the Tri-Cities of Pasco, Richland, and Kennewick, has grown into a primary producer of world-class wine in the last several decades. No one is more surprised, or proud, of the national and international acclaim than the locals. In this, and other premier wine-producing regions, climate, soil, and water work together to create an optimal environment for growing grapes; however, Eastern Washington is a bit of a conundrum. Cabernet Sauvignon and Shiraz grapes have been successfully grown in the Badger Mountain and Red Mountain American Viticultural Areas (AVA), while Pinot Noir grapes have proven to be a failure thus far, even though geologically and meteorologically similar areas have had great success with all three varietals. I discuss both the successes and failures of this relatively new enterprise that has forced the oenological world to rethink some of its long-held beliefs about the importance of geographic location in wine production.

Gamache, Katlin, Jalyn Osgood, and Hannah Queen Geology Richard Orndorff Poster

Geotechnical Analysis of Soil Sample PP-1 from the Palouse Prairie Restoration Project, Cheney, WA The Palouse Prairie Restoration Project is a plan to return 120 designated acres of agricultural land to its original, natural state and provide educational and research opportunities to the broader EWU community. We collected soil sample PP-1 from the lower portion of the north face of a loess hill located at latitude 47.49360, longitude -117.59273, elevation 2545 feet above mean sea level near the EWU water tower. Palouse Prairie soil originated as glacially derived silt that was carried by wind from the Puget Sound then deposited in Eastern Washington during the last Ice Age. We conducted ASTM standard tests on sample PP-1 to determine geotechnical properties of the soil including specific gravity, Atterberg Limits, particle size distribution, optimal water content for compaction, and unconfined compressive strength. This information will help project managers make better-informed decisions related to proposed infrastructure development, including pathways, a visitor center, amphitheater, and parking areas.

Garcia, Analicia and Christine Macharia

Public Health

Katie Taylor

Poster

Modifying the American Fitness Index Toolkit to Assess the Health of a Campus: Healthy Campus, Healthy Eagles

The American Fitness Index (AFI) analyzes a composite of health behaviors and outcomes, community infrastructure, and census data. The AFI ranks the 100 most populous US cities on health and fitness metrics but could be used in other areas and communities. College campuses provide a unique opportunity to determine areas of excellence for promoting healthy active lifestyles as well as opportunities for improvement. To date, there has been no modification to the AFI toolkit for college campuses. PURPOSE: To modify the AFI toolkit for college campuses and assess engagement in healthy active lifestyles. METHODS: Institutional data was used to determine demographics of the college campus. Secondly, data was collected from students (n=90) on health behaviors and outcomes using an online survey. Finally, the campus environment was assessed using walkability surveys and geographic measurements to determine proximity of recreation facilities. RESULTS: On average, EWU students reported sitting 5.4 hours/day and sleeping 6.8 hours/night. Further, EWU students struggle to relax approximately 15 out of 30 days. The average student consumes 230 mg/day of caffeine, and the majority of students meet the RDA for dark green vegetables. However, students have inadequate intake of orange vegetables and lean poultry/fish. In terms of campus health, the inner campus has a walkability score of 23.3 whereas the outer campus was lower at 16.5. CONCLUSIONS: The AFI toolkit for cities can be used to assess college campuses. The modified AFI assessment highlights areas for improvement to empower students to engage in healthy lifestyles. Future assessments should determine ways to improve campus walkability.

Garcia, Arcelia, Dionna Cox, and Eric Gomez

Exercise Science

John Gerber

Oral Presentation

Difficulty in Diagnosis and Treatment of a Navicular Fracture and Talar Osteochondral Fracture in an Adolescent Dancer: A Case Study

The foot and ankle region is the most common area of injury in competitive dancers. In adolescent competitive dancers, 53.4% of the injuries occur at the foot and ankle (Gamboa, et al., 2008). Tarsal navicular stress fractures are often difficult to diagnose and may cause significant disability particularly in athletic individuals (Saxena, et al., 2006). Left untreated, it can result in a complete fracture, arthrosis, and possibly avascular necrosis due to low blood supply. Osteochondral lesions of the talus are frequently described as an uncommon diagnosis that is a difficult pathologic entity to treat (Steele, et al., 2018). Like navicular fractures, these are also difficult to diagnose and treat. This case report describes challenges in the diagnosis and treatment of a 17-year-old female high school competitive dancer who sustained a combination injury of both a navicular fracture and osteochondral fracture of the talus. In her case, she returned to full activity without symptoms following surgical treatment of the navicular fracture, conservative management of the osteochondral lesion, and several months of post-operative rehabilitation.

Garcia, Erika Psychology ~ 49 ~ Judy Rohrer

Oral Presentation

Behind Bars and Beyond Binaries: Examining the Ongoing Oppression and Abuse of Transgender Detainees in ICE Custody

In 2011, Immigration and Customs Enforcement (ICE) first recognized transgender detainees as a vulnerable population (Santos, 2017). While on paper, this identification seems like progress, studies have revealed the ongoing systematic oppression and abuse experienced by transgender persons in detention centers because ICE standards of care are often violated and fail to account for the unique, intersectional identities and care needs of transgender detainees. Violations of these standards reinforce cisnormativity, a system of power that supports binary gender classifications, and ultimately affect trans peoples' experiences and treatment in detention centers that maintain similar sex and gender binaries resulting in sexual abuse, inaccurate detention placement, solitary confinement, an absence of basic needs, and psychological trauma. This paper argues that ICE fails transgender detainees because their detention standards do not adequately account for the unique needs of transgender persons and existing standards vaguely addressing transgender vulnerabilities are not being enforced. I support this argument by examining the shortcomings of the 2019 ICE National Detention Standards in addressing transgender vulnerabilities, the prevalence of violations resulting in experiences of abuse, and the role of institutionalized cisnormativity in perpetuating these issues. Finally, I assess the impacts of this abuse on the well-being of trans persons, and evaluate reforms suggested from advocacy organizations.

Garcia, Laurie, Anthony Cortez-Morales, Betzi Bruno Aguilar

Psychology

Kevin Criswell

Poster

Examining the Interaction between Online Coursework and Internalized Stigma in Undergraduate Students with Chronic Health Conditions Across 2020, 2021, and 2022

Introduction: Online course enrollment has consistently increased and peaked during the COVID-19 pandemic. While it is possible that less in-person coursework may lead to fewer opportunities for stigmatization, little research examined the relationship between students engaged in online coursework and internalized stigma due to chronic health conditions (CHCs). Our current study addresses this gap in the literature.

Method: Eastern Washington University undergraduate students completed online surveys during the Fall 2020 (n = 217), 2021 (n = 116), and 2022 (n = 85). Surveys included CHC questions, percentage of online

coursework, course satisfaction, perceived connection to university, stress, loneliness, and internalized stigma. Pearson correlations addressed relationships between percentage of online coursework and other variables.

Multiple regression modeling addressed whether an internalized stigma x online coursework interaction effect predicted levels of course satisfaction, connection to university, stress, and loneliness.

Results: Students reported taking almost all coursework online (97%) during 2020 and less online coursework during 2021 (42%) and 2022 (34%). While greater perceived loneliness was associated with less online coursework during Fall of 2021 (r = -.22) and 2022 (r = -.23), no other significant bivariate relationships were found. A significant interaction effect of internalized stigma x percentage of online coursework was found for course satisfaction during Fall of 2021 and 2022.

Discussion: Contrary to our hypothesis, online coursework did not broadly affect internalized stigma. The unanticipated finding of more in-person coursework being associated with more loneliness across cohorts may warrant future studies on student experiences of in-person courses since the pandemic.

Garvey, Megan Biology Camille McNeely Poster Fairy Shrimp (*Anostraca*) Hatching in the Vernal Pools of Eastern Washington

Vernal pools are ephemeral wetlands that fill annually with winter and spring precipitation and snowmelt but remain dry the rest of the year. Though important habitats and sources of freshwater biodiversity, they are little accounted for in wetland conservation and restoration practices. Like much of the world's wetlands, they have seen significant decline due to anthropogenic impacts and conversion for alternative land use. Pools are also imperiled due to the impacts of climate change and invasives. These small, temporary waterbodies perform vital ecosystem services and are host to rare and endemic species. Anostraca, or fairy shrimp, lay egg cysts that form dormant desiccation-tolerant egg banks in the substrate of dry pools and hatch with rehydration. The shrimps act as key indicators of pool quality, but little is known about many of these organisms, and the pools in which they reside require further studies. Though some pools have received adequate studies with restoration efforts in recent years, the pools in Eastern Washington lack information on their conditions and inhabitants. This study examines the current water quality conditions (temperature, dissolved oxygen, conductivity, pH, nitrates, phosphates) and shrimp species inhabitants of several pools along the Columbia Plateau, monitors pools throughout their complete hydroperiods, identifies egg bank species diversity via an experimental study using harvested egg banks from those same pools hatched under experimental lab conditions, and long- and short-term comparisons of pool conditions. Ultimately, this study seeks to establish current pool conditions and make recommendations for mitigating any further degradation.

Gordon, Ash Art Lisa Nappa Creative Work Mismatched Baggage Title: Mismatched Baggage Medium: Multi Media on Stretched Canvas Dimensions: 24" x 24" Year: 2022

This piece is made of mismatched socks from my own closet, some of them are mine and some are from people who are no longer a part of my life and some from people who still are. I used a variety of techniques when constructing this piece such as sewing and sculpting. The canvas is 24 inches by 24 inches, the socks form a circle that takes up most of the white canvas. The texture is lively and varied in height, yet consistent throughout the black of the piece. The face protrudes from the black in a way that leaves the viewer unsure if it is emerging or sinking with its stark difference in pallet and texture compared to the majority of the piece. The change in fleshy tones elevate the planes of the face, giving it dimension. The expression on the face is neutral and accepting of its current situation. When viewers look at this piece, I want them to question to material. As they move closer to the canvas and realize that it is made up of mismatched socks I want the viewer to reflect on the types of socks used, and to imagine the story behind each one.

Gray, Aric Biology Jenifer Walke and Paul Spruell Poster Identification of *Batrachochytrium dendrobatidis* lineage in Turnbull National Wildlife Refuge *Batrachochytrium dendrobatidis* (Bd) is an amphibian, water-borne fungal pathogen responsible for the chytridiomycosis panzootic that has led to over 90 extinctions and the decline of 500 species. To date, six lineages have been identified via whole genome sequencing: BdCAPE, BdGPL, BdASIA-1, Bd-ASIA2/BRAZIL, BdASIA-3 and BdCH. Phylogenetic analysis suggests these lineages derived from BdASIA-1 in the Korean peninsula and likely spread due to human activity. Because some lineages are more virulent than others, lineage identification provides valuable insight for wildlife management and research. Moreover, infections of multiple lineages have been detected, increasing the risk of recombination and increased virulence. BdGPL (Global Panzootic Lineage), the primary lineage responsible for the ~51~ chytridiomycosis panzootic, has been detected in North and South America. However, despite confirmed Bd presence in the Pacific Northwest, no lineages have been identified. To identify the local lineage, we sequenced ten internal transcribed spacers (ITS), a highly conserved but variable region of ribosomal DNA, from previously collected samples of amphibian skin swabs (intensity: mean $\pm$ SE = 27787.78  $\pm$  4015.125) of confirmed Bd from Turnbull National Wildlife Refuge (Turnbull NWR) and will compare them to reference strains in the GenBank database using MEGA7 MUSCLE alignment. Despite conflicting evidence for the reliability of ITS lineage identification, we targeted the ITS region due to logistical and budgetary constraints. If a lineage can be discerned from these data, we expect to find the BdGPL lineage, as it has been reported elsewhere in the United States.

Hansen, Allisen Geology Richard Orndorff Poster

A Confluence of Cultural and Water History with the Seli'š Ksanka Qlispe' Dam, Montana The Seli'š Ksanka Qlispe' Dam, formerly known as the Kerr Dam, is the first Native American-owned dam in the United States. Now owned and managed by the Confederated Salish and Kootenai Tribes of the Flathead Reservation, the dam blocks the flow of the Flathead River near Polson Montana. The concrete gravity-arch dam was completed in 1938 (it is one of two dams on the Flathead River) by the Montana Power Company, and it was initially named Kerr Dam after the company president, Frank Kerr. The Kerr Dam, south of Flathead Lake, was considered a blight and a sign of the white man's landgrab and genocide of Native American culture and language. But the dam was purchased at a price of \$18.2 million in 2015 by the Confederated Salish and Kootenai Tribes, and it was renamed the Seli'š Ksanka Qlispe' Dam. It is now a source of hope for the Tribes, and a source of power and water for their economic future. By following the Tribe's history starting in 1855 with the Hellgate Treaty, it demonstrates the enormous impact of water on the Tribe's past, present, and future.

Hays, Alexa Environmental Science Richard Orndorff Poster

The Johnstown Flood and its Impact on Dam Construction and Ownership in the United States In the afternoon of May 31, 1889, unsuspecting residents of Johnstown, PA were submerged in a 35-foot-high wave of water and debris as the South Fork Dam failed, and 20 million tons of water behind the dam tore through the city. In the end, over 2,000 people lost their lives to the flood, which was followed by a fire that burned through the wreckage for 3 days. The embankment dam that blocked the flow of the Little Conemaugh River created Conemaugh Lake, which sat on property owned by the South Fork Country Club. Increased rainfall that spring put immense pressure on the dam, and the country club's neglect of the rock-filled dam ultimately left it susceptible to the catastrophic failure that resulted in so much destruction. The private club's irresponsibility in this disaster resulted in dramatic changes to government regulations regarding ownership and maintenance of private dams. The Johnstown Flood was a historic and tragic moment that forever changed the processes of dam building, maintenance, and regulation in the United States

Hedt, Elizabeth History Larry Cebula Poster Historically Black Neighborhoods in Spokane In Spokane, there were no formal policies segregating specific residents lived where they could afford. However, that doesn't

In Spokane, there were no formal policies segregating specific races before the 1920s, so this meant that Black residents lived where they could afford. However, that doesn't mean non-white citizens were not shunned from moving into white areas. From 1890 to 1920, the Black population of Spokane never surpassed 2,000, but they

did leave a distinct mark in some neighborhoods. The difficult task of finding historically Black neighborhoods in Spokane narrows down to mapping areas by race. With only one race population map available from 1880-1920, the rest of the information came from 1900s plat maps and directories. This data along with stories of early Black settlers confirmed Hillyard and East Central as significant Black Neighborhoods. Most of the Black settlers that migrated north came as family units and settled in these areas because Hillyard and East Central were affordable for the time and close to public transport that would carry Black workers to and from their daily jobs. Today, there are many references to early Black History in East Central and Hillyard. Some of the oldest Black churches in Washington, Calvary Baptist Church, and Bethel AME Church, still serve their community every Sunday less than a mile away from each other in East Central. Early Black American settlers of Spokane are important reminders of a rarely documented population in our area. They paved the way for course-changing individuals in Spokane like Carl Maxey, Eleanor Barrow Chase, and Frances Scott. Discovering more about early African Americans' area of living in Spokane tells us more about their lives, places of worship, where they worked, and their friendship and close relations.

Henderson, Lilyanna
Art
Joshua Hobson
Creative Work
Amazon Coming Soon
Medium: Archival photo prints, and Diorama set on foam board made with twine, wood, and paper.
Dimensions: Prints: 15 3/4" x 10 7/8", Diorama: 11" x 12 1/2" x 12"
Year: 2022
"Amazon Coming Soon" is a diorama accompanied by a series of prints that depicts a dying field that has been cleared to have an amazon warehouse built. So much land is deforested and used by large corporations to put warehouses, shopping centers, and car infrastructure, leading to pollution and destruction of ecosystems. They

warehouses, shopping centers, and car infrastructure, leading to pollution and destruction of ecosystems. They are constantly being built due to the extreme level of American consumerism and greed. The diorama aspect drives home that to these large corporations the land, especially native land, is just a model on their desk that they can easily manipulate with no consequences or regard for nature.

Hines, Koby

Psychology

Jillene Seiver

Oral Presentation

Effects of Procrastination and Intrinsic Motivation on Academic Performance and Life Satisfaction in Upper Division Courses

Traditional procrastination has been defined as an intentional delay in starting an act, which often leads to a negative outcome. Procrastination has been shown to be related to poor academic performance. However, some have argued that one type of procrastination – active procrastination (AP) – can sometimes provide benefits, as individuals intentionally use time pressure to increase motivation. Active procrastination predict better academic performance, whereas passive procrastination (PP) – avoiding the task and trying to act as if there were no task looming – predict poorer academic performance.

The hypothesis for the current study were that higher AP would be associated with higher performance than lower AP or higher PP.

100 undergraduate students in online psychology classes were offered extra credit and completed at least part of the survey. AP and PP were assessed with scales, and academic performance was determined by grades on a term paper. The surveys were presented via Survey Monkey; instructor entered grade information, then deleted the identifying information before researcher received the data file.

Pearson's correlations were performed among both scales and the academic performance measure. AP was positively correlated with grades, whereas PP was negatively correlated.

These results will be interpreted through the findings of previous studies.

Hokanson, Noah Philosophy Kevin Decker **Oral Presentation** On the Intersection of Augustine and Descartes in the Work of Nicolas Malebranche With the Cogito as our basis, how can we perceive bodies? And what is it that brings these bodies into being and causes them to interact with one another? Nicholas Malebranche's philosophy answers these two questions in a very interesting way that synthesized two intellectual giants, one medieval and the other modern. The pursuit of this work is to examine the way in which Malebranche brilliantly synthesized his two intellectual heroes: St. Augustine and Descartes. Both influenced him greatly and in his work again and again we will see this. Sometimes he synthesizes as in the case of his occasionalism and sometimes he draws particularly from each of his heroes throughout his corpus as is especially seen in his moral philosophy. Both approaches will be considered. This is of particular note to the study of modern philosophy as it allows us to examine a modern philosopher with pronounced influences, that will, in addition, demonstrate a philosopher in the modern period with strong contiguity with the medieval and ancient periods. This is seen as he draws from Neoplatonism, Augustine, and Descartes which is of interest as the modern period is not necessarily known for this.

Holley, Autumn Biology Jenifer Walke **Oral Presentation** Evaluating efficacy of anti-Batrachochytrium dendrobatidis probiotic treatment on Pacific chorus frogs (Pseudacris regilla) at current and modeled climate change temperatures Chytridiomycosis, an amphibian disease caused by a fungal pathogen, *Batrachochytrium dendrobatidis* (Bd), has been linked to global population declines. Symbiotic antifungal skin bacteria contribute to Bd-resistance in some amphibians and may be used in probiotic therapy, but probiotic development often fails to consider potential climate change impacts. Field microbiome analysis and in vitro anti-Bd assays of isolates from Pacific chorus frogs (Pseudacris regilla) at Turnbull National Wildlife Refuge suggested Pseudomonas silesiensis was strongly anti-Bd and present at a higher abundance in uninfected frogs, indicating potential for in vivo anti-Bd activity. We tested the anti-Bd efficacy of *P. silesiensis* treatment on *P. regilla* (n = 60) collected from Turnbull and housed at historical and modeled future temperatures to determine the current and long-term probiotic potential under climate change conditions. Frogs were swabbed for Bd infection and microbiome analysis in the field and in the laboratory at incremental time points to investigate effects of captivity and heat, probiotic, and Bd treatments. To evaluate host-microbiome-pathogen dynamics, we will analyze 16S rRNA sequencing and Bd qPCR data. Preliminary results indicate undetectable infection levels in situ despite high prevalence here in recent years; however, some frogs had low intensity infections after isolation in captivity and before Bd exposure. These frogs may have had undetectable field infection levels presenting in captivity, a phenomenon previously observed due to lowered microbiome diversity. This ongoing research will determine the efficacy of a promising probiotic and provide insight into host-microbiome-pathogen interactions to help reduce amphibian declines.

Holman, Sophie, and Pamela Ordona Psychology Kevin Criswell Poster Adaptive and Maladaptive Coping Strategies Predict Health and Academic Resilience in Undergraduate Students with and without Chronic Health Conditions: A Longitudinal Study Introduction: Prior work suggests that the use of adaptive coping strategies (e.g., approach-oriented activities) leads to better health and performance outcomes. While most research focused on students with a specific chronic health conditions (CHCs), it is unclear how coping strategies are used across students with multiple CHCs. The current longitudinal study addresses this gap in the literature.

Method: Undergraduate students (n = 131) at Eastern Washington University completed online surveys during the Fall and Winter of the 2020-21 academic year. Surveys included CHC information and validated measures of quality of life (QoL), stress, resilience to academic difficulties, and frequency of coping strategies. Multiple regression modeling addressed whether coping strategies remained independent predictors after controlling for baseline (Fall) levels of outcome variables and time between surveys.

Results: Across students with and without chronic health conditions, less usage of avoidance coping strategies (e.g., disengagement), more usage of approach strategies (e.g., planning), and more usage of adaptive cognitive strategies (e.g., positive reframing) during Fall were associated with better QoL across most domains, greater academic resilience, and lower overall stress during Winter. Most bivariate correlations were not significant after controlling for Fall outcome levels and passage of time between surveys, with some exceptions (e.g., disengagement predicted lower resilience in students with co-occurring mental and physical CHCs). Discussion: Our findings are consistent with prior work as approach-oriented strategies tended to predict better health and performance. Future studies would benefit from exploring coping strategy use in other student populations (e.g., across gender identities).

Hopkins, Brandon Geography Richard Orndorff Poster

Inland Washington Drought and the Effect on Wildfire

Drought is a significant environmental factor that influences the frequency, intensity, and duration of wildfires within inland Washington. This part of Washington from the east flank of the Cascades to the Idaho border is characterized by dense forests, arid desert plains, hot summer temperatures, and low summer precipitation, all of which create ideal conditions for wildfires. In recent years, wildfires have become more frequent and more severe.

Inland Washington has experienced several consecutive years of below-average precipitation, leading to a decrease in soil moisture and an increase in the availability of dry vegetation. Climate change is also exacerbating the effects of drought. Rising temperatures, changes in precipitation patterns, and an increase in extreme weather events are creating ideal conditions for wildfires to spread. Additionally, human activities such as logging and poor urban planning are increasing the risk of wildfires.

In 2020 alone, the state experienced some of the largest wildfires in its history, with over 800,000 acres burned, tens of thousands of people evacuated, and multiple homes and other structures destroyed. The fires were fueled by dry vegetation and high winds, and they created a significant health hazard due to widespread smoke and particulates. Local authorities have proposed and implemented a range of measures to reduce wildfire risk, including improved land management practices and greater public awareness.

Hove, Rachel Art Joshua Hobson Creative Work In Memory Medium: Gelatin Silver Print (Unique) Dimensions: 8" x 10" Year: 2022 In this series, I looked at the world from a slightly different perspective than I usually do. I took inspiration from simultaneous and distorted seeing from Moholy-Nagy's eight ways of seeing while taking the mundane up a level also inspired me. I used distorted seeing, by splattering and painting the photos with the developer, and I  $\sim 55 \sim$  used sandwich printing to make some of the photos as well. Overall, the images have a unique look as the contrasting effect within each one causes a feeling of wholeness and wanting more. This feeling can be seen as surrealistic since the photos themselves are based upon memories of my past. Due to the photos only being partially uncovered, it gives the appearance of looking into the unconscious mind, which is part of surrealism. The unconscious is why I titled my pieces Unconscious Mind one through eight. This series of photos themselves is personal to me since it is about my father and things around our family home that remind me of him. My father passed away a few years ago, and this series I feel helped me bring back memories of him.

Ives, Keagan Geology Richard Orndorff Poster

Analysis of the PP-3 Soil Sample From the Palouse Prairie Restoration Project Site, Cheney, WA The Palouse Prairie Restoration Project is devoted to the restoration of 120 acres of land to the west of Eastern Washington University. This land is actively being returned to its once-natural state for the purpose of education, research, and recreational activities for students and faculty at EWU and community members of Cheney, WA. Palouse Prairie soil originated as glacially derived silt that was blown eastward from the Puget Sound into eastern Washington during the last Ice Age. We conducted ASTM standard tests on sample PP-3 to determine geotechnical properties of the soil including specific gravity, Atterberg Limits, particle size distribution, optimal water content for compaction, and unconfined compressive strength. These properties are important to understand when building planned infrastructure (roads, parking lots, paths, visitor center, amphitheater) at the site.

Ives Keagan, and Matt Price Geology Richard Orndorff

Poster

The Importance of Snowpack as a Water Source for California

Mountain snowpack is one of the most important factors in supplying water for all of California, especially during the dry fall and summer seasons. Snowpack is a vital source of water and has significant positive or negative impacts on water availability given the amount of snow in a particular winter. Over the past decade, drought related to lessened mountain snowpack in California has caused increased water restrictions and unfavorable conditions for residents of the state. However, the 2023 snowpack reached record levels due to atmospheric rivers bringing heavy snowfall to California from the Pacific Ocean, leading to a forecast of significant drought reduction for the state in the coming summer. We discuss current conditions as well as the overall importance of snowpack to water resource availability in the entire state.

Johnson, Hope Art Joshua Hobson Creative Work Disturb the Comfortable Medium: Graphite, alcohol marker, and micron pen on paper Dimensions: 9"x12" and 8.5"x11" Year: 2022

"Disturb the Comfortable" is a series based on the struggles of women and those who are a part of the LGBTQIA+. These pieces are all on basic drawing paper, using a variety of drawing material. The scribbled faces of these figures represent the utter chaos that trauma leaves in its wake. These pieces focus on struggling with your own identity, as well as redefining yourself after a traumatic experience. My goal with this

composition is meant to bring awareness to the horrors that women and the people of the LGBTQIA\_ face on a daily basis.

Johnson, Thurman Biology Rebecca Brown Oral Presentation

Palouse Prairie Restoration in Eastern Washington: First-year Plant Cover and Richness Driven by Topographic Variation, Not Seed Mix Diversity

With over 99.99% of Palouse prairie lost, regional ecosystem function hinges on restoring native prairie. Little research exists on seed-based Palouse prairie restoration compared to other North American steppes, hindering regional efforts. To test the hypotheses that increasing seed blend diversity would increase native plant cover and species richness and decrease non-native plant cover and richness, with each factor also being influenced by topography, we used a randomized-block design to drill-seed 3 blends into 24 5.6 x 200 m strips on 15 acres of EWU's Prairie Restoration Project in Cheney, Washington in October 2021. Each strip contained 6 1-m<sup>2</sup> plots, totaling 144. plots Treatments included 6 bunchgrass species, 6 bunchgrasses with 8 forb species, and 6 bunchgrasses with 15 forb species. In June 2022, we recorded each plot's species percent cover. We compared species cover and richness and community composition for each treatment across three aspects: hilltop/south, north, and swale using mixed linear models. Diversity and topography interacted to affect non-native richness, which was lower in swales than north slopes across treatments, but higher in north than top/south in grass-only treatments but similar between top/south and swales. Our hypothesis that blend diversity influences native and non-native richness and cover was not supported. Topography imparted large effects, with swales and north slopes having lower native richness and cover and higher non-native cover than top/south. Our results indicate (1) Palouse prairie blend designs should consider topographic variation and (2) increasing blend diversity doesn't provide first-year advantages but interacts with topography to affect community composition.

Jost, Talon Biology Jenifer Walke Oral Presentation Understanding the F

Understanding the Role of Tetrodotoxin on Skin Microbiome Composition and Chytrid Fungal Infection in Rough-skinned Newts (*Taricha granulosa*)

Chytridiomycosis is an amphibian disease linked to population declines and species extinctions, caused by the fungal pathogen Batrachochytrium dendrobatidis (Bd). While chytridiomycosis can result in host death, some amphibians are less susceptible to severe infections due to factors such as host-associated skin microbes, which play an important role in host defense by inhibiting Bd through resource competition and producing antifungal metabolites. Aiding amphibian defense against disease, parasites, and predation are granular (poison) glands releasing toxins, such as Tetrodotoxin (TTX) in response to epinephrine or norepinephrine stress cues. TTX is a potent neurotoxin found throughout marine taxa, but production is limited to amphibians among land vertebrates. Despite negative relationships between TTX concentration and Bd infection intensity, influences of host-produced TTX concentration on microbiome diversity and pathogen interactions remain understudied. We examined relationships of TTX concentrations on host-pathogen-microbiome dynamics in rough-skinned newts (Taricha granulosa, n = 90) collected in the Cascade Mountain region. Among newt populations, there were significant differences in TTX concentration but not Bd zoospore equivalents, suggesting TTX concentration did not influence Bd infection intensity. However, our ongoing investigations into TTX concentration and microbiome diversity may reveal interactions of complex micro-ecosystem processes utilized in Bd defense. Elucidating evolutionary relationships of host-pathogen-microbiome dynamics in vulnerable groups is necessary to further conservation efforts in even distantly related taxa by clarifying physiological and microbiome responses to antagonism.

Kaddoura, Mohammad, and Shayan Shahrabadi

Biology

Luis Matos

Poster

*Drosophila melanogaster* Potential as a Model System for Human Succinic Semialdehyde Dehydrogenase (SSADH) Deficiency

Succinic semialdehyde dehydrogenase (SSADH) functions in gamma-aminobutyric acid (GABA) catabolism by converting succinic semialdehyde (SSA) into succinic acid. Proper GABA synthesis and breakdown is essential for GABA to perform its primary role as an inhibitory neurotransmitter in the central nervous system (CNS). Mutations in the SSADH gene produce SSADH deficiency, a rare genetic disorder in humans. This deficiency yields a buildup of GABA and SSA, allowing 4-hydroxybutyrate dehydrogenase (4-HBAD) to convert SSA into gamma-hydroxybutyric acid (GHB) and 4-hydroxybutyric acid (4-HBA). The buildup of GHB in the CNS results in many symptoms, including developmental, musculoskeletal, and neurological aberrations. To find a treatment for the deficiency, researchers developed and currently use a mouse model. In the model, mice with the deficiency have an increased concentration of GHB, SSA, and 4-HBA. High concentrations of GHB in the mice cause absence-like seizures. When the mice reach the post-natal (PN) age of 14-18 days, the seizures progress to a lethal status of epilepsy resulting in the death of the mice at PN age of 20-26 days. As the mouse model is expensive to maintain and the mice die, here we test the hypothesis that Drosophila melanogaster with gene knockouts for the SSADH homolog can serve as a model for SSADH deficiency. Our first objective is to identify a trait/behavior that associates with the SSADH deficiency in D. melanogaster. The second objective is to test whether the trait/behavior can be manipulated. Various behavioral and developmental assays were tested with mutant and wild-type flies. Our results indicate a significant difference in recuperation time (after CO<sub>2</sub>) anesthesia) exists between the wild-type and mutant and SSADH- flies. Exacerbation of this behavior is currently being tested. Successful manipulation of the recuperation phenotype would suggest that D. *melanogaster* could serve as a model for testing potential therapeutic compounds.

Kannberg, Katherine Art Joshua Hobson Creative Work Beach Lamp "Beach Lamp" is a mixed media lamp sculpture measuring 18" x 10". This unusual piece is complex and made from objects found lying around a craft room. The work is inspired by living on the beach with a bright night light reflecting off the water. The figure poses as the queen of the ocean that has created this fun bright colored atmosphere full of random craft objects and materials. Beach Lamp brings you to a world of color and bright lights. With every little detail it invokes a bold expression of chaos, but it is organized. The Lamp reminds us to enjoy the little details when exploring a beach, to not take it for granted, and to recycle materials so they don't end up hurting the ocean.

Kappes, Cayden, Paulson Thompson, Ray Tanner, and Arthur Wallace Computer Science Sanmeet Kaur Poster Quartzy Inventory Management App

The Eastern Washington University biology department uses Quartzy's lab management services to keep track of their current inventory. For the purposes of managing inventory, Quartzy provides all necessary services to their users, however, the biology department would like a system that can track additional information while modifying Quartzy's database. As it currently stands, tracking who is taking items and why they are taking them is done using paper sign out sheets that will then need to be manually entered into the system by one of the members of the department. Our project is to replace the paper sign out sheet with a mobile app capable of

recording the required information to our own database, automatically construct return numbers when items are marked for future return and modify item quantity in Quartzy's database through their developer API. The goal of our app is to reduce the amount of work required to manage Quartzy's inventory by collecting the same amount of information from the borrower while automating the data processing phase. Once the development of our app has concluded, we should be able to relieve the stress of entering data into Quartzy while also keeping an easy-to-read log of previous transactions.

Keith, Collin, and Gale Kamp Health Services Administration Rosalee Allan Poster Becoming a Different Person with No Control Chronic Traumatic Encephalopathy (CTE) is often overlooked or not given the attention it needs. CTE is a progressive neurodegenerative disorder which is caused by repetitive head traumas, which damage the brain, thereby causing lasting effects to the individual affected. These changes especially impact their behavior, causing them to be more aggressive, impulsive, and even suicidal. When CTE is talked about it is mainly discussed alongside high-impact sports, but it also has a grasp on a large amount of the military population.

discussed alongside high-impact sports, but it also has a grasp on a large amount of the military population. There has been a great deal of information published and research completed surrounding CTE and how it can be prevented, measured, or how the symptoms can be controlled. Behavioral changes are a huge part of this disorder; in order to synthesize the many ways CTE changes behavior the authors will look at the findings from 20 research articles. The purpose of this study is to examine the available literature surrounding CTE and to synthesize an answer for the clinical question being investigated: how does repetitive head trauma affect behavior over time? It is hoped that this study will provide the readers with an idea of what CTE is and all of the associated risks that can occur within a high impact lifestyle.

Kenison, Kiler Biology Ross Black and Camille McNeely Poster

The Sources and Fates of Nutrients in the Deep Lake Watershed

This study will determine the sources and fates of nutrients within the Deep Lake watershed located in Stevens County, WA. Deep Lake is a 191-acre exorheic lake found in northeast Washington state. It is situated at the bottom of a valley with steep walls and is fed throughout the year by snowmelt from tributaries descending the surrounding mountains. To the north of the lake, the tributaries are utilized by cattle ranchers as a water source for livestock while a small community of homes surrounds the lake. Water samples for nutrient analysis, discharge, and metrics including pH, dissolved oxygen, temperature, and conductivity are taken at 8 locations within the tributaries and outflow of the lake. Similar metrics are recorded in the lake at 4 locations, and both water and sediment samples are retrieved. These data are used to determine and compare the concentrations of nutrients moving through the watershed and being deposited in the lake. It is also used to determine the proportion of livestock upstream will correlate to a higher concentration of nutrients and sediment flowing into the tributaries and lake. It is also expected that the septic systems of the homes surrounding the lake will be contributing to diffuse pollution. This analysis of the watershed will allow for the development of better land use practices and suggestions that could improve and protect water quality and health.

Kennedy, Kailani Chemistry & Biochemistry Jamie Manson Oral Presentation Neutron Diffraction Study and Magnetic Properties of NiF<sub>2</sub>(H<sub>2</sub>O)<sub>2</sub>(3-CN-py)<sub>2</sub>  $\sim 59 \sim$  After many experimental attempts, understanding how competing interactions occur in dimensional antiferromagnets remains to be determined. Another magnetic model, like the two-dimensional (2D) S=1 J1-J2, focuses on the J1/J2 ratio. This model will clarify how quantum tricritical points separate Neel and stripe phases. However, some experimental procedure has yet to be able to test this model. Therefore, this research project will mainly focus on utilizing zero neutron diffraction (ND) to identify the ground state magnetic structure of a NiF<sub>2</sub>(H<sub>2</sub>O)(3-CN-py)<sub>2</sub> that can resemble this model. In order to lessen the incoherent background scattering, D<sub>2</sub>O will be used in replace of H<sub>2</sub>O. The outcome of this project is to use the ground state magnetic structures of this compound and combine this with field-dependent SQUID data to create an enthalpy versus temperature phase diagram. Knowing the J1/J2 ratio, magnetic structure, and order parameter on the compound, thus theorize there will be unusual spin configurations.

Kennerly, Sylvia Biology

Jason Ashley

Poster

Overexpression of Fringe Protein in Osteoclast Macrophages

Osteoclast cells are large multinucleated phagocytic cells that play a crucial role in the reabsorption or breakdown of bone tissue in addition to their role in bone remodeling, growth, and repair. Osteoclastogenesis, the differentiation of osteoclast cells from the precursory line of monocyte/macrophage lineage, is dependent on RANK/RANKL pathway signaling while other pathways, such as Notch signaling, influence other factors of the cell life such as size, activity, and lifespan. Notch pathway signaling is modulated by Fringe glycosyltransferases and has previously been shown to play a role in osteoclast differentiation and function. We will use mouse bone marrow cell lines obtained from the cDNA library cell lines that have been treated to isolate for LFNG, MFNG and RFNG overexpressing cells to analyze the impact of overexpression to the cell. We will use a combination of molecular biology techniques, such as RT-qPCR to verify overexpression, fluorescent viability staining using Propidium Iodide and Hoescht dye, and staining for Tartrate-Resistant Acid Phosphatase (TRAP) activity, to investigate the expression levels of the Fringe proteins and the downstream impact to these cell lines. With the results of this study we seek to provide a foundation for future investigations into the regulation of this critical pathway.

Kent, Joshua

Social Work

ManChui Leung

Oral Presentation

The Impact of School-Based Student Support Services, Creating Positive Change to Mental Health and Academic Success

In our present society, we are observing how the coronavirus pandemic perpetuated a mental health crisis among the country's youth and their families. Although this event has mostly illuminated a chronic issue that decades of youth and families have been experiencing. The practice of this systematic review revealed that researchers and advocates for school-based support for students have been identifying and discussing this problem since the 1960s. Yet, there is still not a uniform program for school-based health services as evidenced by the variety of used interventions within the school to address student issues. Now that our world has experienced this pandemic, the sudden shelter-in-place transitions combined with an inconsistent system that was meant to support student health and academic success, has progressed into an overwhelming emergency for which there is not enough government funding nor personnel to address such an evident need. Students have endured transitions, many were not supported, participation and academic success decreased, and mental health crises increased. It was a difficult time for many, and these difficulties have not subsided. Further research is needed to present how funding for school-based health and student services is needed, if not required, for the positive development of our nation's youth.

This study is proposed to answer how/what school-based student support and health services are being

implemented in high schools, and which of these interventions is most effective in reducing symptoms of acute and chronic mental health issues while improving their academic success?

Killian, Suzanne
Mathematics
Hyung Sook Lee
Poster
What is Inquiry-based Mathematical Learning?
To make schools accountable for the education and learning they provide for their students, updating the
Elementary and Secondary Education Act with the No Child Left Behind Act created a ripple effect of damage
to student learning. This kind of pressure on schools and students puts more focus on students getting good
grades than focusing on effort. Lack of effort created bad habits and poor study skills, especially in
mathematics. Recent studies state that math proficiency in the U.S. is 38% and 50% in Washington state (Public
School Review, 2023). This type of learning outcome cries for help on how teacher-directed classrooms at all
levels of math are losing their effectiveness and need for change. This paper will be reviewing three journals
and four books on what inquiry-based mathematical learning is, how it works in a classroom, how it relates to

the 5 practices, and how to balance the love for mathematics with the love for students. When teachers change their teacher-centered classrooms to inquiry-based classrooms they may provide a more effective learning environment for all levels of mathematics.

An example of an inquiry-based science lesson plan will be added to the poster with an addition of a science station next to the poster.

Killian, Suzanne Mathematics Hyung Sook Lee Poster/Creative Work Mathematical Art Exhibit

As teacher-centered classrooms continue to lose their effectiveness at all levels of mathematical learning in the United States, teachers should use a more student-centered approach by implementing math-related art in the classroom. Implementing math-related art in the classroom is a great tool for engaging students in effective mathematical learning. It requires students to use their critical thinking on how to apply mathematical ideas, principles, rules, and properties to design and create art while also allowing the students to freely express themselves. Adding math-related art can transform a math lesson into project-based learning. Teachers can also use math-related art as a summative assessment as students think outside the box in using their mathematical reasoning to implement math-related ideas in their art.

I hope as people observe the Mathematical Art Exhibit, they will see mathematical ideas, principles, rules, and properties transformed into art that I expressed and abstracted freely. Then connecting those free expressions to student learning. Promoting critical thinking as each canvas displays acrylic paint in a way that balances love for mathematics with love for student learning.

Kinney, Mickenzie, and Tyler Scheff

Engineering

Heechang (Alex) Bae and Matthew Michaelis

Oral Presentation

Investigating the Effects of Acetone Vapor Treatment Conditions and Post Drying Methods on Surface Roughness and Tensile Strength of 3D Printed ABS Components

The additive manufacturing/3D printing process using the material Acrylonitrile Butadiene Styrene (ABS) is melted and printed layer by layer to create parts most often used in rapid prototyping or mass production of products. The additive manufacturing process of 3D printing often results in discontinuities and structural uncertainties causing voids and poor layer bonding. Past documented research investigated 3D printed ABS

samples in different orientations and how to improve their tensile strength and fatigue life. This prior research also investigated a surface treatment method using Acetone Vapor Smoothing (AVS) on 3D printed ABS parts. That data confirmed the reduction of stress concentrations on the surfaces and a reduction of structural inconsistencies by AVS methods in the ABS parts. Using AVS methods decreased the roughness of the 3D printed samples creating a smooth surface finish. A correlation was established to an improved tensile strength and fatigue life using an adjusted acetone vapor exposure and improving drying methods. Current research uses the acetone vapor exposure from the previous study that displayed the most improved tensile strength and minimized stress concentrations and structural inconsistencies within the 3D printed parts. This research will determine the optimal drying time which produces the largest tensile strength in the ABS components of various print orientations. Additional research on the improvement of surface roughness utilizing AVS methods are performed on 3D printed samples will be conducted to determine a correlation to tensile strength.

Kinerson, Hailey Philosophy Terry MacMullan Oral Presentation Simón Bolivar

Simón Bolívar was a significant contributor to the fight for independence of many South American countries and helped encourage the unity between the criollos and the indigenous people. Throughout his time, Bolívar fought with the idea of belonging and the identity of his people. He advocated for the development of a centralist government system in the early 19th century and was an avid freedom fighter. Particularly influenced by Andrés Bello in childhood and his early secondary education, Bolívar was very politically influential in his time as shown in the Jamaica Letter and his address delivered at the Inauguration of the Second National Congress Of Venezuela at Angostura. Bolívar was born in 1783 to a wealthy family in Caracas, Venezuela. Orphaned at age 9, Bolívar was sent to be raised by his maternal grandparents where he received a traditional European education nourished by private tutors and other important philosophical and political figures of that time, including Andrés Bello. Bello throughout his life, not only acquired his own impressive political achievements, but had influences on many important figures, including Simón Bolívar. Iván Jaksic said "[Bello's] main concern became providing the new republican systems with enough authority and legitimacy to become self-sustaining. It is for this reason that he contributed to the writing of the constitution of 1833, a highly centralist constitution with strong executive powers, and then he devoted over twenty years to reforming civil legislation to provide a stable environment for the rule of law to prosper." Centralist legislation typically advocates the control of different activities and organizations under a single sovereign authority. Bello assisted in teaching the fundamentals and importance of the French enlightenment

Kneafsey, Katherine Art Joshua Hobson Creative Work Acceptance Title: Acceptance Medium: Silver Gelatin Prints Dimensions: 11" x 8.5" Year: 2022

Acceptance is a collection of black and white silver gelatin photographs measuring 11" x 8.5". These images are single exposures that use form and shadow to create differing illusions. This work examines how our perception of ourselves can be altered with time. Acceptance is the evolution of self-discovery that leads to accepting who we are. The uncertainty of the subject matter in the works addresses how as we grow up most are not sure who we are. Typically we refuse to embrace our true selves because of societal norms that are forced upon us. A wall is built with these false personalities until the pressure becomes too much. Finally, the barrier breaks down and

we say "fuck it" to the norms and life starts to become this beautiful thing where we can just be.

Krisyuk, Zlata, Tristen Naval, Kaity Paz, and Megan Pickett

Psychology

Kevin Criswell

Poster

Depression and Anxiety Symptom Severity in Students with Physical or Mental Chronic Health Conditions during 2020-21 Academic Year: A Longitudinal Study

Introduction: After the COVID-19 pandemic, national surveys indicated an increase in mental health conditions reported by undergraduates. Depression and anxiety can contribute to worse performance, including university work. However, there is limited research comparing depression and anxiety symptom severity between students with mental or physical chronic health conditions (CHCs) since the pandemic. The current study fills that gap by examining depression and anxiety severity in undergraduate students with CHCs.

Method: Undergraduate students (n = 212) at Eastern Washington University completed online surveys during Fall, Winter, and Spring quarters of the 2020-21 academic year. Surveys included CHC questions and a validated measure of anxiety and depressive symptom severity. Paired samples t-tests addressed changes in levels of depression and anxiety severity over time. One-way ANOVAs and independent samples t-tests addressed mean differences across students with anxiety, depression, other mental CHCS, and students without CHCs.

Results: Depression and anxiety symptom severity was stable across time for students with any combination of CHCs and those with no CHCs. Students with co-occurring anxiety and depression reported greater levels of anxiety symptom severity across time when compared to students with only physical CHCs, other mental CHCs, and no CHCs; however, those differences tended to end by Spring quarter.

Discussion: Our findings are consistent with prior research demonstrating that students with co-occurring anxiety and depression may experience lower quality of life. Future studies that target students with combinations of anxiety and depression CHCs may need to be conducted to examine possible interventions for this population.

Kunde, Mason Philosophy Terrance Macmullan

Oral Presentation

An Interpretation and Application of Paulo Freire's 'A Pedagogy of the Oppressed': How We Can Educate Ourselves Against Oppression

Paulo Freire was heavily inspired by religion. He was part of The Council of Churches and helped to inspire and influence the movement of liberation theology. Christianity was a large "why" for many of the purposes and activities in his life. This is reflected in his work "Pedagogy of the Oppressed"; he uses christian references, metaphysics, and epistemology to support his philosophical thought. The most important of which, The Word, which to him is synonymous with praxis, is the act of both action and reflection while also being dialogue and dialectic. To Freire, the word and the act of naming the world is part of what it means to be human. Adam, who named every beast and creature, would have been the first to praxis, to use the word, to name and talk with God: the ultimate dialectic with reality. He uses this Christian metaphysics and liberatory application of praxis to pave an education-based path toward a more equal and just society and a more fully self-actualized individual. By applying his theories, we can make the education system one where the individual is capable of liberating themselves from the oppressive limits set by society, culture, and others. We will also be able to liberate our fellow man along with our oppressors (who are just as trapped in a cycle of oppression as the oppressed). A pedagogy made for and by the people it serves is the only way to true liberation and equality in society and a civilization that strives for justice and fairness.

Lake. Meg and Elaine Larsen

# Biology

Jessica Allen

Poster

Impact of secondary metabolites and primary reproductive mode on *Parmotrema* distribution in the Southeastern United States

Lichens are organisms resulting from fungal and algal symbioses that produce a wide variety of secondary metabolites which serve a variety of biological functions). It is postulated that presence of certain secondary metabolites has an impact on lichen distribution . Some lichen species utilize apothecia for sexual reproduction, while others primarily use lichenized asexual propagules . We hypothesized that distribution of a *Parmotrema* species would increase based on two separate factors: the number of secondary metabolites a species produces and the number of apotheciate individuals within a species. Using the digital herbarium we observed and recorded the presence or absence of apothecia as well as the number of secondary metabolites for 11 species that occur within the Eastern United States. Linear regression data analysis was conducted, which indicated that there was no significant correlation between the number of secondary metabolites produced by a species and species density (p = 0.432). We did find a significant positive correlative relationship between the percent of specimens with apothecia for a given species and that species' density (p = 0.023) with 66.2% of density attributed to apothecial frequency in observed herbarium specimens. To further investigate our hypothesis three primarily apotheciate species distribution and the primary reproductive mode with a Student's t-Test finding no significant correlation (p = 0.379).

Lambert, Miranda Chemistry & Biochemistry Ashley Lamm Poster Synthesis of a Degradable BN Polymer

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. Recycling plastic seems to be the answer to reuse and reduce plastic waste but only a dismal 8.7% of plastic is recycled per year with the rest ending up in landfills and the environment. An alternative to help eliminate this problem is to create polymers that biodegrade or breakdown over time or in certain conditions. The synthesis, characterization, kinetics, and future directions of a boron nitrogen polymer that degrades will be discussed.

Legg, Betsy Other/Unsure **Richard Orndorff** Poster The Life-Giving Nile: The Central Role of the Nile River in the Development and Sustainability of Ancient **Egyptian Civilization** The Nile River played a vital role in shaping and sustaining ancient Egypt for over three thousand years. I explore the relationship between the Nile River and the development of Egyptian civilization. The Nile River was the main source of water and life in the deserts of ancient Egypt. Its annual flooding, which occurred between June and September, brought fertile soil onto the surrounding floodplain, making agriculture possible. The Egyptians created an intricate system of irrigation canals and dikes to utilize the river's flow and ensure that crops were watered year-round. The Nile also provided transportation for trade and commerce, as well as serving as a source of fish and waterfowl. The river's importance is reflected in ancient Egyptian religious traditions, where the Nile was worshiped as a god. The Nile was central to Egyptian mythology and to the pharaoh's power. The Nile was seen as a life-giving force, and the ancient Egyptians believed it was essential for the pharaoh to maintain the river's flow to ensure the country's prosperity. I discuss the Nile River as the

backbone of ancient Egyptian civilization, agriculture, and religion. Without the Nile River, Egyptian civilization may not have developed into the sophisticated and long-lasting society it was.

Legg, Betsy Geosciences Chad Pritchard Poster

Fancher Butte, Steptoe of Eastern Washington: Witness to Weapons of War 1858 and 1958 On September 1, 1858, Fancher Butte, a Steptoe peak near Medical Lake and Four Lakes, Washington, bore witness to a hard-fought battle between elements of the United States Army and an alliance of Native American tribes. Although both forces were numbered between 500 to 700 men, it was the U.S. Army's advanced weaponry that gave them the advantage over their strategically fierce adversaries. The U.S. Army used the Springfield Model 1855 rifle-musket and its newly crafted Minié Ball could inflict a fatal shot at a range of 944 meters (1000 yards), five times that of a bow and arrow and the outdated muskets of the Native American warriors, and two 12-pound Mountain Howitzers could fire a volley of one round per minute with an effective range of 1536 meters (1680 yards). With these weapons, U.S. forces prevailed in the Battle of Four Lakes in what was one of the final battles in the three-year-old Yakima War. One hundred years later, on June 14, 1958, the second-generation guided surface-to-air missile system, the Nike Atlas E(S) (Hercules), designed to destroy the Soviet Union's ability to deliver nuclear weapons on the sovereignty of the United States, was designated for Site F-45, a position on top of Olson Hill, 3.6 kilometers, (2.25 miles) east of Fancher Butte. The Nike Atlas (Hercules) missile, the most technologically advanced surface-to-air missile at the time, had a range of over 120.7 km (75 miles) and a top speed of Mach 3.65 or 4356.5 kilometers per hour (2707 mph). This project was done to help current geological research understand how dramatically humans have altered isolated buttes in eastern Washington.

Leonard, Max and Lucas Robert Geology Richard Orndorff Poster History and Environmental Impa

History and Environmental Impacts of the Salton Sea, California In 1905 a poorly-constructed dike broke and irrigation water from the Colorado River broke out of its canal and filled an ancient seabed in southern California's Imperial Valley. This was the sudden and unexpected creation of the Salton Sea. The Salton Sea has since been maintained by irrigation runoff from nearby farms in the Imperial and Coachella Valleys. Benefiting greatly from tourism in the 1950s and 60s, the Salton Sea attracted more tourists annually than Yosemite National Park. Since 2002 the salinity has doubled, making the Salton Sea 50% saltier than any ocean on Earth. In addition to increasing salinity, water quality issues such as temperature extremes, eutrophication, and related anoxia and algal blooms are adversely impacting fish and other wildlife. Even though it has only been 100 years since its accidental formation, the Salton Sea has become an extremely critical resource for resident and migratory birds. A marine sport fishery was located on the Salton Sea, but it

critical resource for resident and migratory birds. A marine sport fishery was located on the Salton Sea, but it has been closed due to decreasing fish populations. In this study we discuss the history and environmental impacts of the Salton Sea, as well as possible solutions for current environmental problems.

Leonard, Max, Seth Morris, and Logan Becker

Geology

Richard Orndorff

Poster

Geotechnical Analysis of Soil Sample PP-2 from the Palouse Prairie Restoration Project, Cheney, WA The Palouse Prairie Restoration Project is a plan to return 120 designated acres of agricultural land to its original, natural state and provide educational and research opportunities to the broader EWU community. We collected soil sample PP-2 from the upper portion of the south face of a loess hill located at latitude 47.49371, longitude -117.59267, elevation 2,542 feet above mean sea level near the EWU water tower. Palouse Prairie soil originated as glacially derived silt that was carried by wind from the Puget Sound then deposited in eastern Washington during the last Ice Age. We conducted ASTM standard tests on sample PP-2 to determine geotechnical properties of the soil including specific gravity, Atterberg Limits, particle size distribution, optimal water content for compaction, and unconfined compressive strength. This information will help project managers make better-informed decisions related to proposed infrastructure development including pathways, a visitor center, amphitheater, and parking areas.

Levora, Sage, Mychael Henry, and Jake Hillyard

Biology

Krisztian Magori

Oral Presentation

Homeopathic and Allopathic Repellents Efficiency for Deterring Ticks

Ticks have become a nuisance to society due to their ability to transmit dangerous vector-borne diseases. Taking control of the global population of ticks is crucial for preventing tick-borne diseases from being transmitted to host organisms like humans, dogs, and mice. Some of the more common tick-borne diseases in the United States include Lyme disease, babesiosis, ehrlichiosis, and Rocky Mountain Spotted Fever. Industrial chemical acaricides and repellents are the most common and effective methods used against ticks. Unfortunately, ticks are becoming more resistant, and the repellents are becoming less effective. The objective of the study is to evaluate the efficiency of industrialized chemical acaricides and a homeopathic natural repellent against two species of ticks including the American Dog Tick (*Dermacentor variabilis*) and the Rocky Mountain Wood Tick (*Dermacentor andersoni*) under laboratory conditions. We will use a repellent test to analyze the effectiveness of the trialed substances against ticks. We will create a 5cm wide circumference of a vial using the chosen tick substances in 5, 30, and 60 minute intervals. If the ticks move towards the repellent, this is an indication that the ticks are not deterred and the substance is less effective. We hope to see that the homeopathic natural repellent is efficient at deterring ticks. If we do see positive results with the repellent, this can further support prevention methods used to decrease the spread of transmittable diseases.

Long, Logan, and Issac Dunmore Environmental Science

**Richard Orndorff** 

Poster

The Effects of the Indonesian Water Crisis on Rural Populations

Indonesia, a vast country with 6,000 inhabited islands, has had a long history with water scarcity and pollution among both urban and rural populations. The issues facing urban water systems stem from pollution, aquifer over-extraction, and fragmented water management and coordination. Responses to the water crises are already in motion in urban areas, yet populations that rely on self-supplied water are facing a crisis of their own. At least 33% of the population of Indonesia relies on self-supplied drinking water, primarily from wells and rain catchment systems. While some regions have high aquifer productivity, pollution of unconfined aquifers, drawdown and subsidence, saline intrusion, and decreasing recharge rates all pose serious threats. Decreasing recharge rates and the issues facing rain catchment dependency stem from the same source: climate change. Climate change has produced rising sea levels and a 12% decline in precipitation during the dry season. Water catchment systems and wells are becoming less reliable, which increases the frequency and intensity of drought, especially during El Nino years. Freshwater resources on all island nations in the region are especially vulnerable to precipitation variability because many rely on rainwater collection for their supply of fresh water in these semi-arid environments. Drinking water is not the only factor that is vulnerable to these threats; agriculture, rivers, forests, coastal ecosystems, disease and human health, tourism and national security are impacted as well. The outlook for water resources in Indonesia is grim, so innovation, sustainable plans and better education surrounding self-supplied drinking water are necessary to help mitigate the current water crisis.

Long, Logan, Will Montgomery, and Mitchel Stefonowicz Environmental Science Richard Orndorff Poster Geotechnical Engineering Analysis of Soil Sample PP-4 from the EWU Palouse Prairie Restoration Project, Cheney, WA

Eastern Washington University is located on the Palouse, a region in the Inland Northwest distinguished by rolling hills formed by wind blown loess of glacial origin. Due to agriculture, only 1% of this region still maintains its natural habitat. EWU has dedicated a third of its land to restore a portion of the Palouse to its natural state in a multidisciplinary project called the Palouse Prairie Restoration Project. We collected soil from the north face of a hill on the project site to determine its geotechnical properties. We conducted ASTM standard tests on our sample to determine specific gravity, Atterberg Limits, particle size distribution, optimal water content for compaction, and unconfined compressive strength. This information will help EWU develop infrastructure on the site including trails, visitor center, amphitheater, and parking lots.

Low, Rachael

History

Lawrence Cebula

Poster

Spokane's Debates of 1968 for Fair Housing

Born in 1925, James S. Black worked in the real estate industry where he would create the NAI Black company in 1958. In 1968, he was elected president of the Washington Realtors Association. Black was against Senate Bill 378. He believed that it was the right of the homeowner to choose who could buy their homes. He would be part of the 1968 debates with Carl Maxey, a well-known civil rights lawyer.

Carl Maxey was born in 1924, and he would go from being kicked out of childrens' homes to graduating from Gonzaga University on a Boxing Scholarship to become a lawyer. He would become a leading member of the Civil Rights Movement.

Maxey was the Chairman of the Washington State Advisory Committee to the US Commission on Civil Rights. In 1968, he would be part of a series of debates with James S. Black who endorsed Referendum 35 while Maxey would be against the Referendum. Spokane was familiar with demands for equal treatment. The Haircut Protest was one of these protests, which took place in 1963 after an exchange student from Whitworth was refused a haircut based on the color of his skin in Spokane. This case would push Maxey into being the leading member of Spokane's civil right movement as he won the case. In February of 1968 at the Kiwanis Club in Spokane, Black and Maxey debated Referendum 35. Maxey was against overturning Senate Bill 378 as he felt if such practices were allowed to continue, it would endanger America as a whole. While Black's personal view is unknown, it can be determined that he was in favor of the Referendum like many real estate agents. They felt that it was the choice of the homeowners to choose who lived there. Senate Bill 378 was created to protect buyers from racial discrimination and would pull the license of real estate agents who discriminated.

Referendum 35 was created to overturn Senate Bill 378.

Lutz, Adam Geology Richard Orndorff Poster The Importance of Snowpack to Water Availability in the Western United States Snowfall and snowpack are key components of the hydrologic system, and snowpack is a cornerstone water source in the western United States. It has the potential to greatly impact water availability for millions of Americans. In mountainous states like California, snowpack is carefully monitored throughout winter and ~ 67 ~ spring, and snowpack depth is used to predict summer streamflow. Despite seeing some expected increases in global temperatures thought to be associated with climate change, recent trends of snowpack decline in the West have been less severe than anticipated, with some regions experiencing short-term increases in winter snowpack. However, this unexpected stability may not be cause for celebration, for it is uncertain how long it will last. As John Wesley Powell once famously noted, "If it be true... the fact is not cheering... [As] any sudden great change [of climate] is ephemeral, and usually such changes go in cycles and the opposite or compensating change may reasonably be anticipated."

McGillicuddy, Jake Computer Science Yun Tian Poster

Real-Time Video Analysis for Automated Attendance: An Amazon Web Service Solution This Amazon Web Service program utilizes AWS Kinesis Video and Data Services along with AWS Rekognition for real-time analysis of live video feeds, specifically for detecting and recognizing faces. The program aims to address the potential use case of classroom attendance taking, where live video feeds of the classroom can be analyzed to identify the faces of students present and automatically record their attendance. The program offers a scalable and cost-effective solution for attendance management in classrooms of various sizes, allowing for efficient record keeping while minimizing the need for manual labor. With its real-time video analysis capabilities and customizable features, this program has the potential to streamline attendance management in a variety of educational settings.

McPeck, Roxanne, Olivia Morgan, and Andrea Castillo, PhD

Biology

Andrea Castillo

Poster

Overexpressing two *Helicobacter pylori* small RNAs from a bacterial pathogenicity-related chromosomal region to investigate their regulation of virulence genes

The bacterial pathogen Helicobacter pylori infects the stomachs of approximately 50% of humanity, causing symptomatic disease (e.g., stomach ulcers, gastric cancer, and MALT lymphoma) in 10-15% of the infected. Colonizing the acidic, inhospitable stomach requires *H. pylori* to tightly regulate gene expression despite lacking many common bacterial genetic regulatory elements. The pathogen may compensate by using abundant non-protein-coding small RNAs (sRNAs) to regulate gene expression, including infection-intensifying virulence genes. Additionally, severe disease and cancer correlate with infection by *H. pylori* strains that contain a nonessential chromosomal region, the cytotoxin-associated gene pathogenicity island (cagPAI). This encodes powerful virulence factors that include a mechanism for injecting a cancer-promoting protein (CagA) into host cells. Despite identification of multiple cagPAI sRNAs, regulatory effects of only one have been characterized. To investigate potential sRNA-mediated regulation of RNA gene expression in the cagPAI and other virulence genes, we are developing strains overexpressing (abundantly producing) two promising cagPAI sRNAs. We cloned experimental plasmids (circular DNA molecules) to contain an overexpression promoter element and the relevant sRNA. Subsequently, we will introduce these plasmids into H. pylori to generate two sRNA-overexpressing strains. Finally, we will compare total RNA harvested from these two strains and the unmodified strain using RNA sequencing and reverse transcription quantitative polymerase chain reaction (RT-qPCR). The resulting identification/quantification of any significant regulation by these two H. pylori cagPAI sRNAs could illuminate aspects of sRNA regulation of the cancer-associated cagPAI region and other virulence genes.

Madrigal, Arcelia Psychology Susan Ruby

# Poster

Impacts of Cultural Identity and Experience on Perception of Social Emotional Learning Our poster will provide results from two studies that sought to elevate the voices of college students from a regional comprehensive university. Our first study is a survey designed to examine the relationship between cultural identity, previous experience with SEL, and self-perceptions of SEL skills; our second study involves a focus group with college students to allow for greater understanding of the interactions between these variables. Together, these projects provide information to assist school districts in understanding students' variance in social and emotional behaviors/competencies that are linked to their perceptions of cultural identity. Study 1

Our survey is in initial data collection in spring 2022. We asked students to report previous experiences at home and school with social-awareness, self-management, social awareness, responsible decision making, and relationship skills. Students report how comfortable they feel working through cultural and racial differences, working in diverse group settings, and perceptions of their own competencies of the five SEL competencies. Students report how they may respond to given scenarios using personal values and experiences. We predict that students will differ in their perceptions of SEL skills and applications of SEL for scenario questions based on reported experience and cultural identity.

# Study 2

In the Handbook of Multicultural School Psychology (Lopez et al., 2017), Proctor highlights that qualitative research provides a unique opportunity to learn about educational issues and experiences of an increasingly diverse and multicultural U.S. population. Participatory action research is a form of qualitative research that encourages transformative action and change as part of the recess process. The paucity of qualitative research in the school psychology profession is striking; less than two percent of the top journals published qualitative research between 2001 and 2005.

Mason, CJ History Larry Cebula Poster The Segregated South Hill

Throughout the early to mid 1900s across the United States, racial covenants were written into the property records of many homes. Many of these clauses were created in order to prevent those who are not white from living in an area or neighborhood that housed white residents. Up until 1948, these clauses were a legally enforceable contract, which, if violated, could lead to the loss of the property. Even after these clauses were no longer enforceable, many who platted new land and homes still included the racist language. This was meant to tell the potential buyer what type of neighborhood they would be moving into. The Spokane area has many neighborhoods that have a racial covenant in the property records. Williams H. Cowles, Jr., the second generation owner of The Spokesman-Review and many other companies, is one prominent Spokanite who included these covenants in the land he platted. The Comstock Park 2nd Addition was created in 1953 using land owned by the Cowles on Spokane's South Hill. Several hundred homes were originally platted and 150 still remain today. They all contain the same clauses, with the third clause stating, "No race or nationality other than the white race shall use or occupy any building on any lot, except that this covenant shall not prevent occupancy by domestic servants of a different race or nationality employed by an owner or tenant." This clause still remains in the records today. Since his passing in 1970, the family put out a statement disassociating with the covenants. They stated that, "such racial segregation is offensive and in no way represents our company or family values." The poster expands on how William H. Cowles, Jr. platted an area intended solely for those who are white.

Mathias, Anthony Chemistry & Biochemistry Yao Houndonougbo

# Poster

Simulation of the Adsorption of Methane in ZIF-93 using the Universal Force Field

Metal-organic frameworks (MOFs) are a class of materials that can potentially be useful in capturing gases. One of the subtypes of MOFs are zeolitic imidazole frameworks (ZIFs). ZIFs are formed by linking tetrahedral Zn and Co via imidazole groups. By changing the imidazole group, physical properties such as porosity, topology, and thermal stability can be adjusted. These adjustments make ZIFs suitable for natural gas applications. We report the molecular simulation of the adsorption of methane in ZIF-93. We have used the Universal Force Field to model  $CH_4$  and ZIF-93. The results of our simulation are compared to experimental data and to our previous work.

Minlletes, Megan, Pamela Ordona, and Emily Collins

Psychology

Julie Swets

Poster

Potential Associations with Nostalgia Proneness

Nostalgia—defined as a sentimental longing for the past—is associated with many well-being outcomes, such as meaning in life, social connection, and a sense of belonging. Nostalgia proneness is the extent to which people typically experience and value this feeling. In this exploratory study, we examine some understudied benefits correlated with nostalgia proneness, specifically attachment to objects and belongings, expected success in life, and reflections on past relationships with parents. This study will use participants from the SONA pool at EWU and will use correlational analyses to examine relationships between nostalgia proneness, including the Compulsive Acquisition Scale (CAS), the ICD Clutter Quality of Life Scale (CQLS), Generalized Expectancy for Success Scale (GESS), and the Parental Bonding Instrument (PBI). We expect to find those with higher nostalgia ratings will be positively correlated with a higher tendency to acquire objects, positive memories of parental bonding, and expected success in life. In the future, we hope to conduct follow-up studies where we manipulate feelings of nostalgia in an attempt to prove causation to these same variables.

Miranda, Monica Psychology Shanna Davis Poster Effects of English Language Instruction in the K-12 system: A Retrospective Study Linguistically diverse students have extra battles that they have to go through just to be at the same level as their English speaking peers. The purpose of this study is to identify the experiences and memories of those former K-12 students who receive English as a Second Language instruction (ESL) in the US education system using qualitative survey research methodology. By asking college students about their individual experiences with ESLprogram this study attempts to identify possible effects of the (ESL) experience. A survey was sent out to college and university students who received different forms or modes of ESL instruction during their K-12 experience all around Washington state. The survey asks questions about the students' language background, as well as cultural and ethnic background. There are questions about what their instruction and setting looked like in order to get a better understanding of the different experience. Lastly the survey asks about their own thoughts and feelings towards their ESL experience. The qualitative nature of the survey allows for the research to focus on the experiences of students without justifying an experience as good or bad. The results may help identify what students were feeling and what positively contributed and what may have hindered their learning. With at least 50 respondents we can begin to find patterns in how the schools are helping these students learn English and work in the classroom. Scaled responses will be summarized using mean scores. Textual responses will be analyzed for themes by grouping like responses together and then organized into categories.

Montejano, Katie, and Ian Campuzano Psychology Danielle Sitzman

#### Poster

How do we effectively correct health misinformation?

People are frequently exposed to health misinformation. Although it is important to correct this misinformation, the optimal timing of that correction is unclear. Refuting misinformation immediately may help participants to more effectively correct their memory than if they are not corrected until later. However, after a delay, participants may no longer remember their initial answer and may not pay attention to the correct information as closely. The current study examined whether the timing of feedback impacted the likelihood that participants would correct health misconceptions. During Part 1 of the study, participants were asked to answer true or false to a health-related statement (e.g., "stress can cause stomach ulcers"), then rate their confidence in the accuracy of their answer on a scale of 0-100%. Participants in the immediate condition group were then provided feedback about their answers. The feedback message consisted of four parts: 1) The original statement, 2) Information about whether the participants answered correctly, 3) Information about whether the statement was true or false, and 4) 2-3 sentences explaining the correct response. This was repeated for 50 statements. Participants in the delayed condition group first completed the true/false questions and confidence judgments for each of the 50 statements before moving on to the feedback phase. One week later, participants answered the same 50 true/false health statements. Overall, participants were more likely to correct misconceptions refuted immediately compared to if they were refuted after a delay. We discuss why this pattern may exist and other factors that influence the likelihood of correcting health misconceptions.

Morgan, Olivia, RN McPeck, and AR Castillo, PhD

Biology

Andrea Castillo

Poster

Overexpressing sRNA in Helicobacter pylori with Cloning and Transformation

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 and ever-changing environment using small RNAs (sRNAs), which are short, noncoding sequences that regulate other RNAs. The cytotoxin-associated gene pathogenicity island (cagPAI) region of the genome is associated with greater severity of symptoms. Our goal is to learn if virulence is regulated by two sRNAs from the cagPAI region, Hpnc2620 and Hpnc2540, by comparing RNA gene expression in strains overexpressing (making an overabundance of) these sRNAs to the parent strain. We will create overexpression strains with cloning and transformation techniques. The sRNA genes will be introduced to bacteria using a plasmid vector, a small circular DNA molecule capable of carrying the gene insert, in a process called transformation. Genes associated with the plasmid will be expressed at high levels in the bacteria. We successfully transformed an alternate plasmid pTM117 into H. pylori and demonstrated a protocol for future transformations with these bacteria. Current work with plasmid pCTtnpR1 and sRNA genes includes polymerase chain reactions (PCR), agarose gel electrophoresis, and purifications to amplify, verify, and build the experimental plasmids. Helicobacter pylori is naturally capable of double crossover homologous recombination, which uses overlapping complementary ends to switch gene segments and will incorporate sRNA genes from assembled plasmids into chromosomal DNA. This work will allow future investigation of sRNAs, Hpnc2620 and Hpnc2540, for their RNA regulation.

Morris, Seth Geology Chad Pritchard Interactive Presentation Groundwater Flow Simulation Model This interactive presentation will display and operate a groundwater flow simulation model. This model was designed and built to be used as an interactive visual teaching aid for use by professors in conjunction with  $\sim 71 \sim$
related subjects. Almost all groundwater models available to educators can fit in an oversized briefcase, and this can oftentime lead to students having difficulty clearly seeing the processes at work within the model, especially when many students attempt to gather around for viewing. This combined with the drawback of current models being manually operated via gravity draining for flow and a hand pump to produce vacuum created an opportunity to analyze and improve upon the current "industry standard" groundwater model. With the intention that this project be used as a teaching aid for the foreseeable future, safety and ease of use were of the utmost importance during the design phase. Because of this, the final design of this project presents a roughly 50% larger model that mounts to a linear actuation system contained inside a storage cabinet that doubles as a display stand for when in use. Unlike current gravity-fed models, this project will utilize an electric water pump and reservoir to provide continuous water flow and recirculation. The use of a hand vacuum pump has also been circumvented by utilizing a venturi tube to provide an on-demand vacuum to multiple locations within the model at any given time. This interactive presentation will showcase various design improvements in comparison to current groundwater models while presenting an accurate simulation of groundwater flow in a clear and concise manner.

Morrison, Carissa Biology Jessica Allen Poster Survey of Lichens at I Lichens arise through

Survey of Lichens at Eastern Washington University as Bioindicators of Air Quality and Nitrogen Deposition Lichens arise through symbioses between fungi and algae/cyanobacteria. Despite their ubiquity, lichens are often overlooked. However, lichens are valuable bioindicators for air quality, ecosystem health, and old-growth forests. Like a biological sponge, lichens exist in close contact with their environment, accumulating depositions of airborne pollutants. Foliose and fruticose lichens are typically more sensitive to air pollution than crustose lichens. Epiphytes are more reliable deposition indicators than lichens growing on rocks or soil. Thus, an inventory of epiphytic foliose/fruticose lichen biodiversity can indicate both the extent and source of airborne pollutants. Particularly, nitrogen isotope analysis can indicate sources of nitrogenic pollution. The objective of our project was to conduct a grid-based search to sample and identify EWU's campus lichen diversity and determine what proportion of species are nitrophiles. Collection of larger foliose lichens will be sent to a lab for nitrogenic-isotope analysis. This aids in distinguishing between agricultural or fossil fuel sources. Understanding biodiversity, and deposition quantities/sources is especially important in high-use areas like EWU's campus. This is the first documentation of the lichens of EWU's campus and the first EWU lichen assessment of the quantity and sources of nitrogen deposition. We expect to find relatively low rates of biodiversity and substantial nitrogen deposition from agricultural sources on campus.

Moua, Amy, Irina Isianov, and Yalda Mohmand

Health Services Administration

Rosalee Allan

Poster

Rap music and its correlation with the mental health of young adults

Rap music began in the Bronx, NY, in the early 1970s, with MCs and rappers talking and rhyming in sync with the music. Rap has evolved over the years. The roots of this genre began through the Latinx and the African American inner-city community. It has gone through controversy and harmony while moving into the mainstream and redefining musical culture. Over the decades, rap has grown in popularity among youth. It has been seen as a form of lyrical poetry with raw and authentic lyrics. It reflects the struggles and hardships of marginalized communities. However, some critics argue that rap music promotes harmful behaviors, leading to concerns about its impact on the mental health of young adults. Within the same decade, there has been a significant increase in stress and suicide risk among the youth in the US. Literature reviews have shown that exposure to rap music can positively and negatively affect mental health. The rap genre can provide a sense of belonging and empowerment to listeners who identify with the messages in the lyrics. On the other hand, it

encourages negative stereotypes and promotes harmful behaviors, such as drug use and violence. The purpose of this research project is to review the available literature regarding the underlying question: How does rap music correlate to the mental health of young adults? Understanding the complex relationship between rap music and mental health is essential for developing effective interventions and support systems for young adults.

Mueller, Sydney Chemistry & Biochemistry Yao Houndonougbo

Poster

Molecular Simulation of the Adsorption of Carbon Dioxide in ZIF-93 using the Universal Force Field Large amounts of carbon dioxide gas are released into the environment daily because of human activity such as factories, motorized vehicles, and the burning of fossil fuels. The accumulation of  $CO_2$  in the atmosphere contributes to global warming and other environmental issues. Therefore, creating a material that adsorbs as much carbon dioxide as possible is crucial for maintaining a stable atmosphere on Earth. One such material are zeolitic imidazolate frameworks (ZIFs) which are crystalline structures comprised of transition metal ions tetrahedrally coordinated by imidazolate functional groups. ZIF materials are known for their potential to separate gasses and here, the ability of ZIF-93 to adsorb carbon dioxide is studied through molecular simulations. ZIF-93 and  $CO_2$  are modeled using the Universal Force Field and the grand canonical Monte Carlo method implemented in the Monte Carlo for Complex Chemical Systems (MCCCS) Towhee program. The results of the simulation are compared to experiment data and previous simulation work. This study provides useful information about how and to what degree  $CO_2$  adsorbs on ZIF-93.

Mumey, Devin Biology Jessica Allen

Poster

Lichens of Iller Creek: A Checklist for the Iller Creek Unit, a Division of Dishman Hills Conservation Area, Spokane Valley, WA

The field of biodiversity documentation encompasses a broad range of research including new species discovery and description, compilation of species present in a given area, and investigation of interspecies interaction. In an era of increasingly devastating and rapid environmental change, documenting biodiversity has become increasingly important. Anthropogenic effects on urban-adjacent natural areas are especially significant, as they can cause numerous, often drastic, responses in ecosystems. Our objective here was to document the lichen biodiversity in a large urban-adjacent protected area: the Iller Creek Unit of the Dishman Hills Conservation Area in Spokane Valley, Washington. This unit encompasses a diversity of habitat types: Ponderosa pine savannah, riparian forests, mixed mesic coniferous forests, and xeric rocky outcrops. Despite conservation efforts, no formal checklists have been assembled for this unit. To compile this checklist, our methods include collecting voucher specimens of all species from each habitat type. The identification process used relevant literature and standard techniques, including thin layer chromatography, chemical spot tests, and microscopy. Identifications were confirmed via DNA barcoding, using the nuclear Internal Transcribed Spacer region. A total of 101 species, spread throughout 55 genera of 27 families, were identified. We identified 46 crustose, 49 foliose, and 6 fruticose. Moving forward, we intend to perform comprehensive searches of areas without immediate trail access to compile a more complete checklist for use as a baseline for future lichen investigations of the inevitable anthropogenic effects that recreational use and expansion of the city will have on the lichen diversity.

Murphy, Richard International Affairs Thomas Hawley  $\sim 73 \sim$  Oral Presentation

Neoliberalism's Effect on Society: An Analysis of the Internalization of Neoliberalism on Freedoms and Democracy.

Not much is more heavily debated in the realm of social sciences than the phenomenon of Neoliberalism. Philosophers and academics alike, from the lectures by Michel Foucault in the latter half of the 20th century, to the publications of David Harvey and Wendy Brown today, the only constant is that Neoliberalism is a complex and nuanced system of governmentality. This paper seeks to both analyze the phenomenon of Neoliberalism in terms of both its creation and perpetuation, but also how the ideology of Neoliberalism pervades the paradigms of thought in society. This paper argues that the systems of governmentality we call Neoliberalism is an intentional action of the ruling class that is affecting society in ways that will result in the transformation of our current conceptions of freedom, and the eradication of Democracy itself.

Nagle, Sawyer Biology Camille McNeely Poster

The Role of Porosity on the Efficacy of Beaver Dam Analogs

In the Western United States, climate change-caused mega-fires are increasing in frequency and severity, leaving many watersheds vulnerable to erosion and flooding. Studies show that beaver-engineered ecosystems are integral to the resiliency of freshwater systems by creating impoundments and wetlands that mitigate flooding and raise water tables. While beaver dams have well-documented benefits for water quality, many streams lack the habitat to sustain beaver populations. Thus, despite limited research, manufactured structures designed to mimic the hydraulic functions of natural beaver dams, known as Beaver Dam Analogs (BDAs), have become a popular tool in stream restoration.

In this study, I assess the effectiveness of BDAs installed by multiple agencies across Washington State. I am comparing the BDA's ability to slow and store water by measuring water storage and dam porosity across six BDA restoration reaches, six paired control reaches, and four beaver dam reaches.

Preliminary data from the Methow and Okanogan watersheds demonstrate that beaver dams substantially affect water storage. Beaver reaches have dramatically slower water travel times (7x to >400x) compared to control and restoration reaches (p < 0.05). BDA and natural beaver dam complexes also have substantial surface water volume differences (250x).

While natural beaver dams are porous structures, the higher porosity of BDAs may contribute to less water storage compared to beaver-built dams. Porosity may decrease over time if stream-carried sediment fills gaps in BDA structures. However, this requires sediment-rich streams and high-flow events; therefore, porosity is likely a critical factor in BDA effectiveness.

Nall, Grace, with Ruby Gibford Music Jonathan Middleton Creative Work Floating My project is a music compositio

My project is a music composition. It is a song for vibraphone and voice and the lyrics are from a poem I wrote this past winter quarter. The poem "Floating" describes a feeling of detachment from the world, where I feel like an outsider looking in. I find solace in being outside, where I can be myself without the pressure of conforming to society's expectations. The poem reflects on the dichotomy of wanting to belong and feeling free outside of the norm. I choose to remain detached and continue floating, observing from a distance rather than conforming. The repetition of the word "floating" in the song emphasizes the feeling of weightlessness and detachment, reinforcing the theme of being outside of the world. That feeling is emphasized throughout the piece between the vibraphone and the singer(s). Neumann, Connor, Music Jonathan Middleton Creative Work Enchanted Echoes

Enchanted Echoes is a lullaby that is inspired by the slightly haunting, yet soothing feeling of calling into a cave and the cave answering back, except the "cave" in this case, is an enchanted forest. Every instrument part plays the main musical statement that gradually gets more complex as more statements in different instruments are heard. This piece tries to enchant you deeper and deeper into the forest, distracting you from the dangers that could lure you in. Performers are: Alejandra Guzmán-Mercado, Larkin Mullin, Ethan Crawford, Catherine Del Pizzo, Sadie Lenssen, Dr. Stephen Friel, Mason Utz, and Rhiannon Nicholas.

Nguyen, Nhat Physics Andres Aragoneses Poster TARDYS Quantifier

One of the great challenges in complex and chaotic dynamics is to reveal the details of its underlying determinism. This can be manifest in the form of temporal correlations or structured patterns in the dynamics of a measurable variable. These temporal dynamical structures are sometimes a consequence of hidden global symmetries. Here, we identify the temporal (approximate) symmetries of a semiconductor laser with external optical feedback, based on which we define the Temporal And Reversible Dynamical Symmetry (TARDYS) quantifiers to evaluate the relevance of specific temporal correlations in a time series. We show that these symmetries are also present in other complex dynamical systems, letting us extrapolate one system's symmetries to characterize and distinguish chaotic regimes in other dynamical systems. These symmetries, natural of the dynamics of the laser with feedback, can also be used as indicators in forecasting regular-to-chaos transitions in mathematical iterative maps. We envision that this can be a useful tool in experimental data, as it can extract key features of the deterministic laws that govern the dynamics of a system despite the lack of knowledge of those specific quantitative descriptions.

Nguyen, Nhat, John Plimpton, and Hope Storro

Engineering

Uri Rogers

Poster

Modeling a Step Response Using Quadcopters

Currently, drones are being depicted accurately. Approximations are being made and models are formulated from linearized theory. A call for greater accuracy is needed and in order to do that, nonlinear control theory must be considered. A base model has to be created first. After the base model, measurements and simulations must be performed. From those results, modification of parameters to the model are made. This process continues until an accurate depiction of a drone is produced. The model of a drone will be structured in Python and will be of a step response. The drones that will be used are Crazyflie quadcopters.

Nguyen, Nguyen Biology Charles Herr Poster Bacteria chitinase production and activity Fungal contamination is a detrimental problem in cell cultures. The use of antimycotic is inefficient due to their short stability in culture and possible influence on cell activities. The employment of chitinase enzymes in cell cultures then would be the answer owing to their specificity to chitin. Chitin is a major component in fungal cell wall structural stability, comprising chains of monomers/oligomers. Chitinase and related enzymes are produced by many organisms for various purposes, which can be harvested for laboratory uses. Bacteria species were screened on Lysogeny Broth (LB) Agar supplemented with colloidal chitin and cultured for chitinase production. Their chitinase activities were assayed using modified Schales procedure, reflecting chito-monomers/oligomers concentration through Optical Density (O.D.) readings with a Spectrophotometer. Colloidal chitin used for screening and culturing was also assayed on the same procedure to ensure it is free of contamination. Culture broth was observed to influence the assay despite absence of chito-monomers/oligomers. For future experiments, LB Broth will be dialyzed to extract chitin reducing ends. *Bacillus subtilis* was the model bacterium but observed to have low chitinase activity in previous experiments. Therefore, a new model bacterium, *Serratia marcescens*, was screened and chosen for culture and enzyme production. *S. marcescens* chitinase activity will be assayed with Schales procedure, and O.D. readings will be plotted and compared to purified chitinase from *Aspergillus niger*. *S. marcescens* chitinase will also be tested on various substrates to examine chitinase specificity. Our result will enable us to study the potential for laboratory use of chitinase extracted from bacteria cultured in the lab.

Nguyen, Nguyen, and Ramanpreet Singh

Biology

Charles Herr

Oral Presentation

Canine testes thin section culture

Testes tissue culture systems would provide a tool to elucidate spermatogenesis mechanisms, with the aim of genetic preservation of mammals, especially endangered species. Our experiment aims to develop a culture system capable of producing viable mammalian sperm cells in vitro.

Dogs were chosen as the model organism because testes are readily available. Canine testes were obtained from a local veterinary clinic. Thin sections were generated using a commercial electric slicer. They then were cleaned using Dulbecco's Phosphate-Buffered Saline (DPBS) supplemented with antibiotics then cultured in a modified Tissue Culture Medium 199 (TCM-199). Sections were cultured in an environment aimed to best reflect realistic physiological conditions, that is 7%CO2 : 7%O2 : balanced N2 at 37 degrees Celsius. Finally, the sections were stained with live/dead cell stain and observed under a fluorescence microscope to determine viability. Numerous live stained nuclei were observed, proving their high viability (~100% viability) after 21 days of culturing. Sections reformed during culture to assume a tiny testes-like morphology. Fungal contamination was detected in all culture dishes at various time points during the experiment from unknown sources. The sections then were washed with DPBS supplemented with antimycotic before being again cultured in fresh medium.

For ongoing experiments, the culture system will be revised to prevent fungal contamination. While spermatogenesis takes approximately 60 days in vivo, testes thin sections were maintained for 21 days, therefore culture duration will be extended in the future. Overall, our result demonstrated a cost-effective culture system to potentially obtain viable mammalian sperm cells.

Norman, Mark, and Justin Liebert Engineering Arindam Das Poster Distributed Smart Camera System

In the area of home security, inexpensive camera systems are becoming increasingly capable with the use of machine learning. When paired with server-side machine learning algorithms, even entry-level smart cameras can be used for object detection and image classification. A typical consumer can benefit from these systems with a WiFi connection and AC power source; however, many use cases lack one or both of these criteria. Our objective is to create an affordable security system for environments without reliable access to Internet access or electrical power. To make our system viable, it must meet several criteria. It must be operable without an external power source, it must have a wireless range of at least 1 mile, and it must not be prohibitively

expensive to manufacture. To meet these criteria, we are attempting to implement a machine learning algorithm which categorizes objects and events prior to sending image or video data over the wireless network. If each remote camera in the distributed system can determine which events can be safely ignored, i.e., a tumbleweed, the average power consumption of the device drops. Lower power consumption results in a smaller battery and solar panel needed to power the device, further decreasing its cost. In order to achieve these goals, we are writing software for a low-power microcontroller and designing a circuit board to create a minimum viable product of a long-range smart camera with no external power source.

Novak, Benjamin Physics Andres Aragoneses Poster Ordinal Analysis of Complexity in 2D Chaotic Maps

Effectively identifying and characterizing the various dynamics present in complex and chaotic systems is naturally a complicated task which becomes increasingly difficult to do with systems involving multiple spatial dimensions and parameters. Here, we extend ordinal methods of analysis to 2-D iterative systems, focusing on the Hénon map. We utilize the technique of ordinal patterns to characterize the dynamics of each time series and use heat maps to visualize and identify dynamical regimes and symmetries in a selected region of a and b forming a parameter space. Temporal And Reversible DYnamical Symmetry (TARDYS) quantifiers are constructed to evaluate two identified approximate symmetries between ordinal patterns, and we show that these symmetries are strongly correlated throughout the space. We also calculate Permutation Entropy (PE) and Fisher's Information Measure (FIM) as measures of the long-term and short-term complexity, respectively, of the Hénon map, allowing us to better distinguish and identify separate dynamical regimes present in the parameter space.

Novak, Melanie, Emily Tyner, Autumn Grove, Blake Zimmermann Biology Krisztian Magori Oral Presentation Varying Disease Density of *Myotis lucifugus Pseudogymnoascus destructans*, the fungus that causes white-nose s

*Pseudogymnoascus destructans*, the fungus that causes white-nose syndrome (WNS), is causing a severe decline in the populations of over 12 species of bats including Myotis lucifugus (little brown bat). Bats affected with WNS have shown white, fuzzy fungus growth, typically located on their nose, wings, and ears. WNS can cause bats to deplete their fat reserves during hibernation periods due to abnormal increased energy, leading to starvation. Other symptoms include wing damage, skin tissue lesions, dysregulation of body temperature, disruptive breathing patterns, and dehydration. The disease has caused hibernation mortality rates of 75-98% in multiple bat species including *Myotis lucifugus*, which are known to carry parasites such as mites and ticks. The objective of our study is to sample from a population of *Myotis lucifugus* and analyze the density of varying diseases among the host population. We hypothesize that the *Myotis lucifugus* population will contain a combination of pathogens and parasites. Our group will test this by traveling to a regional bat site, collecting samples from *Myotis lucifugus*, and analyzing our findings using laboratory techniques. We will be assisting the Washington Department of Fish and Wildlife, as well as the Bureau of Land Management during this time. The results of this experiment are expected to conclude with minimal to zero confirmed samples of White-Nose Syndrome, as well as multiple findings of mites, ticks, and bat flies. Our results should contribute to prior knowledge of varying disease density among the *Myotis lucifugus* population.

O'Bryan, Michael, and Kodie Counsell Exercise Science Garth Babcock and Otto Buchholz Oral Presentation The Effect of Total Motion Release on Functional Movement Screen Scores in Female Collegiate Volleyball Players

Many athletes are at risk of injury simply due to restricted or dysfunctional movement. Screening tools such as the functional movement screen (FMS) have been utilized to identify these movement dysfunctions and may be used to identify at-risk athletes. However, corrective exercises prescribed to address poor FMS scores and ultimately improve functional movement have not been proven effective. Total Motion Release (TMR) is a new technique to treat movement impairments or asymmetries. Limited research has shown TMR improves quality and range of motion. Thus, the purpose of this case series was to observe the effects of TMR on functional movement scores and patient treatment perception in D1 college female volleyball players. Participants fitting the inclusion criteria volunteered to take a subjective survey aimed at self-perception of body function followed by participating in a functional movement screening. After the baseline tests were completed, participants underwent two weeks of TMR treatment. Following the final TMR treatment, participants retook the subjective survey and participated in a second functional movement screening. A 2x2 multifactorial ANOVA was completed for FMS data and found a significant increase (0.012) in mobility scores from pre to post-intervention. However, no significant change (0.435) was seen from the left to right side scores. A paired sample T-test was used for pre and post-intervention subjective reporting, however no significant change in data was seen (0.083). Our results suggest that TMR may be a beneficial method when attempting to improve mobility and reduce the risk of injury as identified by FMS scores.

Odiorne, Madilyn, Ruby Hammond, and Brynn Richey

Environmental Science

Ruby Hammond

Poster

A Baseline Assessment of Migratory and Resident bird use of a Prairie Restoration Site in eastern Washington Prairies, and other types of grassland ecosystems, have suffered some of the most profound losses worldwide, due to anthropogenic factors such as fossil fuel extraction, agriculture, and climate change. Likewise, organisms inhabiting grassland ecosystems have become extirpated across much of their historical range, not the least of which has been a 50% decline in grassland birds since the 1960s. In response to losses of intact prairie in eastern Washington, a 120-ac site has been established on the EWU campus to regenerate native prairie and monitor changes in the ecosystem as native plants recolonize and replace non-natives. Because birds are an important indicator species of ecosystem health, the goal of our research was to estimate baseline abundance and diversity of birds at the prairie restoration site before restoration takes place. We also assessed bird abundance and diversity at a small, intact prairie remnant 20 mi north of the EWU campus to compare current bird use of the restoration site with that of an intact prairie system. We assessed bird abundance and bird diversity using the line-transect method. We established one transect at each site, and counted all birds seen or heard within 50 meters of the transects. Our findings will provide a baseline of knowledge about how and when birds will begin to reinhabit the EWU restoration site and inform future restoration efforts on the benefits and outcomes of restoring native grasslands locally, and worldwide.

Ollero, Marley Geology Stacy Warren and Chad Pritchard Poster

Mining of Red Marble Quarry, Washington

The Red Marble Quarry is located near Chewelah, Washington within the Huckleberry Mountains. The quarry is an open pit mine that was once sourced for Magnesite, and it remains an active waste pile that sources materials such as basalt, sand, and gravel. Magnesite is a significant iron ore deposit. The area can be characterized by the red magnesite rock outcrops known as the Crosby Deposit and a belt of quartzite that underlays the Crosby Deposit. The Deer Trail group, Stensgar dolomite, and Huckleberry Greenstone can also be found in the area. The magnesite sourced from the quarry did not show enough economic value to continue

its mining operation at the time. By analyzing LiDAR imagery of the area, the amount of material removed during the mining operation from Red Marble Quarry may be determined. Possibilities for reclamation or continued mining can also be concluded.

Ollero, Marley, Jalyn Osgood, and Matthew Slater Geography Lauren Stachowiak

Poster

Spatial Reconstruction of Historical Fires in the Pine Rocklands on Big Pine Key, Florida Fire is essential in ecosystems for maintaining habitat and vegetation. Fire regimes in pine rocklands naturally follow a pattern of high-frequency, low-intensity fires. This curtails fuel load accumulation and preserves fire-tolerant plant species composition. In 2011, a prescribed fire escaped control in pine rocklands on Big Pine Key and burned near a residential area, causing community backlash. South Florida Slash Pine (*Pinus elliottii var. densa*) is the dominant canopy tree species in the dry rockland ecosystem of the National Key Deer Refuge on Big Pine Key. Previous work reconstructed fire regimes for pre- (1911- 1956) and post-management (1957-2014) periods, evaluating fire history metrics for two levels of burn percentages. This previous work found fire return intervals were statistically different for both periods (p < 0.01), but similar for > 10% and > 25% fires (p > 0.10). To build on the reconstructed fire activity, we used GIS to spatially analyze fire activity for each of the 21 major fire years (> 25%). We generated raster surfaces of large fires using Inverse Distance Weighted and Kriging methods on the fire-scarred tree data. We found that fires burned in different spatial arrangements for each major fire year in various locations across the study area. The 2011 fire was no more spatially extensive than other large fires in the dataset. These results support those of the time series analyses previously conducted and help show the 2011 fire was a healthy, beneficial fire to the ecosystem.

Osgood, Jalyn, and Hannah Queen Geology **Richard Orndorff** Poster History and Impacts of Grand Coulee Dam, Washington Grand Coulee Dam is the largest concrete structure in the United States. At 186 meters (550 ft) tall, and 1592 meters (5,223 feet) wide, it towers above the Columbia River in East-Central Washington. Construction began on July 16th, 1933, and utilized over 11,000 men and 27 million hours of labor to build. It was completed on June 1st, 1942. Grand Coulee hydroelectric dam generates a total of 21 billion kilowatt hours of electricity per year. It was a vital source of power during WWII and was responsible for one-third of all wartime aluminum production, which was central to building the aircraft that helped win the war. This concrete gravity dam also holds back the 151-mile-long Franklin D. Roosevelt Lake and Reservoir, which has a storage capacity of 9,386,000 acre-feet of water. On June 6th, 1937, the dam earned the record for the largest continuous concrete pour during a 24-hour period of 12,683 cubic yards. Although Grand Coulee Dam is undoubtedly an engineering masterpiece, ecological and cultural conflicts have plagued the dam from its inception. Its construction is responsible for the displacement and relocation of Indigenous peoples, as well as the decline and near total collapse of salmon habitat along the Columbia River.

Paulsen, Julianna Biology Jessica Allen Poster Geography, Climate, and Habitat Shape the Microbiome of the Endangered Rock Gnome Lichen (*Cetradonia linearis*) Bacterial symbionts are essential components of healthy biological systems and are increasingly identified as essential factors in the study and management of threatened species and ecosystems. Despite management shifts at the ecosystem level, microbial communities are often excluded from discussions of holobiont conservation in favor of the primary members of a symbiosis. In this study, we sought to fill the bacterial community knowledge gap for one of two federally endangered lichen species in the United States: *Cetradonia linearis*. We collected 28 samples of the endangered rock gnome lichen (*Cetradonia linearis*) from 15 sites to investigate the factors influencing microbiome composition and diversity within the thallus. DNA was extracted using a Powersoil Extraction kit and sequenced using 16S rRNA barcoding. Sequence processing and analyses of diversity were conducted in QIIME2. Core bacterial constituents of the microbiome were determined and visualized using the R package microbiome utilities. *Proteobacteria* (37.8 % ± 10.3) and *Acidobacteria* (25.9% ± 6.0) were the most abundant phyla recovered. Habitat, climate, and geography were all found to have significant influences on the bacterial community. A BLAST search of the nucleotide sequences of core members at a 90% threshold revealed shared amplicon sequence variants in the microbiomes of other lichens in the family *Cladoniaceae*. We concluded that the bacterial microbiome of *Cetradonia linearis* is influenced by environmental factors and that some bacterial taxa may be core to this group. Further exploration into the microbiomes of rare lichen species are needed to understand the importance of bacterial symbionts to lichen diversity and distribution.

Parke, Kelly Disability Studies & Universal Access Ryan Parrey Poster

Atmospheres of Ableism: A Phenomenological Exploration of Everyday Encounters Ableism is often understood as discrimination and oppression that affects people with disabilities, and it can

Ableism is often understood as discrimination and oppression that affects people with disabilities, and it can exist in very disruptive, but also very subtle ways for disabled individuals. Though research has been done to understand ableism from a sociocultural perspective, little work has been done in relation to ableism as an everyday effect. Building on the recent work of Dr. Ryan Parrey to develop an ontology of ableism, this research aims to explore thoughts and feelings that arise following ableist encounters through a phenomenological lens. This research will utilize qualitative data collected through interviews and focus groups conducted with disabled communities, to deepen our understanding of the feelings and effects of ableism, both immediate and lasting. Thinking about ableism as an atmosphere can help us identify ableist encounters when they happen and what they feel like for the people that experience them. This research will provide insight that is important in the fight for disability rights and anti-ableist scholarship.

Perez, Jennifer Biology Bo Idsardi and Jenifer Walke Oral Presentation

An effective multi-site course-based undergraduate research experience (CURE) implemented by early adopters CUREs are an effective approach for providing research opportunities to undergraduate students. However, the implementation of CUREs across multiple institutions is still under-researched. The North American Bsal Task Force's Surveillance and Monitoring Working Group developed a CURE called the Student Network for Amphibian Pathogen Surveillance (SNAPS). We used Roger's Diffusion of Innovations as a theoretical framework to study the cognitive and affective outcomes of early adopters of SNAPS. Seventy students participated in the CURE across nine institutions. Data were collected using pre- and post-surveys. Paired t-tests showed that the SNAPS CURE was effective in improving students' self-efficacy, content knowledge, knowledge of field sampling methods, self-reported content knowledge, and self-reported knowledge of field sampling methods. Changes in students' self-reported knowledge of field sampling methods differed by institution but other outcomes were consistent across the nine institutions. Changes in students' content knowledge during the CURE differed based on students' demographics and class standing. Other outcomes were consistent across student demographics and class standing. Our findings suggest that a multi-institutional CURE program can be successfully scaled-up while promoting undergraduate research in STEM fields. Positive

outcomes of early adopters' implementation of CUREs can persuade additional faculty to adopt this model of instruction.

Petersen, Caden Film Drew Ayers Creative Work Cataract Jack Promotional Video The elusive sasquatch, UFOs, ESP and ghosts are prime examples of paranormal phenomena widely accepted as genuine by a large portion of today's society. The hardest thinkers throughout human history have tried to

as genuine by a large portion of today's society. The hardest thinkers throughout human history have tried to prove or disprove their existence in vain. Introducing Jack is a promotional video for the up and coming YouTube channel "Cataract Jack". "Cataract Jack" is an educational platform used to explore strange stories, concepts, and characters as important emanations of the human experience without falling into the often limiting attitudes of the skeptic or believer. Introducing Jack was created with practical miniature sets, painted backgrounds, digital graphics, and a stop motion puppet.

Pfeffer, Bubba Biology Jessica Allen Oral Presentation Comparative population genomics of the leprose asexual lichenized fungi *Lepraria spp*.

Lepraria is a genus of lichenized fungi that reproduce exclusively through clonal propagation and have never been observed to produce sexual structures. Despite this, previous research demonstrated that *Lepraria neglecta* possesses an intact and highly conserved mating type (MAT) locus. The presence of genes widely recognized as the center of control for sexual reproduction in this genus raises questions about the reproduction biology of *Lepraria spp.* and about the functions of MAT genes in fungi generally. Clonal reproduction is plagued by the accumulation of deleterious mutations including transposable elements and clonal interference. Predominantly or exclusively asexual organisms must develop mechanisms to manage these issues with clonal reproduction, or they will go extinct. Here, we present the reference genome assemblies and MAT locus characterizations of five *Lepraria* species. We additionally collected 260 specimens of *Lepraria finkii* and 112 individuals of *Lepraria lanata* across their respective ranges in the Appalachians Mountains to investigate the landscape-level distribution of MAT genes and test for chromosome recombination in populations of *Lepraria finkii* and *Lepraria lanata*. This research represents a new synthesis of micro and macro evolutionary processes in a putatively asexual genus.

Plimpton, John Engineering Thomas Walsh Interactive Presentation PLC Directed Studies by John Plimpton

There are three goals for us: learn about PLCs and ladder logic, implement a simple control system (garage door controller) using PLCs and ladder logic, and demonstrate how vulnerable PLCs are to hackers. This garage door is fully functional with up and down pushbuttons, limit switches, and photo eye feeding our PLC input. Outputs on our PLC include motors that are triggered by relays and LED lights indicating fault occurrence. The PLC was programmed using Connected Components Workbench. Some of the coding techniques will include seal-in logic, direct coils, direct contacts, and reverse contacts. These techniques will be emphasized and explained. Not only do we want to demonstrate our garage door, but we also would like to show how vulnerable PLCs really are to hackers, as they use insecure protocols such as Modbus for communications. We will have a laptop running a Kali Linux virtual machine. With Linux, it will be possible to hack into the PLC and disrupt its

normal operation. In industry, PLCs are a huge threat and an issue that has not been completely resolved. This project ties in both electrical engineering and computer science together.

Potter, Natalie Geology **Chad Pritchard** Poster Projecting variations of deformation in the Spokane, WA area based on isolated buttes. The isolated buttes seen in eastern Washington near Spokane are all interconnected but buried by the Columbia River Basalt that was emplaced in the Miocene, approximately 16mya. The buttes are made up of uplifted Eocene granitic rocks and Cretaceous fold and thrust deformation preserved in Cambrian to Mesoproterozoic rocks. Making multiple cross sections that show possible scenarios of pre-Neogene stratigraphy sheds light on the structural deformation required for the buttes to be where they are currently located. The starkest unconformity is that of the structurally offset contact between the Deer Trail Group and the Belt Super Group, which preserves the Proterozoic breakup of supercontinent Columbia. Locally, the possible continuation of the Jumpoff Joe Fault separates the Piegan Group (part of the Belt Super Group) and either the Buffalo Hump Formation (Windermere Group) or Cambrian quartzite, which shows a potential throw of up to 2km (3.2 miles). The Magnison Butte fault can displace up to 500m or as small as just tens of meters between the units of the Deer Trail Group. The Latah fault may displace up to 60m of basaltic stratigraphy and likely goes into basement rocks. Deciphering the stratigraphic ages and relationships between isolated buttes will provide the first larger scale view of the tectonic and structural history preserved in the basement rocks of the Spokane area.

Powers, Evan, Joshua Stermer, and Tsion Yohannes

Engineering

Michael Meyer

Poster

Using an embedded system for a quality cup of coffee

Many coffee lovers spend up to \$5 on a cup of coffee everyday. To save money one could make them at home, but a quality machine for a good cup of joe can cost up to \$2000. Using an embedded system one could spend less than \$500 and only spend a few hours to make a quality machine that will last a lifetime. Gaggiuno is an open source project that uses C language on an STM-32 microcontroller. Learning C language combined with hardware implementation applied to cheap and simple everyday objects can improve everyday quality of life and save money.

We are improving upon the open source project by implementing a sensor to measure and display the temperature of the milk when it is being steamed. This addition improves safety for the consumer. This is challenging because we have to incorporate the addition into a pre-established circuit with limited space, and tie in new code to a preexisting one. In addition, all of our team members have to learn how to program the touch screen display using the proprietary IDE and language.

Quindlen, Michael Mathematics Frank Lynch Oral Presentation

Calculus of Variations: Important Results and Using the Euler-Lagrange Equation

Calculus of Variations is an area of math where some of the ideas and concepts from differential and integral calculus are applied to functional equations (or functions of functions) to find minimum and maximum functions for a given functional. This paper starts by looking at some of the theory behind Calculus of Variations, including the Fundamental Lemma of Calculus of Variations, which is a key result that is then applied, along with setting the first variation of a functional equal to zero to derive the Euler-Lagrange equation, a differential equation whose solutions are minimizers of a functional J(y). We then illustrate the use of Calculus

of Variations through the Euler-Lagrange equation by obtaining a differential equation modeling a particular system, then solving (or approximating the solution) of the differential equation. Where appropriate, the second variation is calculated to check whether the solution of the differential equation is in fact a minimizer of the functional in question. Alternative forms of the Euler-Lagrange equation are also briefly explored, such as the case where the Lagrange Function inside the functional is not an explicit function of x and the case where a system has damping and an external force.

Reiner, Kai Geology Chad Pritchard Poster Deciphering Anthropogenic VS. Natural Fulgurites In July 2022, a copper electric distribution wire fell on sandy base-course and pulsed about for about an hour causing a line of artificial, or anthropogenic fulgurites - a type of rock formed from fusion of grains where electrical currents interact with sediments. As discussions around anthropogenic changes to the environment increase, so does the need to understand the extent of these changes. This is why research to better understand the similarities and differences between artificial/anthropogenic fulgurites and natural fulgurites was conducted. Differences in formation were hypothesized to demonstrate one way humans impact the surrounding geology of an area. These glass tubes were excavated, described, and analyzed using multiple methods to relate to fulgurites formed from lightning strikes (natural fulgurites). The clastic material that melted was about 60 percent basalt gravel to sand and 40 silica-dominated sand from local Pleistocene megaflood deposits, resulting in 60 wt% SiO2. Using a single crystal diffractometer the clear to white minerals correlates closest to alpha-quartz (a low-temperature variation of quartz) and solid state NMR resulted in a broad glass pattern with a minimal peak for 29Si. Thin section analyses showed quartz crystals surrounded by lighter colored glass, vesiculation, disequilibrium textures, and dissolution profiles with decreasing wt% SiO2 trending away from the minerals into the melt. The lack of high temperature/pressure crystal formation found in the artificial fulgurites (but present in natural fulgurites) is attributed to the pulsing of the downed electric line and an intermediate melt chemistry. Differences in crystal formation demonstrate how humans have an impact on the geological record. Research points to human's electric grids on Earth (i.e., electric lines) potentially creating more alpha-quartz and amorphous silica on Earth's surface directly correlated with human activity.

Richardson, Claire and Carson Desimone

**Environmental Science** 

Carmen Nezat

Poster

Particulate matter in the air we breathe is known to have adverse health risks. The Spokane Regional Clean Air Agency (SRCAA) maintains seven air quality monitoring stations that measure particulate matter less than 10 micrometers (known as PM10) in Spokane County, including locations in the city of Spokane and Turnbull National Wildlife Refuge (NWR). The objective of the study was to compare the heavy metal content of PM10 between urban and rural locations (city of Spokane and Turnbull NWR, respectively). PM10 was collected at both locations for three days per month over five months during 2003-2004, and prepared for analyses by digesting samples in concentrated HNO3 using a microwave digestion system (US EPA Method 3051; CEM MARS Microwave Digester). These digests were analyzed using an Inductively Coupled Plasma-Optical Emission Spectrometer (ICP-OES) to determine the concentration of multiple elements including major ions (Ca, K, Mg, Na) and heavy metals (Cu, Pb, and Zr; US EPA Method 200.7). I expected to see higher heavy metal concentrations in Spokane compared to the Turnbull NWR due to land use differences. However, preliminary analysis suggests similar concentrations among the two sites. For example, the mean Ca concentrations were 20 mg/L ( $\pm$ 7.1) and 23 ( $\pm$ 10.3) mg/L in Spokane and Turnbull, respectively and the mean Zn concentrations of PM10 are being investigated.

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Rogers, Camille Economics Mark Holmgren Poster Effects of Unemployment on Service Industry Employment This presentation is intended to show the effects of unemployment on SNAP usage, and employment in the overall civilian labor force, the Leisure and Hospitality industry, both in the Arts and Entertainment, and

overall civilian labor force, the Leisure and Hospitality industry, both in the Arts and Entertainment, and Accommodation and Food sectors within Washington state. Understanding the relationship between these variables provides a better understanding of employment opportunities for Washington residents. By gathering data from FRED (the Federal Reserve Economic Database), I ran a regression analysis to find that as unemployment increased, there were increases in the number of SNAP recipients, and employees in the overall civilian labor force, as well as in the Leisure and Hospitality industry, both in the Arts and Entertainment, and Accommodation and Food sectors.

Roof, Brendan English Paul Lindholdt Oral Presentation Individualism and Nonconformity in Ralph Waldo Emerson's "Self-Reliance" My presentation utilizes the etymology of the word genius to explore Emerson's "Self-Reliance." Emerson would empower the individual in a conformist society to find harmony through nonconformity. The etymology of genius as a spiritual guide reinforces his stance on individualism, namely by qualifying the spirit, or the individual's discretion, as all-powerful and constant. The word is rooted in the belief that a "spirit attendant" overlooks and guides the host body of each individual. Genius has also been defined as the "personification of a person's natural appetites." In terms of Emerson's genius, man's inherent appetite to belong to a collective reinforces the necessity of self-reliance. In an article from the Berkeley-based *Greater Good Magazine*, Zaid Jilani explains that "The power of conformity... has deep implications for polarization."

Rosenbaum, Gracie Biology

David Daberkow

Oral Presentation

Investigating the influence of isoflurane and urethane anesthesia on dopamine signaling Dopamine (DA) is a neurotransmitter that innervates the striatum of the brain and is involved in reward learning and movement control. Fast-scan cyclic voltammetry (FSCV) is a technique that uses microelectrodes to monitor DA signaling in the brain. FSCV studies with anesthetized rodents usually use isoflurane or urethane anesthesia; however, the possible influence of these anesthetics on DA signaling has not been thoroughly investigated. Male Sprague-Dawley rats 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 where electrodes were placed. The reference electrode, coated with Ag/AgCl, was placed just below dura, the FSCV electrode was placed in the striatum, and the stimulating electrode was placed above the medial forebrain bundle. Biphasic pulses (60 Hz, 60 pulses, 300 µA) were sent through the stimulating electrode to allow for the release of DA from neurons. Once consistent DA signals were observed, DA signals were stimulated and recorded for 1 hour. Preliminary data suggest an attenuation of the DA signals under isoflurane anesthesia when rat body temperature was not kept stable. Conversely, under urethane anesthesia, when temperature was carefully monitored and kept stable, DA signals remained relatively stable. Future directions involve carefully monitoring and keeping rat temperature stable under isoflurane anesthesia while monitoring DA with FSCV.

Sanchez, Alexander Art Joshua Hobson Creative Work Galactic Haze Title: Galactic Haze Medium: Digital Art Year: 2021

Galactic Haze is a digital piece that consists of mixtures between the colours and hues of onyx black, white, grey, electric blue, neon pink, magenta, and violets. All of those colours combined a galactic appearance of an individual in a haze avoiding the mouth from appearing. This work is based on my own disconnections within reality and being unable to vocalize properly towards others. The symbolism of the haze is the feeling of disconnection between myself and others, specifically in verbal situations. I either cannot express certain emotions, or explain the words that are in my mind. Not only that there had been a set of emotions that I unfortunately do not remember presently, which brings even more symbolism of the haze around the head and mouth. As a person who deals with mental health, it is already difficult to remember conversations, or remember too much of conversations that brings a sense of embarrassment on questioning why I would speak in the first place if it leads to humiliation. It creates an illusion of being isolated with a mental fog making the piece an overall melancholic, lost, and distant symbolic and emotional piece.

Sanchez, Citlalli Biology Jason Ashley Poster

Knockout of LFNG gene using Di-Cas7-11 system in RAW264.7 macrophages Introduction: Cas-711 is a newly discovered CRISPR technology that has been used to make specific incisions within the targeted RNA. Cas-711 prevents collateral damage to the neighboring RNA strands unlike other Cas systems such as Cas-13, which has been known to be destructive to neighboring RNA strands when used for knockout of genes. RAW264.7 macrophages are cells that come from the Abelson leukemia virus which originated in mice and are being used in cellular research. We are looking at the role of the LFNG gene in osteoclast differentiation in RAW264.7 macrophages. These macrophages are used as a model of osteoclast differentiation experiments. Methods: We used Cas-711 to knockout LFNG gene in cultured RAW264.7 macrophages by building a retroviral plasmid and cloning spacer sequences to target mRNA of the LFNG gene. Results: We concluded that the Cas-711 system was able to conduct the knockout of the LFNG gene. We plan on characterizing the differentiation of the RAW264.7 cells.

Sangster, Tianah and Andrea Orozco Health Services Administration Rosalee Allan Poster Period. An End to Menstrual Stigma Menstrual health is an essential aspect

Menstrual health is an essential aspect of personal health for those who have a uterus, and yet, it is not talked about often enough. The education and conversations in younger females regarding menstrual health is very limited and menstrual health is considered a taboo. This increases the possibility of misconceptions, health problems, and stigmas amongst females regarding their menstrual health. Although completely natural, menstruation is tied to concepts like shame and impurity, which hinders those beginning menstruation to learn about an integral part of their health. Lack of knowledge and understanding can cause physical, mental, and emotional health issues for young adults, and can continue as they age. The lack of conversations or the hiding of menstrual health/products can create a sense of disgust, inconvenience or in all something that is problematic rather than what it really is which is a mark of female wellness and health. It is important to end menstrual  $\sim 85 \sim$ 

health stigmas and make a mark for future generations of the importance of these conversations. The purpose of this study is to increase menstrual equity and menstrual health awareness to change the health of youth going forward. It is hoped that this study will inform the public about the impacts of not creating a safe space of conversation for youth to learn about an integral part of their health and practice healthy and hygienic habits.

Schaaf, Brooks Economics Mark Holmgren Poster Wealthy and wanting: What the wealthy miss out on through income segregation The United States has a growing rate of income inequality between the top earners and the bottom earners measured by the Gini index, as reported by the US census bureau. This spread of income distribution has resulted in geographical distributions of individuals by real wage with those highest earners separated from the bottom earners. The bottom earners' regional separation is well researched and shows how low income individuals miss out on economic opportunities that living and working in close proximity to those high earners would provide. In this paper, we will examine the implications that this geographic stratification has on consumption behavior for some of the most wealthy zip codes as measured by median wage using data provided by Site To Do Business (STDB). This data set is extensive containing data related to wages, business and real estate value and foot traffic through specific businesses allowing us to examine what those in the highest earning zip codes miss out on by being separated from those in lower earning zip-codes and what consumption preferences lead them to leave their zip codes and travel to less affluent areas. With a better understanding of what wealthy people miss out on legislators and social commentators can better prescribe legislative and social solutions to growing income inequality.

Scheff, Tyler, and Mickenzie Kinney Engineering Awlad Hossain and Heechang (Alex) Bae Oral Presentation Correlating the Mechanical Properties of I

Correlating the Mechanical Properties of Fiberglass Composites for Different Flaw Defects Structural weight reduction with improved functionality is one of the targeted desires of engineers, which drives materials and structures to be lighter, but without compromising critical properties such as strength, elasticity and endurance. Lightweight composite materials are widely used in many industries including automobile and aerospace. The presence of different types of defects such as voids, inclusions, de-bonds, improper cure, and delamination are common during the composite fabrication. In composite industries, engineers practice Ultrasonic Non-Destructive-Test (NDT) to detect undesirable structural defects. In this research, we will prepare different composite samples using fiberglass. Samples will be prepared with and without embedded flaws along the thickness and length direction. Samples will also be prepared where we can change the flaw geometry; flaws can be round, square and/or diamond shapes. Then, we will use an ultrasonic flaw tester to detect the flaws and their corresponding location. Finally, we will conduct several tensile tests to determine the mechanical properties of those samples. We will demonstrate how the composite strength and elasticity changes with different flaw geometries and shapes.

Schuller, Elyssa Geology Richard Orndorff Poster Sea Level Rise and Coastal Erosion in the United States Coastal erosion is an ongoing process resulting from hydraulic pressure, abrasion, and dissolution; it is strongly influenced by human activities. Wave energy associated with storms and tides erodes sediment and rock, and rising sea levels direct this energy further and further inland. The Atlantic coast of the United States represents 27% of US coastlines. This coast is eroding 2 to 3 feet per year. The Gulf Coast is eroding more rapidly, with an average erosion rate of 6 feet per year. Parts of the Louisiana coastline are eroding at an astounding rate of 50 feet per year. Shorelines erode when wave energy removes material at a faster rate than it is supplied by coastal deposition, and most of the coastal erosion is occurring in delicate low-lying wetlands and barrier islands. Within the past three decades, we have seen rising sea levels and increasing storm frequency and energy, all of which reshapes our coastlines. Scientists project increasing ocean temperatures and a 30cm rise above current sea levels by the year 2050 along the east coast, potentially inundating coastal cities and creating larger, more violent storms and much greater rates of erosion. I take an in-depth look at climate, sea level, and coastal erosion and discuss the impacts of projected sea level rise over the next 30 years.

Schultz, Matthew

Political Science//International Affairs

Majid Sharifi

Poster

Contested Lands and Waters : The Political Forces Surrounding Northern Dynasty's Proposed Mine Near Bristol Bay, Alaska

Above Bristol Bay, in Southwest Alaska, lies one of the largest deposits of copper on the face of the earth. Additionally, this region supports the largest stock of wild sockeye salmon on the planet, sustaining the 25 federally recognized Native Alaskan Tribes that reside in the region, as well as commercial and recreational anglers. In an era of development and green energy, the demand for copper has never been higher. Despite its value, however, this deposit that was discovered in the 1980s still hasn't been mined. While there are numerous stakeholders at play, causing massive amounts of political and social dispute, this study offers significant evidence that public opinion, as it has been organized by non-profit organizations, has been the most critical factor in preventing any large scale mining in the area. Through grass-roots advocacy, fundraising, and effective marketing campaigns, political leaders through several presidential administrations have felt the pressure to create permanent protections for Bristol Bay, something that is still being disputed to this day.

Schwendiman, Larissa Art Jenny Hyde Creative Work Human Nature Human Nature Human Nature is a 36x48 Acrylic painting depicting a private form of intimacy that many shy away from discussing. Although sexual activities and forms of intimacy are popular throughout the world, people have a habit of shying away from it rather than focusing on its normality. Taking inspiration from the Romanticism period, the work "Human Nature" strives to showcase the beauty of intimacy and the story behind it rather than focusing on the uncomfortably sexual activities possessed.

Scoles, Alexander Geography Richard Orndorff Poster The History of Lake Tulare, California: Past and Present Lake Tulare in California's Central Valley was once the l

Lake Tulare in California's Central Valley was once the largest freshwater lake west of the Mississippi. The lake supported a rich ecosystem and was a vital resource for Native Americans in the region. In the late 19th century, settlers began draining marshes at the lake's edge for farms, thus beginning a long period of progressive desiccation and replacement by agriculture. I will discuss the history and consequences of human interactions with Tulare Lake. I will also look at historic periods when flooding partially refilled the lake basin (such as 1938 and 1955) as well as present conditions in spring of 2023. Lake Tulare has filled again due to high rain

and snowfall from atmospheric rivers pouring into California from the Pacific Ocean.

Scoles, Alexander Geology Stephen Tsikalas Oral Presentation Exploring the Changing Climate of Inland Washington and Northern Idaho, 1993 to 2022 This study explores the available 30-year data sets, 1993-2022, for weather stations across inland Washington and Northern Idaho with the following questions in mind: 1) have the 30 year climate normals shifted in the most recent 30 years? The climate normals considered are monthly average maximum, average minimum, average temperature, and average precipitation totals. Spearman Rank correlation tests were used to determine any significant correlations for the temperature and precipitation variables over time. Scatter plots and trend lines were used to help determine directionality for variables with significant correlations. Tests highlight a general increase in minimum temperatures, enough to sometimes move the average temperatures higher despite maximum temperatures remaining generally the same. Precipitation has decreased primarily for the month of July suggests drier summers may be the new norm. Follow-up studies will seek correlations between warming summer months and human health and mortality rates.

Simmons, Taylor Psychology Michael Zukosky Poster

The Effect of Familismo on the Mental Health of Mexican Immigrants to the United States and their Children In a recent study by Margarita Alegría, et al. (2009), ethnic minorities often do not pursue mental health care due to issues such as an anticipation of low-quality care. One way to increase the quality of care for ethnic minorities, and in this case Mexican immigrants, is to consider what specific cultural factors affect their mental health. For example, social science research in psychology and anthropology has described how changing roles of familismo affects the mental health of Mexican immigrants living in the United States. This article reviews the research on familismo and mental health. It aims to support mental health practitioners in their understanding of how familismo has the potential to both amplify and reduce mental health symptomatology.

Simpson, Jocelyn, and Tatum Dickison

Physical Education, Health & Recreation

Kailyn Gunning

Poster

Confidence and Exercise: Is There a Link Between Exercise and Perceived Confidence? High self-confidence is crucial in social, work, and academic settings. Previous research suggests that individuals with greater confidence tend to be healthier and happier. PURPOSE: To investigate whether exercise intervention (resistance training (RT), aerobic training (AT), no exercise (NE)) could increase perceived confidence levels before an academic test. It was hypothesized that participants who exercised before the test would have higher perceived confidence levels compared to those who did not. METHODS: Eastern Washington University students (n=18, 12 males), between the ages of 18-40 were recruited. Participants were randomized into one of the interventions (AT, RT, NE). After the exercise intervention was completed, perceived confidence was assessed using the Rosenberg Confidence Scale and then participants completed an academic test. RESULTS: There was no significant difference in perceived confidence levels between the three groups (AT:  $69.3 \pm 6.22$ , RT:  $68.3 \pm 16.27$ , NE:  $75 \pm 10.94$ ) (p=0.588). CONCLUSION: Overall, the results of the study did not support the proposed hypothesis, however, this study was limited in its scope, and future research could explore the effects of regular exercise on perceived confidence levels in various settings.

Singh, Ramanpreet, Nguyen Nguyen, and Taylor Matteucci

## Biology Charles Herr Poster Developing Cryopreservation Methods of Wheat Roots In the midst of record breaking rates of plant species extinction due to climate change and fungal diseases, a

In the findst of record breaking rates of plant species extinction due to chinate change and rungal diseases, a universal cryopreservation method would provide a means for preservation of these many different species. The concept of plant root cryopreservation first emerged in the late 1960's, and with it came new avenues of preserving tissue for the purposes of agriculture and research. Frozen tissues can be transported and stored more reliably than other more conventional means. When thawed, they have the potential to be cultured and grown. Several different methods of cryopreservation exist. This experiment used the Fast (3°C/minute) and Slow freeze (0.3°C/minute) method with a controlled freezing unit on a wheat plant species. Cryoprotectant solutions containing 10% DMSO or 10% glycerol were used in conjunction with high (3.11 M) and low (1.5 M) sorbitol concentrations. A no sorbitol group was also tested. After being frozen, samples were transferred to a liquid nitrogen tank for storage, and later thawed. Thawed samples were stained with fluorescent dyes to observe live and dead cells under fluorescent microscopy. Root tips were deemed "surviving" if multiple live nuclei were present. In the glycerol group, Slow freezing showed a higher survival rate, while the DMSO group had good survival rates for both freezing rates. The Slow freeze rate showed greater survival rates overall compared to the Fast rate. Future experiments to develop a universal method will include testing on various plant species, such as potato plants, and succulents.

Smith, Annika Geology Richard Orndorff Poster

Relationship Between Wildfires and Flooding in the Western United States As wildfires have increased in magnitude and frequency across the western United States, flood frequency and magnitude have also increased. In forest environments, the soil is typically extremely absorbent, so it is useful for flood protection. But after a high intensity fire burns through a wooded area, it leaves behind charred, hardened soil that is unable to absorb the same quantity of water, creating prime conditions for flooding and debris flows. According to the Proceedings of the National Academy of Sciences (PNAS), in the Western U.S. annual forest fire area has increased by more than 1,100% from 1984 to 2020 (Williams et al., 2022). Areas where over 20% of forest area burned in a year, local streamflow increased by an average of 30% over a period of 6 years. While increased streamflow may seem helpful for increasing water supply, it can actually be destructive according to Park Williams (one of the co-authors in the PNAS study) in an article in Smart Water Magazine. With such extreme increases, reservoirs, dams, and other infrastructure can be overwhelmed, leading to an increased risk of catastrophic floods and mudflows. I will discuss these and other issues related to the connection between wildfires and flooding.

Smith, Dominic Education Joshua Hobson Creative Work A Life Journey

The purpose of my triptych of monoprints was to create a visual narrative that encompassed a journey of life through color and shape while also creating another narrative with them as individual pieces through their titles and how I viewed them on their own. I want these pieces to work with each other but to be viewed and appreciated on their own without the viewer thinking they're missing something larger. Being a collection of color and shapes, I invite the viewer to associate their own life story to my work through the use of the abstract imagery and the emotions they surface up.

Snyder, Mariah Physical Education, Health & Recreation Katrina Taylor and Christi Brewer Poster

The Physical and Psychological Effects of Multi-Ingredient Pre-Workout Supplements in Females During Resistance Training

Following the production of commercial multi-ingredient pre-workout products, there has been a need for the progression of the scientific literature surrounding performance enhancement of MIPS. The proposed physical and psychological benefits of MIPS are extensive, but only a few have been consistently demonstrated to enhance performance. Within those studies, only three previous studies have studied female populations. The primary purpose of this study was to determine the effects of various doses of MIPS compared to caffeine-only and a placebo on physiological (repetitions to failure) and psychological (OMNI-RES, Rating of Fatigue, and exercise enjoyment) responses during resistance training in recreationally-trained females. This study was constructed of 6 total sessions; a baseline testing session, a familiarization session, and four exercise/supplementation protocol sessions. Participants were randomly assigned to one of the four supplementation protocols, with at least 72 hours between each session. The exercise protocol was composed of a standardized dynamic warm-up, 4 sets of progressive load, with the final set of repetitions to failure at 75% of the participant's measured 1RM. This protocol was used for both leg press and bench. Following the completion of each set, participants completed three questionnaires in order to assess psychological performance. Data was collected from January until mid-March. Following data collection, outliers and normality will be assessed. Differences in repetitions to failure due to supplementation protocol were analyzed using a one-way ANOVA. Differences in RPE, exercise enjoyment, and ROF were analyzed using a 1x4 one-way ANOVA. When necessary, Bonferroni post hoc analyses were used to determine where significant differences exist. All data was analyzed in SPSS v27.0 with an alpha level set at 0.05.

Springer, Elena and Cora Malcom Health Services Administration Rosalee Allen Poster The Price Insulin Truly Has On American Lives Chronic illnesses are a global issue and therefore

Chronic illnesses are a global issue and therefore are a more researched topic around the world, especially if they are common among populations. Most of these illnesses require medications to maintain a good quality of life or even in some cases just to survive. In this study, we will be looking at those who meet the expectations of the latter requirement for prescriptions, more specifically, the illness Diabetes Mellitus and how the prices of insulin in the United States of America are forcing Americans to fast their rations of insulin that are covered by insurance, thus risking their own lives with complications like Acute Myocardial Infarction. We will focus on the rates of ICU admissions in the USA for the primary diagnosis being AMI and a secondary diagnosis for DM. We will compare that to countries who are honest about their insulin prices and are labeled as more "healthcare affordable", along with providing research around the world of the complications and dangers of fasting insulin doses. The price of Insulin should not come at the cost of American lives, or even take away the quality of those lives when we have medications that can easily improve them. Our country willingly lets people die from preventable diseases just so pharmaceutical companies can be greedy on a population that has no other choice. There is enough evidence to prove that rationing one's insulin while they have diabetes mellitus makes them much more likely to be admitted to the ICU fighting for their life with an acute myocardial infarction.

Stegall, Annastacia Creative Writing Jonathan Johnson Oral Presentation The Forgotten Poet, Elsa Von Freytag-Loringhoven, and Her Contribution to Modernism The Baroness, Elsa Von Freytag-Loringhoven's, poetry and readymade collection has long been ignored throughout discussion of the modernist era. A revolutionary Dadaist and creator of the readymade, this presentation will do a deep dive into how women like the Baroness, are often left out of academic conversations and not given the recognition that they rightfully deserve. Although the second wave of feminism resulted in a resurgence towards the general population giving credit to women's contributions in academia, women that are outwardly sexual are still shunned from the public eye. Resulting in the question of how leaving sexual, fem-presenting individuals, like Freytag-Loringhoven, out of academic history, shapes modern education. Thus, reporting on who Elsa Von Freytag-Loringhoven was, and how she helped shape modernism into what academics know it to currently be, will be used to encourage a change in how we teach modernism for the future.

Stockslager, Jamison

Physical Education, Health & Recreation

Katie Taylor and Carri Kreider

Poster

The Impact of Single-Gendered vs Coeducational Physical Education on Female Adolescent Body Image and Self-Esteem

Physical activity has been shown to be related to disease prevention and reduced prevalence of premature death. It is also related to overall greater health as well as improved psychosocial well-being in both adult and adolescent populations. Further, resistance-based exercise has shown to be related to good psychosocial health with more positive body image and increased self-esteem. However, the majority of adolescents and adults do not meet physical activity guidelines, particularly for resistance training. Schools play an essential role in providing opportunities for, and education in, resistance training. However, little is known about the differential classroom formats for resistance training, i.e., single-gendered versus co-educational, on body image and self-esteem in female adolescents. PURPOSE: To determine the effects of single-gendered versus coeducational resistance training classes on body image and self-esteem in adolescent females. METHODS: Adolescent females are currently being recruited from Grades 9-12 in WA state high schools. Participants are either enrolled in a single-gendered or coeducational resistance training class at their respective high schools. Participants are asked to complete surveys on body image (Body Change Inventory) and self-esteem (Rosenberg Self-Esteem Scale) prior to, at the midpoint, and at the end of the 8-week class. Data will be analyzed using a 2 (condition) x 3 (time) repeated measures ANOVA with an alpha level set at 0.05. Data collection will be conducted between February 2023 to April 2023.

Ssebanakitta, Bakima Psychology Jillene Seiver Oral Presentation Post Traumatic Growth after COVID-19 as a Function of Cognitive Emotional Regulation and Emotional Intelligence Post Traumatic Growth (PTG) is generally defined as a blanket term for the desirable mental change directly developed by the difficulty of navigating extreme life events (Kou et al., 2021). Thomas et al. (2020) described emotional intelligence's (EI) effect as a mediator upon cognitive emotional regulation (CER) and Post traumatic growth (PTG). The 2020 study found positive and significant relationships of all adaptive CER strategies to

both EI and PTG. Such resiliency increases can be used as a measure of overall Mental Wellness and the likelihood of remission from PTSD (Connor, 2006). Conducted after the "height" of the COVID-19 pandemic, the current study combines the trauma event sources

from Thomas et al. (2020) through a 2+ year, and an ongoing unique opportunity to widely study a protracted stressor (COVID-19 Pandemic) with varying levels of isolated yet related HMS events. 182 adult participants of a mostly student population (91%) were recruited from Eastern Washington University summer and fall quarter psychology classes, after IRB approval. Via SurveyMonkey, all participants completed four scales assessing  $\sim 91 \sim$ 

trauma history (THS), cognitive-emotional regulation (CERQ), emotional intelligence (AES/SREIS), post-traumatic growth (PTGI), and several items regarding COVID-19's impact. Our hypothesis were partially supported: (H1) Thomas et al. (2020)'s findings would be generally supported; (H2) that grief would correlate with EI and PTG in parallel patterns to trauma history; and (H3) HMS would positively correlate with PTG, CER, and EI factors. These results support EI's importance with what positive psychology calls "the good life" through times of distress as well as when encountering daily average life events. Utilization of cognitive and behavioral coping skills to assist the internal narrative navigation post-event is crucial to outcome potentials. Additionally, support for the exploration of separate grief items on distress and anxiety related measures will be discussed.

Streeter, Cole Chemistry & Biochemistry Ashley Lamm Poster Crystal structure of Triazatriborino[1,2-a:3,4-a':5,6-a'']tris[1,3,2]benzodiazaborole Triazatriborino[1,2-a:3,4-a':5,6-a'']tris[1,3,2]benzodiazaborole was first synthesized in 1961 but little is known about this molecule. Previous attempts to synthesize this molecule created an undefined polymer. The synthesis, crystal structure, and future applications of this compound will be discussed.

Tabino, Makenna Biology Rebecca Brown Poster Mowing Cattail Cover to Increase Aquatic Vegetation Diversity on the Coeur D'Alene River Floodplain in Cataldo, Idaho

The Schlepp Easement is a 400 acre wetland on the Coeur D'Alene River floodplain, near Cataldo, Idaho. The wetland has been restored to protect it from heavy metal pollution transported downstream from mining sites near Kellogg, Idaho, the location of the Bunker Hill EPA Superfund Site. This wetland was restored to provide safe habitats and feeding grounds for migratory waterfowl and to maintain wetland biodiversity. However, cattail is prone to becoming overdominant and outcompeting other plants, which greatly limits a wetland's biodiversity. Our objectives were to test whether aquatic boat mowing can reduce cattail cover, improving species diversity and cover of submerged aquatic vegetation beyond one year. Four treatments were applied in summer 2022 in three separate parts of the wetland (blocks), including control (no mowing), one mowing, two mowing, and three mowings per year. In October 2022, line transect surveys of aquatic vegetation were conducted on 20 meter transects located within each treatment in each block (12 total transects). We recorded all vegetation along the transect, both submerged and emergent. Water depth was recorded every meter along the transect. We found that cattail cover was reduced in mowed areas. A second set of mowing treatments is planned in summer 2023. We plan to resample fall 2023 to determine how the effect varies with time. This study has potential applications in other wetland ecosystems where cattail is over-dominant.

Taylor, Kevin Geology Richard Orndorff Poster

Historic Failure of the Teton Dam, Idaho and its Impacts on Future Dam Construction

The Teton Dam is located in southeastern Idaho 15 miles northeast of Rexburg, near the Wyoming border. The dam was intended to help with flooding and to provide hydroelectric power and irrigation to surrounding cities and farms in the Upper Snake River Valley. Construction on the dam began in the summer of 1972, and it was completed in June, 1975 with a total cost of \$39 million. The dam stood 305 ft tall and spanned 3,100 ft across with its intended reservoir extending 17 miles upstream with a holding capacity of 288,000 acre-ft. Only a year

later, on June 5, 1976, it experienced a catastrophic failure during its first filling. This collapse occurred due to a combination of hydraulic fracturing of jointed rock and internal erosion of the right embankment of the dam. The outburst of water exceeded a flow rate of 1,000,000 ft3/sec and resulted in 11 fatalities with over \$400 million in property damage. The failure of the Teton Dam has been a case study in engineering and led to development of the Bureau of Reclamation's safety program that has been recognized as the worldwide standard for dam safety and risk management.

Toulou, Erin Geology Chad Pritchard Poster Preliminary Grou

Preliminary Groundwater modeling of the West Plains, Spokane County, Washington: Deciphering erratic trends in PFAS contamination

The West Plains of Spokane County, eastern Washington is a plateau of Columbia River Basalt between Deep Creek, Hangman Creek, and south of the Spokane River. Primarily in Airway Heights, the quantity and quality of drinking water pumped from basalt aquifers has affected residents in the area. The most recent issue is PFAS contamination, which is thought to negatively affect human health and is found in drinking water wells across the West Plains. We interpret subsurface geology using new well logs from the Palisades area. When using ArcGIS PRO, well information can then be interpreted and projected as various data points. After this, it can be interpolated to predict multiple geological horizons and can be used to estimate the flow direction of groundwater. Using PFAS results from across the West Plains the erratic contamination can be linked to possible sources, including airports, fire stations, car washing facilities, or dumps. These models can help residents in the West Plains Region understand the possible contamination-sinks as well as create a safer environment for them and their families.

Toulou, Erin, and Marley Ollero Geology Richard Orndorff Poster The Water Crisis of Lake Mead, Nevada The Colorado River flows from the west

The Colorado River flows from the western flanks of the Rocky Mountains in Colorado to the Gulf of California and is the primary water source for millions of residents of the southwestern United States. When Hoover Dam was completed in 1935, it created Lake Mead, the largest reservoir in the United States. At its fullest, Lake Mead holds 2 years of Colorado River flow. Lake Mead provides water to the cities of Las Vegas, Boulder City and Henderson, NV, and it provides electricity for Los Angeles, CA. Hoover Dam and the upstream Glen Canyon Dam regulate the amount of water in the Colorado River. Unfortunately, due to aridity and continuing high demand for water from both Lake Mead and Lake Powell, lake levels are dropping significantly. Lake Mead is expected to drop 20 feet within the next year. With levels dropping at an alarming rate, residents of southern Nevada are experiencing a water shortage crisis in what is already one of the driest areas in the nation, the Mojave Desert. We discuss the severity of the crisis, as well as the impacts on residents of the region.

Trejo-Bernal, Lizette Sociology Kassahun Kebede Oral Presentation The New Generation: The Experience of Second-Generation Mexican Immigrants This oral presentation will focus on how second-generation Mexican immigrants experience life in the United States in comparison to their first-generation immigrant parents and other non-immigrant native-born citizens. With a diverse population in the United States, the challenges, advantages, and the upbringing of ~93 ~ second-generation immigrants is often overlooked. These children were born into two different cultures, the one belonging to the origins of their parents, and their own birthright culture. The spilt in identity created a new generation of Americans, those who had to overcome language barriers, cultural clashes, and educational systems that were not created for them to succeed. This oral presentation will not only review the research on the experience of this population group but also allow for a discussion on the trends moving forward.

Trier, Michael **Biology** Rebecca Brown Poster Using deep learning to understand and map the impact of large-scale dam removals on plant communities and fluvial landforms In the United States, there are now more dams being removed than being constructed; however, less than 10% of these removals have been or are being studied. While the negative environmental impacts of dams are well documented, the ecological responses to dam removal are less understood. The Elwha and Glines Canyon dams on the Elwha River, Washington, USA were removed in 2011 and 2014, respectively, and they became the largest dams to be removed to date. A decade after these removals, how have plant communities and fluvial landforms changed, and, if so, how has the relationship between these two factors evolved over the past ten years? Using vegetation surveys and remotely sensed aerial imagery collected by the United States Geological Survey, I will define vegetation cover and fluvial landform types. Then, using deep learning, I will train a neural network to identify and digitize these vegetation and landform layers. The landform and vegetation layers will then be overlayed to examine their relationship. This deep learning model could then be deployed in other dam removals to help restoration practitioners better understand and manage plant community responses to future large dam removals.

Williams, Mykey Art Joshua Hobson Creative Work Stitches Medium: Digital Illustration Print Dimensions: 11" x 16" Year: 2023

Stitches is a digital illustration of a young deer suspended in the air with two magpies by its sides. One is in the process of sewing up a long, twisting wound through the deer's flank with strands of grass while the other threads flowers in between the stitches as if to make it look nicer — ultimately beautifying its death. The digital medium allowed for cleaner lines and brighter colors, as well as easier control to make it as detailed and thoughtful as I could. It's a rather morbid piece, but I purposefully refrained from making it gory. I wanted it to be beautiful, almost comforting, even though it's a little disconcerting. Though this piece started as a simple experiment in my free time, it quickly became more of an exploration on the fine line between life and death, as well as a personal dive into my own grief from the last year or so. It's not necessarily a cheerful outlook, but I certainly didn't aim for anything completely heartbreaking.

Woodworth, Kylee Geology Richard Orndorff Poster History and Development of Hanford Reservation, Washington At the height of World War II, the United States government created the Manhattan Project in a race against Germany to develop the first atomic bomb. In search of remote areas to produce the necessary plutonium, the US government established a nuclear facility at Hanford, WA, which met all the criteria needed to develop and power the site. The Columbia River was vital to powering the plant and providing much-needed cooling water for the Manhattan B Reactor. The site created plutonium for the second bomb dropped on Japan, then it continued plutonium production into the Cold War. By the 1980s, production of plutonium was halted, and in 1989, the Tri-Party Agreement was signed to mitigate nuclear waste and protect the Columbia River to comply with federal regulations. Over 30 years later, cleanup has led to growth and development of the Tri-Cities (including Pacific Northwest National Labs), creating thousands of jobs in the region. Cleanup will continue for many more decades to come.

Worrell, Emerson Biology Camille McNeely Poster

Carbon Storage and Uptake in Woody Riparian Ecosystems in Eastern Washington

This study will estimate carbon storage and carbon uptake in riparian zones along streams within the Crab Creek, Hangman Creek, and Rock Creek watersheds in Eastern Washington. Riparian zones are important wildlife habitat and maintain water quality and stream health. However, riparian zones in this region have been heavily modified through clearing of woody vegetation and conversion to other land uses, such as agriculture and urban development. Terrestrial carbon storage is important for climate mitigation and could provide additional motivation for riparian restoration. However, the capacity for carbon storage in locally restored riparian zones is unknown. For this project, I will estimate carbon storage and uptake in 3 site types: 1) established riparian woody vegetation, 2) restored riparian woody vegetation, and 3) modified riparian zones with little woody vegetation. For woody vegetation, I will estimate carbon storage and uptake using programs called i-TreeEco and i-Tree Landscape. These programs require measurements of tree diameter at breast height and satellite imagery for estimation of tree height. My first hypothesis is that established riparian areas will have the highest carbon uptake and carbon storage, restored riparian areas will be intermediate, and non-wooded riparian zones will have the lowest amounts of carbon uptake and carbon storage. This study fits in with the larger research and effort of stream and ecosystem restoration and will hopefully guide further riparian restoration in the region.

Zagar, Luke Philosophy Kevin Decker and Christopher Kirby

Oral Presentation

Hume's Ethics on the Acceptability of Suicide in the Modern World

Suicide and euthanasia remain holly debated topics in the United States and across the globe. The purpose of this research is to incorporate the arguments outlined by David Hume in one of his later philosophic works, "On Suicide", to the greater academic contemporary debate on euthanasia and suicide in general. This work was done by means of peer reviewed academic research, containing both journal articles and published books. These both serve to incorporate a variety of intellectual voices into this conversation, including but not limited to the: cultural, psychological, political and religious implications of suicide. The Humean argument for the legitimacy of suicide (insofar as it is up to the individual to determine) aligns and dissents uniquely with each of these perspectives, but generally does not consort with most modern thinkers. However, his argument still holds value as it provides valuable insight into the preconceived ideas of suicide held by many, and the liberty we all have in our individual action. Altogether, this paper aims to contrast the autonomy held by individuals, as advanced by Hume, with the inherent value of human life.

Zepp, Hunter Design Colin Manikoth ~95~ Interactive Presentation

Déjà vu

Creativity is diminished when the Game Design process begins with discussions about which software to use, which proprietary platforms needs support, and what hardware needs purchasing. Everyone should make a game, at least once, to understand the concepts of Game Design. Then those concepts can be applied to other projects via gamification, or the application of game-design elements and principles to non-game contexts. Utilizing the open source software Decker, anyone can easily make games with sound, images, animations, and interactions with no-coding experience. The visual constraints of Decker make the easy-things-easy and its scripting language makes the hard things possible. My text-based adventure game Deja Vu demonstrates how game design can be accessible to everyone and how an engaging story is more important than complex visuals.