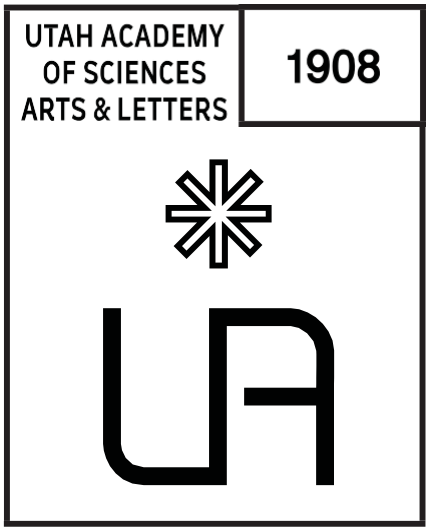

UTAH ACADEMY
of
Sciences, Arts & Letters

Established 1908

Annual Conference

March 23, 2024

University of Utah

UTAH ACADEMY OF SCIENCES, ARTS, & LETTERS

Annual Conference - Saturday, March 23, 2024

University of Utah

9:00 a.m. – 10:00 a.m.

Check-in and Registration

William R. & Erlyn J. Gould Auditorium, J. Willard Marriott Library

10:00 a.m. – 10:05 a.m. – Angela Banchero-Kelleher, President

Welcome to University of Utah

Plenary

Social and Behavioral Sciences Building (S BEH building)

10:15 a.m. – 10:30 a.m. – Keith Lawrence, President-Elect

Distinguished Service Award Presentation

Jean Tokuda Irwin

Keith Lawrence, President-Elect

John and Olga Gardner Prize Presentation

Dr. Loreen Allphin

10:30 a.m. – 11:15 a.m. Angela Banchero-Kelleher, President

O.C. Tanner Lecture: Human Life History Evolution & Sensitivity To Social Safety That Shadows Our Lives

By Dr. Kristen Hawkes

11:15 a.m. – 11:20 a.m.

Excursion announcement

11:20 a.m. – 12:15 p.m.

Panel Discussion: Exploring the Intersections of Social Impact, Systems Thinking, and Equity-Centered Design

Presenter: Jonathan H. Westover, Summer Valente, Cassie Bingham, Dr. Sean Crossland, Dr. Ezgi Sertler, Dr. Stevie Munz

12:15 a.m. – 12:20 p.m.

Conference Photo - Outside S BEH

12:00 a.m. – 12:30 p.m.

Poster Session

Faculty Center – Marriott Library

12:30 p.m. – 1:00 p.m.

Lunch - William R. & Erlyn J. Gould Auditorium

1:00 p.m. – 2:30 p.m.

Oral Sessions

ARTS:

Session A: Room: 1140

BIOLOGICAL:
Session A: Room: 1170

BUSINESS:
Session A: Room: 1110

EDUCATION:
Session A: Room: 2008
Session B: Room: 1745

ENGINEERING:
Session A: Room: 1735

HUMANITIES/PHILOSOPHY/FOREIGN LANGUAGE:
Session A: Room: 1120

LANGUAGES/LITERATURE:
Session A: Room: 1008

PHYSICAL SCIENCES:
Session A: Room: 1130
Session B: Room: 1150

SOCIAL SCIENCES:
Session A: Room: 1715

2:30 p.m. – 3:00 p.m.
Refreshment Break
Room William R. & Erlyn J. Gould Auditorium

3:00 p.m. – 5:00 p.m.
Division Breakout Session
See "Division Session Room Assignments"

5:00 p.m. – 6:00 p.m.
UASAL Board Meeting
Sill Center

The UASAL spring conference is able to provide the following Technical access:

Every classroom has a projector with HDMI access. All rooms should have an HDMI cord. Presenters should bring any adaptors they need to connect their laptop/iPad to the projector through the HDMI.

Presenters should bring any adaptors they need to connect their laptop/iPad to the projector through the HDMI. It is advised that presenters have a backup presentation (e.g., both flash drive and laptop). The library will be open that day, in case of emergency please see the information, research, and technology Assistance bar in the KNOWLEDGE COMMONS on the 2nd floor of the Marriott.

Internet access is available, the U has dedicated guest wifi (UGuest), a phone with SMS messaging is required in order to receive a text message with the access code.

Excursion

Our host university for the conference will also host our spring excursion; please join UASAL for an off-the-grid, overnight excursion at the U's Bonderman Field Station at Rio Mesa from June 7th thru 9th, 2024. Bonderman is an outdoor laboratory for the sciences, humanities, social sciences and cultural studies, stimulating scholarship about a broad range of environmental topics associated with human and natural system interactions. We will spend time in this beautiful country on the Delores River, hiking, visiting, and learning from Dr. Kristen Hawkes, Distinguished Professor of Anthropology at the U, and Brock James, Great Basin archaeologist. Get ready for a sunrise yoga, picnics in the red rocks, and campfire stories at night. Bonderman is equipped with bunk houses, a communal kitchen (meals are included), and a bath house. Contact CoCo James (coco.james@utah.edu) for more information.

Distinguished Service Award
Jean Tokuda Irwin

The Distinguished Service Award is given in recognition of exceptional service to the higher education community in Utah.

Jean Tokuda Irwin holds a B.A/M.A. from the University of Texas/Permian Basin. She is the Arts Education Program Manager for the Utah Division of Arts and Museums. She serves on NASAA/AE's Diversity, Equity, Access & Inclusion Group & NEA/POL Accessibility Working Group, Spy Hop Advisory Board, Emerald Hills Institute Board. Past service includes panelist for NEA, sister SAAs and President's Committee for Arts and Humanities Education; NASAA/AE Advisory Group & Leadership Taskforce, Coalition for Minorities Advisory Committee to the Utah State Board of Education; the Utah Indian Education Taskforce; National PTA Board of Directors (added dance & film/video to national Reflections Program); adjunct faculty - Odessa College, Galveston College. Western Texas College and Director of Museums (History & Art). Recipient of Utah Human Rights award/Utah Counselors Association, Ruby Chacon Award for Arts and Social Justice, the Sorensen Legacy Foundation Award for Lifetime Achievement in Arts Education and Utahns for Culture Special Honoree. Her mixed media work appeared in the 2002 Cultural Olympiad featuring 20 works by Utahns and most recently in the Clay, Paper, Scissors Gallery in Laramie, WY. She is a serial fondler of books and crafts visual journals, is an independent world cinema addict who loves traveling, weird foreign foods, and squiggly ingredients. She abhors bottled water and plastics.

John & Olga Gardner Prize
Dr. Loreen Allphin

The Gardner Prize is awarded annually for exceptional achievement by an academic professional in Utah.

Loreen Allphin, plant ecologist/conservation geneticist, received her doctorate in 1996 from the University of Utah (biology with an ecology and evolution emphasis). She has served on the faculty at Brigham Young University from 1996-present. She is currently a faculty member in the Department of Plant and Wildlife Sciences at Brigham Young University in Provo, UT, USA, where she serves as chair of the departmental graduate committee. Since 2003, she has

also served as an adjunct curator of plants at the Utah Museum of Natural History in Salt Lake City, UT, USA. . Dr. Allphin teaches undergraduate courses in conservation biology, genetics and reproduction in natural populations, ecology, and medicinal botany. Her research interests include: ecological and conservation genetics of rare plant populations; systematics of Brassicaceae, primarily the genera *Boechera* and *Draba* in western North America; phylogeography of rare plant genera and species in western North America; exploration of biogeographic patterns associated endemism and rarity in plants; plant population and community ecology; and plant reproductive ecology.

O.C. Tanner Lecture
Human life history evolution & sensitivity to social safety that shadows our lives
Dr. Kristen Hawkes

Summary: A hunting/paternal provisioning hypothesis has long been central to ideas about what happened in human evolution. But challenges have been accumulating that point to an alternative grandmother hypothesis, initially aimed to explain why postmenopausal longevity increased and maturation slowed, yet birth intervals shortened in us compared to our closest living relatives, great apes. Now more features that distinguish us from them are linked to the evolution of human life history, including our pair bonding habits, our big brains and distinctive sensitivity to social safety that begins with precocious agency for engagement in otherwise helpless human babies. Resulting lifelong appetites for mutual understanding and response to social context enrich our lives. They also sharpen "us versus them" divisions with high costs reported in today's alarming headlines. Other costs include stressful vigilance about uncertain social safety that amplifies health disparities for stigmatized and marginalized minorities.

Journal of the Utah Academy Publication Policy

The Journal of the Utah Academy of Sciences, Arts, and Letters publishes works in all of the fields of study encompassed in the Academy's mission. Papers published in The Journal of the Utah Academy of Sciences, Arts, and Letters are drawn from papers presented by members in good standing at the annual conference of the Utah Academy. The Journal of the Utah Academy is a refereed journal. To qualify for publication, the papers must be recommended through a refereeing system.

Presenters are encouraged to publish their paper in The Journal of the Utah Academy. The Journal's criteria are that a submission is (1) fresh, meaningful scholarly insight on its subject; (2) readable and well written; and (3) of general interest for an academic readership beyond the author's field.

If you wish your paper to be considered for publication in The Journal, please submit a Microsoft Word document to the chair of the appropriate division by June 1st 2022. Contact information for division chairs is available on the Utah Academy's website (www.utahacademy.org). Editorial responses will be forthcoming after the resumption of school the following fall when referees have returned their comments to the division chairs.

Papers should be between ten and twenty double-spaced pages. Detailed instructions to authors are available at http://www.utahacademy.org/.

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J. Willard Marriott Library
Poster Presentations
Poster Session
Division Chair: Jacque Westover
Utah Valley University

SESSION A: Faculty Center
Session Leader: Jacque Westover
12:00 p.m. - 12:30 p.m.

Arts

Title: Contemplating Islamic Geometric Patterns: Using Eye-Tracking Tools to Facilitate a Higher Worship Experience
Presenter: Barrett Blake
Authors: Barrett Blake and Brandon Ro
Affiliation: Utah Valley University

Title: Contextual Synergy: Exploring Architectural Compatibility within Context
Presenter: Kevin Hart
Author: Kevin Hart and Brandon Ro
Affiliation: Utah Valley University

Title: Designing for Well-being: An Investigation of Architectural Composition on Physical Health
Presenter: Jared K. Bradshaw
Authors: Jared K. Bradshaw and Brandon Ro
Affiliation: Utah Valley University

Title: Discovering Ancient Sacredness: Exploring the Astro-Architectural Orientation of Christian Churches in Israel and Palestine
Presenter: Yan-ho Ng
Authors: Kent Miller, Yan-ho Ng, and Brandon Ro
Affiliation: Utah Valley University

Title: Exploring and Mapping Ritual onto the Byzantine Church Complex at Horvat Beit Loya
Presenter: Hailey Packard
Authors: Hailey Packard and Brandon Ro
Affiliation: Utah Valley University

Title: Exploring the Impact of the Divine - A Case Study on Sagrada Familia
Presenter: Eric Burton
Authors: Eric Burton and Brandon Ro
Affiliation: Utah Valley University

Title: Healing by Design: Unraveling the Relationship Between Physical Spaces and Emotional Restoration
Presenters: Samuel Weisler and Colton Korpi
Authors: Samuel Weisler, Colton Korpi, and Brandon Ro
Affiliation: Utah Valley University

Title: Psychitecture: How Light, Life, and Water in Our Built Environment Affects Mental Well-Being
Presenter: Sean Donner
Authors: Sean Donner, Nathaniel Stucki, and Brandon Ro
Affiliation: Utah Valley University

Title: Turning Towards the Lord: Latter-Day Saint Temple Astro-Architectural Orientation
Presenters: Desiree Ritchie and Jake Wendt
Authors: Desiree Ritchie, Jake Wendt, and Brandon Ro
Affiliation: Utah Valley University

Title: What is the Impact of Dramaturgy?
Presenters: Jordan Lockwood and Mac Minshew
Authors: Dr. Amanda Dawson, Robert Mac Minshew, and Jordan Lockwood
Affiliation: Utah State University

Biological Sciences

Title: Elucidation of an Operon(s) for a Group 3 Capsule in *Escherichia coli* Strain M12
Presenter: Elise Ihnen and Wade A. Stanford
Authors: Elise M. Ihnen, Wade A. Stanford, and Michael A. Olson
Affiliation: Snow College

Title: Encoding and Processing of Visual Information in the Leech
Presenter: Belle Brown
Authors: Belle Brown and Krista Todd
Affiliation: Westminster University

Title: Isolation and Characterization of Bovine Milk Derived Extracellular Vesicles
Presenter: Logan Whitney
Authors: Logan Whitney, Elley Colledge, Jaren Wilson, Jonah Pena-Ekker, and Kolbe Mason
Affiliation: Southern Utah University

Title: Isolation of Multi-drug Resistant *Serratia* from Soil
Presenter: Kaeson Severe
Authors: Kaeson Severe, Landon Severe, and Bryson Baggs
Affiliation: Weber State University

Title: Microbial Communities in PCB Contaminated Soils and Potential for PCB Degradation
Presenters: Hali Hutchinson, Jerzee Findlay, Gina Fuller, Akir Rowe, and Kingdom Wanjoku
Authors: Hali Hutchinson, Jerzee Findlay, Gina Fuller, Akir Rowe, and Kingdom Wanjoku
Affiliation: Weber State University

Title: Repeatability of Fecal Egg Counts in Wild Horses
Presenter: Jaron Dixon
Authors: Jaron Dixon, Laura Redfield, and Graham Goodman
Affiliation: Utah State University Eastern

Education

Title: Writing with Artificial Intelligence Across Disciplines
Presenters: Patryk Hughers and Demetrios Pagonis
Authors: Rebeckah Cumpsty, Patryk Hughes, Jazmyne Olson, and Demetrios Pagonis
Affiliation: Weber State University

Title: Benefits of Midterm Quizzes in the Classroom
Presenter: Willow Park
Author: Willow Park and Dr. Caleb Hiller
Affiliation: Southern Utah University

Humanities, Philosophy, and Foreign Language

Title: The State of Student Media at HBCUs and HSIs
Presenter: Marianna Lopez
Authors: Marianna Lopez, Mckinna Baird, and Jean Norman
Affiliation: Weber State University

Kinesiology and Health Sciences

Title: Perceived Motivators and Barriers to Facilitate Exercise Among Primary Care Clinic Patients
Presenter: Kelsey Hansen
Authors: Kelsey Hansen, Saori Hanaki
Affiliation: Weber State University

Title: Physiological Effects of Pickleball Based on Skill Level
Presenter: James Zagrodnik
Authors: Jasmine Bennett, Chelsea Cavitt, Belal Glab, Zachary Holt, Emma Lapp, Krystal Serrano, Kaitlyn Standifird, James Zagrodnik, and Ryan Zimmerman
Affiliation: Weber State University

Physical Science

Title: Co-culture PANC-1 and COS-7: Find methods to effectively grow two distinct cell lines together
Presenter: Valerie Rivera
Author: Valeria Rivera
Affiliation: Utah Valley University

Title: Hydrophobicity of Micropatterned PDMS
Presenter: Russell M. Bodily
Authors: J. Fielding Hokanson, Russell M. Bodily, Kylee Stoddard, and Chris Monson
Affiliation: Southern Utah University

Title: J-Type Aggregation of Cyanine Dye in Aqueous Solutions of Monovalent and Divalent Metal Cations
Presenters: Ethan Fielding and Alexander Stewart
Authors: Ethan Fielding, Alexander Stewart, and Hussein Samha

Affiliation: Southern Utah University

Title: Organic Chemistry Student's' perceived costs and goal orientations
Presenter: Seunghwan Shin
Authors: Seunghwan Shin and Sydney Coates
Affiliation: Southern Utah University

Title: *Semivolatile* Organic Compounds Throughout Utah
Presenter: Demetrios Pagonis
Authors: Sara Nielson, Hannah Verhaal, Hafid Bahena, and Casey Reeder
Affiliation: Weber State University

Title: Spatial visualization versus memorization differences among sexes in organic chemistry
Presenter: Lauren Jensen
Authors: Derek Baker, Lauren Jensen, Dagney Goodfellow, and Seunghwan Shin
Affiliation: Southern Utah University

Title: Synthesis and Electrochemical Analysis of [Ir(ppy)2]2BPM
Presenter: Dylan Tatarian
Authors: Dylan Tatarian and Matthew B. Prater
Affiliation: Southern Utah University

Title: Synthesis of (E) - Phenylocten-3-ol from 1-Octyn-3-ol Through TBS Protection, Hydroboration, and Palladium- Catalyzed Cross-Coupling
Presenter: Raymond Brex Delray
Authors: Raymond Brex Delray and Dr. Nathan Werner
Affiliation: Southern Utah University

Title: The Stability of Extracellular Vesicles
Presenter: Elley Colledge
Authors: Elley Colledge, Logan Whitney, Jonah Pena Ekker, Kolbe Mason, Charlee Cannon, and Jessica Pullan
Affiliation: Southern Utah University

Title: Timing of Magmatism and Genesis of Mineralization in the Silver Island Mountains, Western Utah
Presenter: Kara Olsen
Authors: Kara Olsen, Logan Knight, Aybree DeGrange, Jon Henroid, and Elizabeth Balgord
Affiliation: Weber State University

Title: Testing the use of lichen cover on rock lines associated with a prehistoric hunting site (bison jump) in NW Wyoming to date their construction
Presenter: Cadence Truchot
Authors: Cadence Truchot, Emma Krolczyk, Tammy Rittenour, and Todd Guenther
Affinition: Utah State University

Social Sciences

Title: Are You a Cheater?

Presenters: Christopher Lowery, Brittney Hoaldridge, Chandler Barclay, Dafne Mejia, Romeo Tiumalu, and Nick Marsing
Authors: Christopher Lowery, Brittney Hoaldridge, Chandler Barclay, Dafne Mejia, Romeo Tiumalu, and Nick Marsing
Affiliation: Snow College

Title: Creative comparison of human and AI lyrics
Presenter: Joshua Olsen
Authors: Nathaniel Bruse, Daniel Lewellen, Joshua Olsen, Isaak Thompson, and Nick Marsing
Affiliation: Snow College

Title: Does exposure to true crime media influence our safety behaviors?
Presenter: Tayla Bair, Lilly Binks, Sami Flanagan, Seli Ha'angana, Taesi Higgs, and Nick Marsing
Authors: Tayla Bair, Lilly Binks, Sami Flanagan, Seli Ha'angana, Taesi Higgs, and Nick Marsing
Affiliation: Snow College

Title: Does ones Religion and Religiosity effect if you are more likely to believe in conspiracy theories
Presenter: Alec Mitchell, Roman Gause, and Nick Marsing
Authors: Alec Mitchell, Roman Gause, and Nick Marsing
Affiliation: Snow College

Title: Exploring Stress Responses to Spine-Chilling Narratives
Presenter: Olivia Larson
Authors: Olivia Larson, Bailey Cox, Jacob Williams, Ash Ellenburg, and Nick Marsing
Affiliation: Snow College

Title: Mythical Threads of Love
Presenter: Jadyn Littlefield
Authors: Jadyn Littlefield, Tylee Leishman, Elise Peery, Aiyana Santiagio, and Megan Parodi
Affiliation: Snow College

Title: Stigma Management Communication (SMC): A Systematic Review
Presenter: Tia Zebe
Authors: Tia Zebe and Sydney O'Shay
Affiliation: Utah State University

Title: The French Media on the Marshall Plan
Presenter: Eve Harding
Author: Eve Harding
Affiliation: Brigham Young University

Title We are not alone: Examining the impact of a tween-teen diabetes day camp
Presenter: Heidi Blaylock
Authors: Heidi Blaylock, Carter Leuba, Aiden Hill, Christina Aguilar, Carla Cox, Eddie Hill (Weber State University), and Bethany Arrington (Old Dominion University)
Affiliation: Weber State University

Oral Presentations

Arts

Division Chair: Jim Godfrey
Utah Valley University

SESSION A: Room 1140
Session Leader: Jim Godfrey

1:00 p.m.
Title: The power of art: Increasing multi-cultural consciousness through an online global art workshop
Presenter: Ran Qi
Author: Ran Qi
Affiliation: Southern Utah University

1:20 p.m.
Title: From East to West with Ruth. St. Denis
Presenter: Alyssa Arnold
Author: Alyssa Arnold
Affiliation: Utah Valley University

2:00 p.m.
Title: Ballet, Film, and Mythology: A Focus on Persephone
Presenter: Samantha Marx
Author: Samantha Marx
Affiliation: Utah Valley University

2:20 p.m. Break - William R. & Erlyn J. Gould Auditorium

2:30 p.m.
Title: Frederic Balazs and Ernst von Dohnányi: From Budapest to the American Southwest
Presenter: Jackie Bodily Biggs
Author: Jackie Bodily Biggs
Affiliation: Brigham Young University

2:50 p.m.
Title: Researching Sound Deprivation with Classical Music
Performance: Chastalynn Chamberlain Martin
Author: Chastalynn Chamberlain Martin
Affiliation: Utah Tech University

3:10 p.m.
Title: Seeing is not Always Believing: An analysis of the score errors in the Adagio from Louis Vierne's 3rd Organ Symphony
Presenter: Connor Larsen
Author: Connor Larsen
Affiliation: Brigham Young University

3:30 p.m.
Title: Identifying Chords in Contemporary Music
Presenter: Leonardo Sanjinez

Author: Leonardo Sanjinez
Affiliation: Utah State University

Biological Sciences

Division Chair: Daniel Clark
Weber State University

SESSION A: Room 1170
Session Leader: Daniel Clark

1:00 p.m. Welcome

1:15 p.m.
Title: Using Transfection as an Annotation-free Ground Truth for Training Noninvasive Metastatic Cancer Mapping Methods
Presenter: Drew Allred
Authors: Drew Allred and Vern Hart
Affiliation: Utah Valley University

1:30 p.m.
Title: Bioprospecting of Antibiotics from Soil Bacteria
Presenters: Cori Bailie
Authors: Cori Bailie and Olga Kopp
Affiliation: Utah Valley University

1:45 p.m.
Title: *Equisetum bogotense*: Still phylogenetically labile after all these years
Presenter: William D. Speer
Authors: William D. Speer
Affiliation: Salt Lake Community College

2:00 p.m.
Title: Circulation Tumor Cell Detection in Flowing Samples
Presenter: Clint Flinders
Author: Vern Hart, Ellie Evans, Tyler O'Loughlin, Caroline Torgersen, and Clint Flinders
Affiliation: Utah Valley University

2:15 p.m.
Title: BioArt Scholars in Microbiology and Visual Arts
Presenter: Natalie Pollock, and Lisa Wiltbank
Authors: Jude Agboada, Megan Capener, Natalie Pollock, Alex Robles, and Lisa Wiltbank
Affiliation: Weber State University

2:30 p.m. Break - William R. & Erlyn J. Gould Auditorium

Business

Division Chair: Taowen Le
Weber State University

SESSION A: Room 1110
Session Leader: Taowen Le

1:00 p.m. Welcome

1:10 p.m.
Title: Measuring the Efficacy of AI-Enabled Communication: Advancing Websites Beyond Traditional Interfaces
Presenter: Matthew Pecsok
Authors: Chong Oh and Matthew Pecsok
Affiliation: University of Utah

1:35 p.m.
Title: Moonlighting Madness: Mixing Student Learning with Paid Consulting
Presenter: Kristy Grayson
Authors: Kristy Grayson, Kathryn Davis, and Phillip Garner
Affiliation: Utah Tech University

2:00 p.m.
Title: Revamping Organizational Hierarchy to Foster Innovation: The Case for RenDanHeYi
Presenter: Jonathan H. Westover
Authors: Jonathan H. Westover and Rachel Bi
Affiliation: Utah Valley University

2:25 p.m.
Title: Tabletop Gamification in Leadership Education
Presenter: Parker White
Authors: Scott Hammond, Parker White
Affiliation: Utah State University

2:50 p.m.
Title: Compulsive Social Media Use and Happiness
Presenter: Jeff Clements
Author: Jeff Clements
Affiliation: Weber State University

Education

Division Chair Doug Stump
Southern Utah University

SESSION A: Room 2008
Session Leader: Doug Stump

1:00 p.m.
Title: Picturing Disability; Access: Artifacts of Inclusion and Exclusion in Higher Education
Presenter: Rachel Bryson
Authors: Rachel Bryson
Affiliation: University of Utah

1:20 p.m.
Title: Workbook Style Learning Integrated into the Classroom
Presenter: Willow Park

Authors: Willow Park, Jayden Peacock, Caysen Crum, Karissa Stalder and Dr. Caleb Hiller
Affiliation: Southern Utah University

1:40 p.m.
Title: Collaborative Practices Between Utah Teachers and Social Workers in Schools
Presenter: Kristina Moleni, Andrea Garavito Martinez; Fangaafa Tu'ifua
Authors: Kristina Moleni, Andrea Garavito Martinez; Fangaafa Tu'ifua
Affiliation: Weber State University

2:00 p.m.
Title: Exploring Student Outcomes in STEM Education
Presenter: Jeff Clements
Author: Jeff Clements
Affiliation: Weber State University

2:20 pm
Title: Replacing White Noise through Seeing, Sustaining and Resisting: Listening to Hear the Voices of 2nd Generation Latino/a/x Immigrants in a Digital Storytelling Workshop
Presenter: Elizabeth Healey Mainoo
Authors: Elizabeth Healey Mainoo
Affiliation: Utah Valley University

Education

Division Chair Doug Stump
Southern Utah University

SESSION B: Panel Discussion Room 1745
Session Leader: Doug Stump /Angelda Schill

1:00 p.m.
Title: Panel Discussion: Reimagining Management Pedagogy: Innovative Approaches to Engaging Learners
Presenter: Dr. Angela Schill, LynnAnn Erickson, Dr. Silvia Clark, Dr. Ruthann Cunningham, Dr. Maureen Andrade, Dr. Jill Jasperson, Dr. Yang Huo, Dr. Jacque P. Westover, Dr. Jonathan Westover
Authors: Dr. Angela Schill, LynnAnn Erickson, Dr. Silvia Clark, Dr. Ruthann Cunningham, Dr. Maureen Andrade, Dr. Jill Jasperson, Dr. Yang Huo, Dr. Jacque P. Westover, Dr. Jonathan Westover
Affiliation: Utah Valley University

Engineering

Division Chair: Ali Siahpush
Southern Utah University

SESSION A: Room 1735
Session Leader: Ali S. Siahpush

1:00 p.m. Welcome

1:15 p.m.

Title: Two Dimensional Heat Conduction in a Short Cylinder
Presenter: Logan Nicholass, Daniel Hofeling, Evan Percival
Authors: Logan Nicholass, Daniel Hofeling, and Evan Percival
Affiliation: Southern Utah University

1:30 p.m.
Title: Analysis Of A Spray-Type Passive Downdraft Evaporative Cooler
Presenter: Ayline Vega, Matt Lovell, Jayden Payne
Authors: Ayline Vega, Matt Lovell, and Jayden Payne
Affiliation: Southern Utah University

1:45 p.m.
Title: Analysis Of Air Subjected To A constant Heat Flux Within A Tube Under Forced Convection
Presenter: Jacob Vinson, Joshua Brinkerhoff, Evan Percival, Manfredi Aloisio
Authors: Jacob Vinson, Joshua Brinkerhoff, Evan Percival, and Manfredi Aloisio
Affiliation: Southern Utah University

2:00 p.m.
Title: Solar Heating Of Water And Air
Presenter: Larry Webster, Savanah Higley, Capri Franzen, Gage Van Dyke
Authors: Larry Webster, Savanah Higley, Capri Franzen, and Gage Van Dyke
Affiliation: Southern Utah University

2:15 p.m.
Title: One-Dimensional Heat Conduction Through Composite Walls
Presenter: Savanah L. Higley
Authors: Savanah L. Higley and Ali S. Siahpush
Affiliation: Southern Utah University

2:30 p.m. Break - William R. & Erlyn J. Gould Auditorium

3:00 p.m.
Title: Scale Analysis Of Natural Convection Over A Heated Vertical Plate
Presenter: Ali Siahpush
Authors: Braeden Brown and Ali S. Siahpush
Affiliation: Southern Utah University

Humanities, Philosophy, and Foreign Language

Division Chair: Thomas C. Terry
Utah State University

SESSION A: Room 1120
Session Leader: Thomas Terry

1:00 p.m.
Title: Hildolf, Son of Odin
Presenter: Leif Ravnsen
Author: Leif Ravnsen
Affiliation: Utah Valley University

1:15 p.m.
Title: The Benevolent Relationship between Humans and Trees: The Power of Storytelling
Presenter: Jolee Robinson
Author: Jolee Robinson
Affiliation: Southern Utah University

1:30 p.m.
Title: Trauma Reporting Behind Barbed Wire: Japanese American Internment Camp Newspapers and Violence, 1942-1945
Presenter: Glen Feighery
Author: Glen Feighery
Affiliation: University of Utah

1:45 p.m.
Title: Well Stated, Half Solved: The Most Important Problem(s) Facing the State of Utah and Its National Echoes
Presenter: Thomas C. Terry
Author: Thomas C. Terry
Affiliation: Utah State University

2:00 p.m.
Title: From Story to History to Ritual: Anne Washburn's Mr. Burns: A Post-Electric Play
Presenter: David A. Hatch
Authors: David A. Hatch and Anne Washburn
Affiliation: Southern Utah University

2:15 p.m.
Title: The Magic of Familial Trauma
Presenter: Ariel Longoria
Authors: Undergraduate Ariel Longoria and Adena Rivera-Dundas, Ph.D.
Affiliation: Utah State University

2:30 p.m. Break - William R. & Erlyn J. Gould Auditorium

3:00 p.m.
Title: Reframing Empathy
Presenter: Emily Richael
Author: Emily Richael
Affiliation: Brigham Young University

3:15 p.m.
Title: Navigating Intercultural Competence
Presenter: Alexia Orbezua Black
Authors: Alexia Orbezua Black and Ko-Yin Sung
Affiliation: Utah State University

3:30 p.m.
Title: High-Context Instruction: Boosting Academic Success in Online Composition Courses

Presenter: Jeshua Enriquez
Authors: Jeshua Enriquez and Roberto Rojas-Alfaro
Affiliation: Salt Lake Community College

3:45 p.m.
Title: Transcendence and Benevolence: Navigating Human Values through the insights of Emily Esfahani-Smith and Viktor Frank
Presenter: Lacretia Mills
Authors: Lacretia Mills
Affiliation: Southern Utah University

Language-and Literature

Division Chair: Michael Taylor
Brigham Young University

SESSION A: Room 1008
Creative Fiction and Non-Fiction
Session Leader Angela Banchero-Kelleher
Creative Fiction and Non-Fiction

1:00 p.m.
Title: *from* Befores and Afters
Presenter: Morgan Rose-Marie
Author: Morgan Rose-Marie
Affiliation: Utah Valley University

1:20 p.m.
Title: *from* "Bare My Breast"
Presenter: Megan McComber
Author: Megan McComber
Affiliation: Brigham Young University

1:40 p.m.
Title: *from* "The Imaginary Child"
Presenter: Jessica Mohsen-Crellin
Author: Jessica Mohsen-Crellin
Affiliation: Brigham Young University

2:00 p.m.
Q & A / Audience response

Physical Sciences

Division Chair: Vern Hart
Utah Valley University

SESSION A: Room 1130
Session Leader: Vern Hart

1:00 p.m.

Title: 2D Fluorescence of Phycocyanin Bioconjugation and Its Impact on Light Harvesting
Presenter: Colton Koch and Brecken Shakespeare
Authors: Colton Koch, Brecken Shakespeare, Tyler Holmes, and Jacob Dean
Affiliation: Southern Utah University

1:15 p.m.
Title: A Device to Measure Ionic Strength in a High School Lab Setting
Presenter: Abigail G. Petersen
Authors: Abigail G. Petersen and Christopher F. Monson
Affiliation: Southern Utah University

1:30 p.m.
Title: A Microfluidic Device for the Quantitation of Dissolved Oxygen
Presenter: Jedd Kjar
Authors: Jedd Kjar, Mariah Clayson, Lohra Miller, Samantha Mckay, Madison J. Evans, Cameron Stokes, K. Brayden Bailey, and Christopher F. Monson
Affiliation: Southern Utah University

1:45 p.m.
Title: Analysis of gravitational fields inside of a cavity throughout different dimensions
Presenter: Tate Thomas
Authors: Tate Thomas and Alexander M. Panin
Affiliation: Utah Valley University

2:00 p.m.
Title: Artificial black holes: are they a threat to humanity?
Presenter: Tate Thomas
Authors: Tate Thomas and Alexander M. Panin
Affiliation: Utah Valley University

2:15 p.m.
Title: Can a planetary system survive a host star supernova explosion?
Presenter: Benjamin Miera
Authors: Benjamin Miera and Alexander Panin
Affiliation: Utah Valley University

2:30 p.m. Break - William R. & Erlyn J. Gould Auditorium

3:00 p.m.
Title: Can primordial black holes constitute dark matter?
Presenter: Alexander M Panin
Authors: Alexander M. Panin, Tate Thomas, Tensor Elmikawy, and Enrique Mendoza
Affiliation: Utah Valley University

3:15 p.m.
Title: Hydrophobicity of Micropatterned PDMS
Presenter: J. Fielding Hokanson
Authors: J. Fielding Hokanson, Russell M. Bodily, Kylee Stoddard, and Chris Monson
Affiliation: Southern Utah University

3:30 p.m.
Title: Investigation of the Electronic Properties of Homobinuclear Iridium Complexes
Presenter: Matthew B. Prater
Author: Matthew B. Prater
Affiliation: Southern Utah University

3:45 p.m.
Title: Analysis of Thermospheric Neutral Densities Using GOCE Satellite Observations
Presenter: Agustina Peck
Author: Agustina Peck, Ivana Molina, and Ludger Scheirless
Affiliation: Utah State University

Physical Sciences

Division Chair: Vern Hart
Utah Valley University

SESSION B: Room 1150
Session Leader: Keith Lawrence

1:00 p.m.
Title: Manganese Desert Rose Nanoparticles Formation using FusionRed.
Presenter: Nakelle Goldie
Authors: Nakelle Goldie, Taytum Stratton, Simon Langlois, and Christopher Monson
Affiliation: Southern Utah University

1:15 p.m.
Title: Organic chemistry students' perceived costs and goal orientations
Presenter: Seunghwan Shin
Author: Seunghwan Shin
Affiliation: Southern Utah University

1:30 p.m.
Title: MSR Research
Presenter: Isabella Gonzalez, Angie Ordoñez
Authors: Isabella Gonzalez and Angie Ordoñez
Affiliation: Snow College
1:45 p.m.
Title: Numerical Analysis of Stable Steady state solutions in a Gray-Scott model
Presenter: Samuel Andersen
Author: Samuel Andersen
Affiliation: Southern Utah University

2:00 p.m.
Title: Photo-induced Reactivity of a Model Dipyrrole
Presenter: Samuel Archer
Authors: Samuel Archer, Jaren Meikle, and Jacob Dean
Affiliation: Southern Utah University

2:15 p.m.
Title: Quantum Game Theory and Genuine Quantum Advantage
Presenter: Noah Hebdon

Authors: Noah Hebdon and Jean-Francois Van Huele
Affiliation: Brigham Young University

2:30 p.m. Break – William R. & Erlyn J. Gould Auditorium

3:00 p.m.
Title: Spatial visualization versus memorization differences among sexes in organic chemistry
Presenter: Lauren Jensen
Author: Lauren Jensen
Affiliation: Southern Utah University

3:15 p.m.
Title: The Impact of Winter Deicing Materials on Water Quality in Weber County, Utah
Presenter: Cody Ellsworth
Authors: Cody Ellsworth, Merick Durtschi, and Caitlin Tems
Affiliation: Weber State University

3:30 p.m.
Title: UVU VASIMR Group: Instrumenting Plasma Diagnostics
Presenter: Connor Stong
Authors: Connor Stong, Tessa Miller, Ben Miera, Josh Gibbons, and Phil Matheson
Affiliation: Utah Valley University

Social Sciences

Division Chair: Emily Putnam
Salt Lake Community College

SESSION A: Room 1715
Session Leader: Emily Putnam

1:00 p.m.
Title: Planning for growth: Toward a mixed-use, transit-oriented, walkable urban future on the Wasatch Front
Presenter: Jeremy Bryson
Author: Jeremy Bryson and Charles Leech
Affiliation: Weber State University

1:15 p.m.
Title: Observer Observer on the Wall Who is Most Biased of Them All?
Presenter: Mannie Esplin
Authors: Mannie Esplin, Danielle Larsen-Rife, and Kendra Johnson
Affiliation: Utah Tech University

1:30 p.m.
Title: I Know What you Researched Last Summer!
Presenter: Joshua Milliner and Jai K. Earhart
Author: Joshua Milliner, Jai K. Earhart, Grace Winder, and Xin Zhao
Affiliation: Weber State University

1:45 p.m.
Title: The Demography of Apostasy, Conversion, and Retention Among Members of The Church of Jesus Christ of Latter-day Saints in Utah
Presenter: Rick Phillips
Authors: Ryan T. Cragun, Bethany Gull, and Rick Phillips
Affiliation: University of Tampa, Utah Tech University, University of North Florida

2:00 p.m.
Title: Playing with Race in Dungeons and Dragons
Presenter: Christopher LeCluyse
Author: Christopher LeCluyse
Affiliation: Westminster University

2:15 p.m.
Title: "I Read the News Today, Oh Boy": Oppositional Consciousness-Raising in British Invasion Rock
Presenter: Theresa Martinez
Author: Theresa Martinez
Affiliation: University of Utah

2:30 p.m. Break - William R. & Erlyn J. Gould Auditorium

3:00 p.m.
Title: College Students and Professors Perceptions of a Student with ADHD: Does the Gender Matter?
Presenter: Jackson Thomas Anderson
Authors: Jackson Anderson, Aonika Russell, Rick Anderson, and Kathryn Sperry., Ph.D.
Affiliation: Weber State University

3:15 p.m.
Title: Becoming Fannibals: Identity and Engagement in the "Hannibal" Fandom
Presenter: Francis Vales
Author: Francis Vales
Affiliation: Salt Lake Community College

3:30 p.m.
Title: Analysis of gene expression related to learning and ethanol tolerance development in honey bees
(Apis mellifera)
Presenter: Rachel E. Robinson and Chandler Peterson
Authors: Authors: Rachel E. Robinson, Zachary D. Tadler, Hannah M. Hughes, Chandler M. Peterson, Lindsey R.
Aune, Brennan M. Brown, Jackson T. Anderson, and Timothy E. Black
Affiliation: Weber State University

3:45 p.m.
Title: Trust as the Wormhole of Organizational and Social Change and Transformation: Building Bridges and Accelerating Progress
Presenter: Jonathan H. Westover
Authors: Jonathan H. Westover

Affiliation: Utah Valley University

POSTER ABSTRACTS

Arts
Posters

Title: Contemplating Islamic Geometric Patterns: Using Eye-Tracking Tools to Facilitate a Higher Worship Experience
Authors: Barrett Blake and Brandon Ro
Affiliation: Utah Valley University
"In Islamic art and architecture, geometric patterns often represent the infinite characteristics of God and the unity among believers. This study aims to analyze various patterns to determine their influence on worship experience within mosques.
Due to the rich mathematical, artistic, and religious significance of geometry in the Islamic tradition, recent studies of these geometric patterns seek to understand their construction, simplification, and applications. This research aims to understand better how the built environment influences spirituality using geometric patterns.
This study utilizes 3M's Visual Attention Software (VAS) to analyze images of different geometric patterns used in Islamic art and architecture. VAS uses AI algorithms based on human eye movement patterns to simulate how people objectively view images before bias influences vision with up to 92% accuracy. Using comparative analysis, this research can identify how patterns allow for a rich and contemplative worship experience based on whether they attract focused versus general attention.
By utilizing "heat maps" generated by VAS, this study is designed to determine which patterns attract general attention and which act as distractions. It is hypothesized that the patterns that capture the most general attention are repetitive or non-irregular, while patterns centered on a single focal point likely detract from the ritual experience.
This research aims to uncover how Islamic geometric patterns impact the worship experience by analyzing how unbiased visual attention algorithms respond visually to architectural ornamentation and artistic representations. Through comparison and interpretation of results, this study is expected to increase understanding of how art and ornamentation in architecture can influence the spiritual experiences of worshippers in the context of Islam.

Title: Contextual Synergy: Exploring Architectural Compatibility within Context
Author: Kevin Hart and Brandon Ro
Affiliation: Utah Valley University
The main goal of this study is to explore the intricate relationship between a target building and its surrounding context. Building upon prior research where individuals were presented with a set of images and asked to rate their feelings toward buildings in various contexts, this study takes a more analytical approach. Instead of relying on subjective assessments, visual analysis software will be employed to objectively analyze the images and identify what captures people's attention the most. The software will produce a heat map, showcasing the areas of highest visual engagement, along with the sequence in which viewers focus on different elements. We will be able to see what draws people's attention when looking at these buildings in various contexts. The focal point of my research involves running images from the previous semester through 3M Visual Attention Software(VAS). I will present this program with one of several images, and it will produce visual analysis diagrams. By juxtaposing this data with findings from last semester, I suspect that the out of context buildings will pull focus away from the buildings as a whole which will show the correlation between where people look and their enjoyment of a space. The

VAS will be key in pinpointing aspects of these images that affect user enjoyment.
This data is crucial for architects and designers to understand, to create a more enjoyable experience for the users. Some architects have neglected the context around their structures, as exemplified by some of Frank Gehry's buildings, such as his Dancing House. This building disregards its neighbors and context. This research aims to shed light on how such oversights can impact the overall aesthetic and experiential aspects of a space, and to identify key aspects of a building to be aware of when designing within context.

Title: Designing for Well-being: An Investigation of Architectural Composition on Physical Health
Authors: Jared K. Bradshaw and Brandon Ro.
Affiliation: Utah Valley University
Architecture uniquely distinguishes itself from other forms of art by its ability to create inhabitable spaces through the design of spans, supports, and openings. From the earliest structures, such as those at Göbekli Tepe, they incorporated aesthetic designs to structural forms to resonate with the people of that era. Over time and across diverse locations and cultures the methods of openings have been influenced by available material, laborers, technology, and cultural priorities. This research aims to understand the key factors influencing the engagement and aesthetic appeal of architectural openings as it relates to physical well-being. Research by Esther Sternberg demonstrates a connection between the built environment and physical health; thus, this research will provide architects with the knowledge to design both beautiful and healthy buildings.
This study performed a comparative analysis of stone, brick, wood, concrete, steel, and plaster wall opening systems at multiple opening ratios with various applied aesthetics. A total of 72 openings were examined with the aid of A.I. eye-tracking software. This digital tool eliminated the requirement of large groups of human participants reducing variability in results. The studies images were digitally composed and analyzed yielding graphic results of heat maps and visual interest charts, reflecting the probability of human engagement in the initial 3-5 seconds of viewership.
Building upon previous research performed by Benjamin Varnell and the authors, which hinted to the significance of opening width-to-height ratios, this study employees a broader database anticipating the conclusion of opening proportion and the use of supporting ornamentation as the primary factors contributing to engaging aesthetic openings. This study creates avenues for further investigations on the impact architect’s adoption of the findings have on physical health and well-being. These factors display the importance of design choices when seeking to design beautiful and healthy architectural spaces.

Title: Discovering Ancient Sacredness: Exploring the Astro-Architectural Orientation of Christian Churches in Israel and Palestine
Authors: Kent Miller, Yan-ho Ng, and Brandon Ro
Affiliation: Utah Valley University
Churches have played a major role in society and are very specific to their religion. The very direction one faces during worship is significant. So, is it safe to assume that the orientation of a church would also be significant? Is it possible that early architects understood astronomy which allowed them to specifically pinpoint an orientation for their ancient buildings? Also, are there astronomical inferences that can be derived from said orientations? Determining and surmising first whether the practice of actively orienting religious buildings took place can be a significant and interesting research starting point.
Our project will incorporate archeoastronomy techniques to analyze the orientation of ancient archeology. The orientation and alignment will be determined based on the azimuth, horizon

altitude, and solar declination. To aid in these discoveries, online resources and databases will be consulted. The scope of the buildings will be limited to churches with a prothesis chapel in the Holy Land. Existing archaeological plans and coordinate systems will be compiled and analyzed to determine commonalities between the different religious structures. Both churches and monasteries will be considered in this analysis. The angle of each church will be measured, and the degree of orientation will be determined by measuring coordinates from Google Earth imagery. The churches will then be analyzed based on their type, time, and location to determine whether their orientation was intentional or considered during the time of construction.
It can be assumed that the orientation of the church was significant and considered during construction. Religion is often very rigid and specific in practice. It can be inferred that the orientation which greatly affected construction would be considered. The orientation would affect the location of each of the rooms within the floor plan, which would place significant importance on the orientation of each church or monastery.

Title: Exploring and Mapping Ritual onto the Byzantine Church Complex at Horvat Beit Loya
Authors: Hailey Packard and Brandon Ro
Affiliation: Utah Valley University
The Beit Lehi Basilica, a sacred site steeped in history, has captivated the attention of numerous researchers and archaeologists. This study delves into the ritual history of the site focusing specifically on the ritual of baptism. The aim of this research is to paint a vivid picture of the historical and ritualistic dimensions of this sacred space, particularly the transformative experience of baptism for early Christian converts.
At the heart of this study is exploring the sensory and circulatory elements involved in the baptismal rite. We seek to reconstruct, through meticulous analysis, the immersive journey undertaken by early Christians as they embraced their faith within the walls of the basilica.
The rituals enacted within the Beit Lehi Basilica offer a fascinating glimpse into the religious lives of the early Christian saints. Far from being a mere religious practice, this ritual represented a profound spiritual encounter with the divine.
By synthesizing existing archaeological records and textual sources, this research endeavors to piece together the intricate mosaic of the ritual practiced within the basilica's hallowed walls. Through this approach, we aspire to uncover the possible sequence of events comprising the baptismal ritual and shed light on its broader significance within the early Christian tradition.
Ultimately, this investigation seeks to unravel the experience of early Christian saints within the Beit Lehi Basilica, illuminating not only the intricacies of the ritual practice of baptism, but also the enduring legacy of faith and devotion that permeated its sacred walls. In doing so, we hope to contribute to a deeper understanding of the formative experiences that shaped the early Christian community and continue to resonate through history to today.

Title: Exploring the Impact of the Divine – A Case Study on Sagrada Familia
Authors: Eric Burton, Brandon Ro
Affiliation: Utah Valley University
Sacred architecture is created to leave an impression. To create a space that helps amplify and elevate one’s experience into the spiritual. Sagrada Familia is an example of one of the most complex and unique sacred spaces on the planet, offering a massive space to connect with one’s spirituality. In this project, we are examining the experiences of people who responded to various survey questions and compiling the data to explore the impact that this sacred space had on them. Sacred spaces are meant to be appreciated by people of any faith or belief. They are spaces to embrace spirituality whatever that looks like for the person. As our survey data was gathered at random, we feel it presents an appropriate array of viewpoints on the subject.
The research methodology for this case study involves analyzing survey responses from Julio

Bermudez's database on Extraordinary Architectural Experiences (EAE). We will be comparing and contrasting the responses from the 24 candidates who had an EAE at Sagrada Familia. The survey responses will be compared against Lindsey Jones' three ritual contexts: theatre, contemplation, and sanctuary. This will help us categorize our data into a simple and applicable format.
We expect to find that the data shows that this sacred space does leave an impression. That it is important for these types of spaces to exist, and in learning about them and taking the time to visit them and study them, one can gain a greater understanding and appreciation for sacred and meditative spaces.
While we are focusing solely on Sagrada Familia, the data we analyze will be useful for many sacred spaces. Our study will help demonstrate the significance of sacred architecture and the role it plays in helping us connect with our spirituality.

Title: Healing by Design: Unraveling the Relationship Between Physical Spaces and Emotional Restoration
Authors: Samuel Weisler, Colton Korpi, and Brandon Ro
Affiliation: Utah Valley University
Understanding the connection between physical environments and human well-being has prompted a growing interest in the creation of 'healing spaces'. This is particularly relevant in educational settings. The demands of modern education, coupled with the stressors inherent in academic environments, underscore the critical need for intentionally designed healing spaces within educational institutions. Such spaces have the potential to significantly impact the physical, mental, and emotional health of individuals, creating an ideal environment for learning and creativity.
This research will contribute to the integration of wellness-focused environments in educational institutions by pinpointing the principles of healing spaces. These principles will be identified through the research of articles, books, and previous studies. Next, we will choose a range of local outdoor educational space case studies to measure their effectiveness as healing spaces based on the principles previously identified and outline areas of improvement. The principles will then be applied through a design proposal improving an outdoor healing space at Utah Valley University's Computer Science building.
We hypothesize that the principles identified through research and analysis to be readily applicable to transform existing and future outdoor spaces into healing environments. This will not only increase their utilization but will also positively impact the health and well-being of students, staff, and faculty.
The potential implications of this research extend beyond the Computer Science building at Utah Valley University. Ultimately, this project contributes to the growing body of knowledge on healing spaces and serves as a practical guide for architects, designers, and educators seeking to integrate well-being-centric design principles into our spaces.

Title: Psychitecture: How Light, Life, and Water in Our Built Environment Affects Mental Well-Being
Authors: Sean Donner, Nathaniel Stucki, and Brandon Ro
Affiliation: Utah Valley University
Human Beings are drawn to nature, but we spend the majority of our lives in buildings. Through the implementation of 3M Visual Attention Software and peer reviewed studies, this study illuminates the critical role of light, life, and water as design features in fostering healing environments and improving the overall human experience. As mental health challenges grow within our world population, the designers and architects of our world must strive to understand neuroscience and the human psyche to learn how building elements, or the lack thereof affects

mental health.
After studying research into healing spaces and biophilia, we further studied how bringing light, life, and water into a space can have a calming effect on our minds. We will begin by utilizing Building Information Modeling software to model a room with white walls and plain furniture. We then added plants, natural views, water features, and artificial and natural light all separately to the room and ran each iteration through eye-tracking simulation software to understand how the eye reacts to the changes in the environment. The final image of the room included all the aforementioned elements together and analyzed it with eye-tracking software.
Through this process we expect to find that people's ability to concentrate and their mental well-being will increase with the introduction of natural light, living plants, and water. This research will show that although architecture isn't likely the main cause of the growth in depression and anxiety disorders in our society, building design and urban planning focused on including living elements and natural materials can and should play a role in healing our minds and psyche.

Title: Turning Towards the Lord: Latter-Day Saint Temple Astro-Architectural Orientation
Authors: Desiree Ritchie, Jake Wendt, and Brandon Ro
Affiliation: Utah Valley University
This research analyzes the astronomical orientation of temples following the teachings of the Church of Jesus Christ of Latter-Day Saints. The objective is to document and analyze the orientation of each temple based on its architectural features to determine orientation angles. A specific pattern in connection to the ancient Jewish tabernacle alignment of carnal directions of West and East will be carefully noted and analyzed in comparison to the more temporary Christian alignments. As both religions influence the Latter-Day Saint tradition, we will determine which religious orientation is observed more.
Only temples that have been fully constructed and dedicated by ecclesiastical leadership will be studied. The orientation will be analyzed using archeoastronomy research methods and means. The data will be collected in an excel document and then summarized, along with other observations regarding the architectural elements. Both interior and exterior elements will be examined, such as ornament, sacred room location, tower number and placement, and inscriptions. We expect a variety of orientations as each temple's site and location range from around the world, with most orientations facing East or West. The multiplicity of temple analyses will help establish an overall average pattern in orientation, allowing for a more generalized conclusion.
Analyzing the specific architectural elements will also add increased evidence to intentions for alignment. Future analysis will need to be conducted to accommodate the continual addition of temples that are constructed and dedicated. The continual data and analysis of this research project will inform overall patterns of orientation and insight into the ever-expanding church and its connection with astro-architectural alignments.

Title: What is the Impact of Dramaturgy?
Authors: Dr. Amanda Dawson, Robert Mac Minshew, and Jordan Lockwood
Affiliation: Utah State University
A dramaturg is a person who contextualizes the world of the play via historical research, contemporary knowledge of script structure, etc and shares the research with the cast and crew to further the production experience. We wanted to know the impact of dramaturgy on undergraduate theatre productions. We had the opportunity to serve as researchers and participated as dramaturgs for the first two productions of the year. We are Pussy Riot or Everything is P.R. and Waiting for Lefty. We interviewed three dramaturgy faculty members at three U.S. universities and inquired about their programs and if/how dramaturgy is incorporated into their programs. We created our own dramaturgy resources for our respective shows and sent

a survey to collect feedback on our work.

Biological Sciences
Posters

Title: Elucidation of an Operon(s) for a Group 3 Capsule in *Escherichia coli* Strain M12
Authors: Elise M. Ihnen, Wade A. Stanford, and Michael A. Olson
Affiliation: Snow College
The Enterobacteriaceae family of bacteria includes several medically relevant pathogens, including *Salmonella* spp., *Shigella* spp., and *Escherichia coli* (*E. coli*). The World Health Organization lists Enterobacteriaceae as critical for researching and developing new antibiotics. *E. coli* causes various infections in the gastrointestinal tract and extraintestinal sites. The *E. coli* strain M12 can colonize several mucosal sites in a mouse model, including the mammary gland and urinary tract, and M12 can also evade outside these sites, causing sepsis. An important virulence factor for M12 to cause sepsis is a Group 3 polysaccharide capsule.
Group 3 polysaccharide capsules and closely related group 2 capsules are important virulence factors for other *E. coli* that cause extraintestinal infections. However, the exact role in the pathogenesis and genetic regulation of group 3 capsules is still poorly understood. The cluster of genes needed for the biosynthesis and export of the group 3 capsule in M12 is found on a 23-kilobase island and consists of 3 regions with 17 genes.
Our project investigated whether the capsule genes are transcribed into a single polycistronic messenger RNA (mRNA) transcript controlled by a single promoter or transcribed into shorter polycistronic mRNA segments controlled by multiple promoters. We isolated total RNA in conditions where M12 expresses the polysaccharide capsule. We identified co-transcribed genes using reverse-transcription polymerase chain reaction (RT-PCR) and gene-specific primers, suggesting these genes are located on a single polycistronic mRNA transcript. Our future direction is to explore the regulation of the operon(s) once we identify how the group 3 capsules are arranged in a single or in multiple operons.

Title: Encoding and Processing of Visual Information in the Leech
Authors: Belle Brown & Krista Todd
Affiliation: Westminster University
The medicinal leech, *Hirudo verbana*, possesses a dual visual system consisting of five pairs of cephalic eyes and numerous photoreceptors located in segmental sensilla along its body. In this study, we employed microdissection, extracellular electrophysiology recordings, iontophoretic dye injections, and intracellular recordings to explore the visual processing mechanisms in the leech, focusing on cellular responses to ultraviolet (UV) light stimuli. Our investigations revealed that the leech exhibits robust behavioral motor responses when its head eyes are exposed to UV light, consistent with previous findings of reactions observed with sensilla exposed to UV light. In addition, the behavioral response from the nerve cord showed significantly more activity than the simple encoding of the sensory information of the light from the eye nerve. A novel technique was also developed for dual recording of sensory and behavioral information, allowing action potentials from the eye to be matched with resulting action potentials from the nerve cord. This research significantly enhances our comprehension of the leech's visual system and sensory processing, while also providing valuable insights into broader visual neuroscience. The leech's visual capabilities represent a valuable model for investigating the visual mechanisms in simpler organisms, and it may also inspire innovative approaches in the development of artificial vision systems.

Title: Isolation and Characterization of Bovine Milk Derived Extracellular Vesicles

Authors: Logan Whitney, Elley Colledge, Jaren Wilson, Jonah Pena-Ekker, and Kolbe Mason
Affiliation: Southern Utah University
Extracellular vesicles (EVs) are small membrane-bound nanoparticles that are secreted from almost all cells and play a vital role in intracellular communication. They are commonly found in many organism excretions including urine, milk, and blood. Due to their stability and non-immunogenic properties, EVs may provide a new approach to target drug delivery. Our research aims to develop an isolation protocol for extracellular vesicles from raw bovine milk. Upon isolation, we characterize the extracellular vesicles through several methods. To determine the morphology of the extracellular vesicles we applied the use of scanning electron microscopy, determining the size and shape of the EVs. There are three categories in which the current standards set by the International Society of Extracellular Vesicles (ISEV) center on, those being proteins, lipids, and nucleic acids. More specifically the protein-to-lipid ratio. To determine the surface protein concentration for the isolated EVs we applied the use of a Rose Bengal assay as well as bicinchoninic acid assay. The concentration of lipids is characterized through the use of a sulphophosphovanillin assay. Lastly, the EVs are characterized with an RNA assay involving the use of TRIzol-protocol. The combination of these assays and characterizations aid in meeting the standards set by ISEV. This work will aid in developing a low-cost, high-yield protocol in the isolation and characterization of EVs that may be used in future research.

Title: Isolation of Multi-drug Resistant *Serratia* from Soil
Authors: Kaeson Severe, Landon Severe, and Bryson Baggs
Affiliation: Weber State University
Antibiotics are commonly used to prevent and treat bacterial infections, but due to over-prescription and misuse of antibiotics, bacteria may change in response to the use of these medicines, creating antibiotic resistance. Furthermore, bacteria are able to share that new antibiotic resistance with neighboring organisms through horizontal gene transfer. This project started as a part of our Microbial Ecology lab in the spring of 2022 to identify Tetracyline-resistant bacteria from local soils. We collected our soil sample from a leach field outside of Eden City, Utah. Then we isolated and analyzed three antibiotic-resistant bacteria through serial dilution, growth on Tetracycline-containing media, DNA extraction, DNA sequencing and bioinformatics. These analyses suggested that all three of our Tetracycline-resistant bacteria belonged to the same genus of bacteria, *Serratia*. We performed analyses for resistance to additional antibiotics with a Kirby Bauer plate. A through literature review of the genus has suggested that *Serratia* spp. are generally not known to be antibiotic-resistant, let alone multi-drug resistant. Further genetic testing and research is needed to understand the variables contributing to the alarming rise of antibiotic resistance in soil samples.

Title: Microbial Communities in PCB Contaminated Soils and Potential for PCB Degradation
Authors: Hali Hutchinson, Jerzee Findlay, Gina Fuller, Akir Rowe, and Kingdom Wanjoku
Affiliation: Weber State University
Polychlorinated biphenyls (PCBs) are toxic chemicals popularly used in electrical manufacturing companies from the 1930s - 1970s. PCBs, colloquially known as "forever chemicals", are known to cause significant health concerns and are notoriously difficult to remove from an environment. PCBs are currently banned in the United States; however, they can still be found in the environment due to improper disposal methods. This research aims to better understand ecological networks, genomic novelties, and potential bioremediation of microbes from PCB-contaminated environments. Microcosm cultures were developed to resemble the original conditions of the environmental samples, containing PCB-contaminated mud from Wood's Pond, Lenox, Massachusetts, and filtered pond water with three different treatments: aerobic, anaerobic, and anaerobic with the addition of sulfate. These cultures have been growing for five

months, showing signs of active microbial metabolism (e.g., rust patches in sediment, gas production). The microcosms were used as inoculum for agar containing PCBs, and thirty PCB-tolerant colonies were isolated. In addition, we performed DNA extractions, PCR amplification, and 16S rRNA amplicon sequencing on an Oxford Nanopore MinION DNA Sequencer. Preliminary data suggest that the samples contain genera known to be associated with PCB degradation, such as *Paenibacillus, Clostridium, Rhizobium,* and *Sphingobacteria*.This data will aid further research to determine if and how these microbes metabolize PCB compounds.

Title: Repeatability of Fecal Egg Counts in Wild Horses
Authors: Jaron Dixon, Laura Redfield, and Graham Goodman
Affiliation: Utah State University Eastern
Having been used for over a century, fecal egg count (FEC) analysis is one of the most commonly used techniques for diagnosing and quantifying parasitic infections in domestic animals. Despite its long-standing use, the FEC efficacy is contingent upon the technique employed, each with its unique advantages and disadvantages. In this study, we investigated the precision of centrifugal fecal flotation using Sheather's sucrose solution. This method is commonly used by veterinarians but has not been validated in wild horses. To determine the precision of this method, we homogenized fecal samples collected from twelve wild horses and performed quadruplicate centrifugal flotation analyses in each. Our results indicate that the centrifugal flotation method is precise, with similar egg counts found across samples. This underscores its applicability in both research and clinical settings, offering a dependable tool for evaluating parasitic burdens in wild equine populations. This study not only reinforces the validity of the centrifugal flotation technique but also paves the way for its broader adoption in parasitological surveillance and management programs.

Education
Posters

Title: Writing with Artificial Intelligence Across Disciplines
Authors: Rebeckah Cumpsty, Patryk Hughes, Jazmyne Olson, and Demetrios Pagonis
Affiliation: Weber State University
Generative large language models such as ChatGPT have the potential to impact nearly every academic field. We conducted a study in upper division Literature and Chemistry courses to assess student comfort using large language models, the efficacy of the models in each field, and students perceptions of the future impacts of these models. We found that a semester of exposure to large language models increased student comfort using those models in both courses. The perceived future impacts of generative artificial intelligence varied across the courses, with chemistry students anticipating greater impact within their field than literature students. Student feedback on the use of large language models also varied across disciplines, with literature students identifying a greater number and more significant drawbacks to using a large language model, including the ethical implications of generative AI.

Title: Benefits of Midterm Quizzes in the Classroom
Authors: Willow Park and Dr. Caleb Hiller
Affiliation: Southern Utah University
Chemistry is a difficult subject for many students. Often students don’t perform as well on the exams as they would like; despite thinking they are prepared for the exam. They don’t realize that they might not yet have mastery on a topic, even though they've completed the required homework. In an effort to help students gauge their preparedness before an exam, we have created midterm quizzes and implemented them into a general chemistry course. Midterm

quizzes are designed to help students gain proficiency for troubling/difficult topics. Questions are pulled from a pool, so with each attempt students are presented a slightly different quiz. Students are allowed to re-take a quiz as many times as they would like and receive the best score from all their attempts. To further incentivize students to enter the exam better prepared for success, we have also made the first 10% of their exam score dependent on their midterm quiz performance. The desired outcomes for the midterm quizzes is to help students recognize when they don't understand a topic, encourage them to work at it until they do, to help them understand the type of effort that is required to succeed with difficult material, and ultimately learn how to better prepare for exams. We are performing this study to determine whether students find the midterm quizzes to be beneficial and to identify their intrinsic motivation for taking them.

Humanities Philosophy and Foreign Language
Poster

Title: The State of Student Media at HBCUs and HSIs
Authors: Marianna Lopez, Mckinna Baird, Jean Norman
Affiliation: Weber State University
This research explores the state of student media at Historically Black Colleges and Universities (HBCUs) and Hispanic Serving Institutions (HSIs) given the decline of student media outlets in the past decade due both to the challenges of newspapers in general and the pandemic. It is an attempt to document the presence of student media at these non-White institutions, an effort that does not appear to have been completed before now.
Despite ample research on student media, there is a void of data specific to HBCUs and HSIs. Research also has been conducted on journalism programs at HBCUs (Crawford, 2012; Jeter, 2002; Sturgis and Johnson-Ross, 2019), but not addressing student media at these unique institutions. At least journalism at HBCUs have been researched. Hispanic Serving Institutions, a much newer federal designation, have been the subject of some work in the academy, but little if any research has been done on journalism, let alone student media, in these bilingual institutions. The most current lists available show a total of 666 HBCUs and HSIs in the United States, including Puerto Rico (The Hundred Seven, 2018; Hispanic Association of Colleges and Universities, 2021). This study started by gathering information from the institutions' websites and social media, and by making phone calls to the newsrooms when no information was available on websites or social media. Through this initial step, we identified 220 HBCUs and HSIs with student media, including newspapers, radio stations, broadcasts, and podcasts.
This team deployed a questionnaire to learn more about these outlets to help us shed light on their production operations, publishing styles, diversity inside of the newsrooms, and work methodology. We also have created a unique dataset for future research on student media. We expect to have results from that survey in time for the conferences.

Kinesiology and Health Sciences
Posters

Title: Perceived Motivators and Barriers to Facilitate Exercise Among Primary Care Clinic Patients
Authors: Kelsey Hansen and Saori Hanaki
Affiliation: Weber State University
PURPOSE: To determine what patients' needs are to facilitate regular exercise, including what they look for from their healthcare providers as well as their barriers and motivators to exercise. These are essential in implementing an effective intervention.

METHODS: 371 patients (& gt;18 years) at four local primary care outpatient clinics completed an online anonymous survey consisting of 24 questions including demographics, medical conditions, IPAQ-short form, questions about exercise education by healthcare providers, and barriers and motivators to regular exercise. 268 complete responses were categorized into with chronic disease conditions (CC) and without chronic disease conditions (NCC) to compare how the needs and barriers to exercise differ.
RESULTS: Survey respondents were mostly female (65%), Caucasian (92%), and with postsecondary education (86%). The most common perceived barriers to exercise were low motivation, low energy, and it takes too long. The most common perceived motivators to exercise were having a support system, planning and preparing for exercising in advance, having a partner to exercise with, tracking progress, and positive verbal affirmations. Most in both groups (98%) agreed exercise will improve their health. While the amount of physical activity and sitting hours were similar between groups, fewer CC (53%) believed they participated in a healthy amount of exercise than NCC (67%, p=.007). CC also believed their medical conditions made it hard to exercise (40% CC vs. 15% of NCC, p< .001). More in CC (82%) reported that exercise education provided by the healthcare providers was helpful, compared to NCC (71%, p=.017). Most (92%) who received exercise education from their providers considered that the information was helpful, particularly when it was given verbally.
CONCLUSION: Findings suggest the implementation of social support is sought out in both groups. Particularly among CC, they value the involvement of their healthcare provider in the planning and engagement in exercise.

Title: Physiological Effects of Pickleball Based on Skill Level
Authors: Jasmine Bennett, Chelsea Cavitt, Belal Glab, Zachary Holt, Emma Lapp, Krystal Serrano, Kaitlyn Standifird, James Zagrodnik, and Ryan Zimmerman
Affiliation: Weber State University
Background: The Sports and Fitness Industry Association announced pickleball as the fastest growing sport in the U.S. the last 3 years, with an 185% increase over this timespan. To date only two studies have been conducted on the game and its impact on peoples' health and physiological changes. Purpose: Identify the physiological effects of pickleball based on skill level. Methodology: Participants wore Hexoskin vests that measured heart rate, breathing rate, and step count while they played pickleball. Participants performed a 5-minute rest, 30 -45 minutes of recreational pickleball play with matched skill level players, a Borg Perceived Exertion Scale, and a 5-point enjoyment Likert Scale. Results: 132 participants were successfully tested. Playing pickleball increases breathing rate 39.70% and heart rate 28.46% from resting across all groups. Preliminary analysis indicates that the number of games played (Average: 3.2), Borg Perceived Exertion Scale (Average: 13.22), and Enjoyment Rating (Average: 4.72) remained consistent across skill groups. Age appears to be correlated with skill level as older players had lower skill levels and age decreased as skill level increased. The highest skill level players demonstrated the highest playing breathing rate (35.56/minute), heart rate (132.87 BPM), and cadence (71.63 steps/minute) across all skill levels. Averages indicate as skill level increases so too does playing heart rate and cadence while breathing rate remains relatively consistent, but statistical analysis needs to be conducted to confirm. Conclusion: Pickleball is a highly enjoyable game across many ages in which any age and skill level can have positive health enhancing benefits from participation in game-play pickleball. Skill level may have an impact on the physiological effects of playing pickleball however statistical analysis needs to be performed to confirm, partly to account for known age-related responses to physical activity.

Physical Science
Posters

Title: Co-culture PANC-1 and COS-7: Find methods to effectively grow two distinct cell lines together
Author: Valeria Rivera
Affiliation: Utah Valley University
Although stem cells are found in adult organs to preserve function and structure by remodeling differentiated cells to promote growth and re-generation. Stem cells are target to oncogenic conditions and progenies of tumor progression. Cell lines studies show PANC-1 or pancreatic tumor cells isolated in a flask with Dulbecco's Modified Eagle Medium (DMEM) with low concentration of glucose and sodium pyruvate supported cell proliferation. Similarly, COS-7 cell lines or kidney cells were isolated in a flask with DMEM and promoted growth and survival. Consequently, the cells were split to create more tissue cell lines with DMEM and trypsin for protein hydrolysis. However, PANC-1 and COS-7 will be isolated in the same flask to study the interaction between two different types of cells. Different methods will be tested to grow PANC-1 and COS-7 in the same flask and find more proficient ways to co-culture two distinct cell lines.

Title: Hydrophobicity of Micropatterned PDMS
Authors: J. Fielding Hokanson, Russell M. Bodily, Kylee Stoddard, and Chris Monson
Affiliation: Southern Utah University
We have developed a method to make highly hydrophobic layers of polydimethylsiloxane (PDMS) by dilution in alkane solvent and addition of sacrificial magnesium particles, followed by sonication in hydrochloric acid. Dissolution of magnesium leaves behind pillar-like PDMS structures on the surface of our substrate which exhibit hydrophobic characteristics. Hydrophobicity and layer clarity can be manipulated by changing solvent type, PDMS to solvent ratio, and percent magnesium. Aging PDMS slurry can improve hydrophobicity.

Title: J-Type Aggregation of Cyanine Dye in Aqueous Solutions of Monovalent and Divalent Metal Cations
Authors: Ethan Fielding, Alexander Stewart, and Hussein Samha
Affiliation: Southern Utah University
The effect of monovalent cations of sodium and potassium, and divalent cations of magnesium, calcium, zinc, and cadmium on the aggregation behavior of the cyanine dye (NK-3796) in aqueous solution was investigated using UV-vis spectrophotometry. J-aggregates are formed in the aqueous solutions of cyanine dye upon incremental addition of salt solutions. The appearance of a narrow single red-shifted band at 652 nm in the UV-vis spectra suggests that the dye monomers are quantitatively converted to J-aggregates in the presence of inorganic salts.

Title: Organic chemistry students' perceived costs and goal orientations
Authors: Seunghwan Shin and Sydney Coates,
Affiliation: Southern Utah University
Organic chemistry is one of the most feared and failed courses in the undergraduate curriculum. Consequently, studying what makes this course "too difficult" as perceived by students is worthwhile because these perceptions result in many students not considering STEM majors because they require chemistry courses. Our research group has investigated perceived costs in general chemistry, and this study expands our understanding of these constructs in organic chemistry. Students' perceived costs of a chemistry class can be many, such as task effort, loss of valued alternatives, emotional, and others. These costs might be overcome by students' interests and goals, yet the level of perceived costs might have a lasting impact on the students' overall perception of chemistry and their desire to pursue chemistry and other STEM careers in the future. In this study we investigated the mentioned subclasses of perceived costs, other salient

perceived costs, and mastery or performance goal orientations and the impact these constructs may have on students' experiences in organic chemistry classrooms. Expanding on a previous study in general chemistry, we present the results of interviews we conducted with students in this class. Our results reveal that students struggle with the content, pace, and overall difficulty of the material. These results are not surprising; however, we also uncovered the students' deep desire to learn and understand the material, the motivating effect of having a good relationship with their professor, and many other themes that emerged from our conversations.

Title: *Semivolatil*e Organic Compounds Throughout Utah
Authors: Sara Nielson, Hannah Verhaal, Hafid Bahena, and Casey Reeder
Affiliation: Weber State University
Semivolatile organic compounds (SVOCs) are a key class of human emissions that negatively impact air quality in Utah. This project tackles four aspects of SVOC chemistry, including their regional concentrations, their presence in chemical products, their transport indoors, and the challenges one encounters when measuring them from mobile platforms.

Title: Spatial visualization versus memorization differences among sexes in organic chemistry
Authors: Derek Baker, Lauren Jensen, Dagney Goodfellow, and Seunghwan Shin
Affiliation: Southern Utah University
Differences in sexes have long been speculated, yet their application in chemistry learning environments has not been well researched. Literature shows that males have larger cerebral volumes for visual capacities more often associated with hands-on projects and courses than female brains. And female brains have larger cerebral volumes for areas associated with memorization and socialization which more highly correlate with lecture-based learning. Given the high attrition of women in chemistry courses, we investigated this phenomenon in organic chemistry topics that are highly visual (e.g. chirality, Newman projections, chair conformations, bond rotations, etc.) and topics that require more memorization (e.g., functional groups, energy values associated with sterics, nomenclature, definitions, etc.). We conducted an anonymous survey with students who are currently enrolled in organic chemistry or have taken organic chemistry in the past. The questions varied in difficulty as well as levels of visualization or memorization required. The results show correlation with the literature that males score better in the visual-based questions, and females score better in the memorization-based questions. In addition, we conducted interviews with male and female students in organic chemistry, and found that the female students self-generated various techniques to visualize 3D rotations (e.g., use their hands, draw arrows, etc). While most male students didn't adopt these techniques because they were able to do the 3D rotations in their head. With these results, we plan to design course interventions to bridge the gaps between the extremes of visualization vs. memorization-based concepts for the students.

Title: Synthesis and Electrochemical Analysis of [Ir(ppy)2]2BPM
Authors: Dylan Tatarian, Matthew B. Prater
Affiliation: Southern Utah University
Binuclear metal complexes have garnered interest in recent decades, yet numerous details remain unexplored. While many enzymes leverage binuclear catalysis in their processes, progress in applying this phenomenon outside of enzymatic contexts has been limited. Means of improvement over mononuclear complexes generally remains unexplored. Homobinuclear complexes, featuring two identical metal centers within a single complex, pose intriguing challenges, particularly in elucidating exact mechanisms governing traditional organometallic steps such as oxidative addition, migratory insertion, transmetallation, and reductive elimination. Recent advances in the synthesis of Ir complexes offer a promising avenue for construction of

novel homobinuclear complexes tailored to investigate electron transfer mechanisms, which we propose will offer insight into organometallic steps.
This project marks the initial foray into this research domain. We synthesized the parent complex to facilitate its analysis and are in the process of creating an array of homobinuclear iridium complexes to explore the impact of substituents on **Δ**_o. These endeavors serve as the preliminary stages of a broader investigation into binuclear complexes.

Title: Synthesis of (E) - Phenylocten-3-ol from 1-Octyn-3-ol Through TBS Protection, Hydroboration, and Palladium- Catalyzed Cross-Coupling
Authors: Raymond Brex Delray, and Dr. Nathan Werner
Affiliation: Southern Utah University
The 9-borobicyclo[3.3.1]nonane (9-BBN) catalyzed hydroboration reaction of terminal alkynes enables the synthesis of aryl- and alkyl-substituted vinylboronic acid pinacol esters. These vinylboronic acid pinacol esters are useful reagents in palladium-catalyzed Suzuki-Miyaura cross-coupling reactions which are commonly used in the synthesis of pharmaceuticals and fine chemicals. In this work, we evaluated the tolerance of the 9-BBN-catalyzed hydroboration reaction with alkynes bearing alcohol, ester and silyl ether functional groups. It was found that propargyl alcohol, and the acetyl and benzoyl ester and tert-butyldimethylsilyl (TBS) ether derivatives of propargyl alcohol do not undergo productive 9-BBN-catalyzed hydroboration reaction with pinacolborane. The secondary alcohol, 1-octyn-3-ol, was then evaluated. It was found that the tert-butyldimethylsilyl (TBS) ether derivatives of 1-octyn-3-ol underwent productive 9-BBN-catalyzed hydroboration reaction with pinacolborane in 61% yield. The hydroboration product, (E)-3-[tert-butyldimethylsilyloxy]octenylboronic acid pinacol ester, successfully underwent palladium-catalyzed cross-coupling reaction with bromobenzene in 66% yield. The TBS protecting group was then removed with tetrabutylammonium fluoride in 66% yield.

Title: The Stability of Extracellular Vesicles
Authors: Elley Colledge, Logan Whitney, Jonah Pena Ekker, Kolbe Mason, Charlee Cannon, and Jessica Pullan
Affiliation: Southern Utah University
Extracellular vesicles (EVs) are secreted from cells and play a vital role in the human body's intracellular communication.1 EVs can easily pass through different barriers because of their size (less than 200 nm), and they contain a lipid bilayer that is embedded with proteins.(2,3) These traits have caused EVs to become an interest in drug therapy and the EV field has grown rapidly. Since the extracellular vesicle field is still being researched, there is no current set standard for long term isolated EV storage and thawing. We are running a stability study that will cover different temperatures and thawing techniques over 12 months. An aqueous two-phase system is used to isolate the EVs, then they are stored at -80°C, -20°C, 4°C, and room temperature. At time markers, the isolated EVs are thawed using different conditions and then imaged by SEM. We have found that isolated EVs stored at -80°C are uniform and organized at the time points one month and six months. In addition to morphology, size distribution, protein functionality, lipid concentration, and nucleic acid presence will be tested in the future.

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drug carriers for cancer therapy. Molecular Pharmaceutics 2019; 16:1789-1798.

Title: Timing of Magmatism and Genesis of Mineralization in the Silver Island Mountains, Western Utah
Authors: Kara Olsen, Logan Knight, Aybree DeGrange, Jon Henroid, and Elizabeth Balgord
Affiliation: Weber State University
The Silver Island Mountains, located in western Utah near Wendover NV, contain the geologic record of at least 500 million years of the evolution of western North America. The purpose of this project was to understand the timing, genesis, and evolution of mineralization, specifically metal deposits, in order to assess the viability of economic development in the area. We accomplished this by mapping faults, fractures, mineral deposits, and chemical alterations in the field. The majority of the exposed units in the map area are Paleozoic marine rocks, with abundant fossils, including crinoids, brachiopods and stromatoporoids. Those units were intruded into by undated igneous body. The study area is bisected by a north striking, west dipping, high angle normal and transform fault and an east striking, south dipping moderately steep normal fault. Faults and fracture sets with localized chemical alterations are consistent with a hydrothermal origin suggesting an epithermal mineralization pattern in the area. Numerous skarn style deposits were identified throughout the field area particularly east of the N striking fault along the intrusion. Samples were collected from the intrusion and zones of hydrothermal alteration for further analysis. We observed crystalline structure using the scanning electron microscope, determined elemental composition using energy dispersive X-ray analysis and X-ray fluorescence spectroscopy and identified additional crystalline structures and phases using X-Ray diffraction spectroscopy. There are zones of highly altered rocks and potentially valuable ore deposits, including the minerals chalcopyrite, malachite and jasperoid bodies. Timing of mineralization is bracketed by the age relationships between the intrusion and cross-cutting faults. Our analysis shows there are some potentially viable minerals in this area and it is worth continued study to assess economic viability.

Title: Testing the use of lichen cover on rock lines associated with a prehistoric hunting site (bison jump) in NW Wyoming to date their construction
Authors: Cadence Truchot, Emma Krolczyk, Tammy Rittenour, and Todd Guenther
Affiliation: Utah State University
This research investigates the use of lichenometry to provide age control for archeological features. The Wiggins Fork Bison Jump Complex, a prehistoric aboriginal hunting site in NW Wyoming, was used repeatedly to run buffalo off escarpments and steep slopes to supply tribes with enough food to last the winter. My research investigates the use of lichen cover on piles of placed rocks to date cairn lines associated with the jump, as well as the jump funnel at the mouth of the jump that routed the bison off the escarpment. Cairns are piles of ~2 to 15 rocks that would keep the buffalo in a designated area during this communal hunt process. It is expected that older rock constructions will have greater lichen cover. This can be tested by comparing the percent cover of the rocks by lichen to Optically Stimulated Luminescence (OSL) dates collected from under the same rock cairns as part of MS thesis research by E. Krolczyk at Utah State University. OSL provides an age for the last time sediment was exposed to light and should provide a date for when the rock was set on the land surface. My research approach of using lichen growth to provide relative cairn construction ages is faster, less costly, and less disruptive of the delicate archaeological features than the use of OSL dating, which requires lifting of rocks to date the sediment underneath. In general, lichenometry from photographs will cause less destruction of archaeological sites, which are viewed as living features and sacred to tribes. The results of this research will provide guidance on the use of lichen-cover to date archaeological rock features at the Wiggins Fork Bison Jump Complex and similar sites throughout the region.

Social Sciences
Posters

Title: Are You a Cheater?
Authors: Christopher Lowery, Brittney Hoaldridge, Chandler Barclay, Dafne Mejia, Romeo Tiumalu, and Nick Marsing
Affiliation: Snow College
Infidelity has been a widespread issue facing relationships for many years. Several studies have shown that poor communication and betrayal can damage a relationship, and this can lead to separation or divorce. The American Psychological Association recorded that 20-40% of all divorces are linked to an instance or continuation of infidelity. A big question that arises from this issue is: How do we reduce infidelity? After reading the results of the relation of adultery to poor communication, our group decided that a potential solution would be breaking down the definition of cheating. We believe that a survey would be a good way to get different people's ideas on what unfaithfulness is to them. Our survey will have a wide range of questions from different categories of cheating. Those categories consist of physical, mental, emotional, online, and other forms of disloyalty. Ideally, we want as many different groups of people as possible to take our survey, including people from different ages, ethnicities, and sexuality groups so we can have many diverse results. The goal of our project is that after people take our survey, they will open up conversations with their partners that will help establish what infidelity means to them. We are aiming to help people have fewer arising problems from betrayal in their relationships. We also set out to gather more research that supports the claim that the definition of cheating has changed throughout generations. This definition will continue to change throughout lifetimes so, it would be smart to start opening the ability to define adultery. We hope that this survey opens up that very conversation about how important it is for people to talk about these sorts of things when they get into relationships. Hopefully, this project will live on to help people learn and communicate about cheating.

Title: Creative comparison of human and AI lyrics
Authors: Nathaniel Bruse, Daniel Lewellen, Joshua Olsen, Isaak Thompson, and Nick Marsing
Affiliation: Snow College
In recent years, the rise of artificial intelligence has become a threat to the arts. AI has recently made bounds in the quality of content creation, reaching the level of human-made writings. There has been much research into algorithm aversion, and the inaccuracy that humans have in determining artificial intelligence generated content (AIGC).
One prominent study showed how much artificial intelligence generated music can affect emotions. These sections of music did not have lyrics however, and as any Taylor Swift fan will tell you lyrics are just as important as notation to relate with a piece of music. Other research has been done on poetry and AI vs human capability, but nothing has been done specifically on lyricism.
Survey students to test if they can tell the lyrics apart from human-written lyrics. The lyrics we will have are Student-written lyrics, basic AI lyrics, trained AI lyrics, and regular song lyrics. And ask them why they think that it’s AI made or Human made. Each Question will have 3 parts. The first part will ask about whether or not they think the provided song is written by a human or an AI The second part is asking them how confident they are in their answer. And the third part is asking them why they answered what they did.
It is believed that participants will be inaccurate in determining AI-generated lyrics from human-written examples. This is due to the recent advances in AI, making it possible for AI to create content on the level of humans. However, it is conversely believed that participants will be the

most accurate in choosing base AI's lyrics, as that's the sample with the most grammatical errors. It is expected that participants' reasons for their choice will include topics of grammar, emotion, and originality.

Title: Does exposure to true crime media influence our safety behaviors?
Authors: Tayla Bair, Lilly Binks, Sami Flanagan, Seli Ha'angana, Taesi Higgs, Nick Marsing
Affiliation: Snow College
Previous researchers have talked about and experimented on the connection between personalities and true crime, or the ethical dilemma of true crime, but not one research is linked or connected to true crime and safety measures. This led us to form the research question of whether True Crime and exposure to true crime affect safety behaviors. Does watching or consuming true crime influence safety behaviors especially in college students? The study will be narrowed down to college students therefore narrowing our true crime content to college students as well. Interestingly, when true crime first became a phenomenon, women were highly drawn to it and not surprisingly, to this day, surveys always resulted in women being more interested in true crime versus men. We will make sure that we gather a fair amount of both men and women in our research and make sure that our definitions of "safety measures" are the same. We will have our participants listen to a podcast of true crime based on college students and watch a true crime documentary. We will observe their safety behavior, if any, before or when they are on their way to the study location. We then will measure their reactions and the safety measures they took after that. Such safety measures include safety objects such as pepper spray or a pocket knife. Others include if someone will be on their phone while walking alone at night or checking the back of their seat before getting into their car. We expect at the beginning of this research that women would tend to be more cautious and relay more safety behaviors such as owning self-defense objects such as pepper spray or a flashlight. For men, we expect that they would not have any safety measures or safety behaviors.

Title: Does ones Religion and Religiosity effect if you are more likely to believe in conspiracy theories.
Authors: Alec Mitchell, Roman Gause, and Nick Marsing
Affiliation: Snow College
Conspiracy theories have become more of a widespread term that is thrown around to explain the unexplained. It provides people answers to events that aren't fully explained by the parties involved, or evidence does not provide the answers that people need. Theories like "JFKs Assassination" to less common but still notable ones such as "Birds aren't real". While these events still happen, researchers ask the question: "What is the underlying cause for belief in these conspiracy theories?" And can other outside forces influence one's ability to believe in such things? Many studies show a wide range of explanations for why people believe or do not believe in conspiracy theories. And what these people do or do not have in common. One thing they have in common is their belief or non-belief in Religion. Studies show that religious individuals that are a part of a religious community have a tendency to primarily rely on information from their community and are skeptical of outside sources. Our study focuses on if ones religious beliefs can impact their views on alternate explanations for historical events that have taken place. We will be focusing on the last 100 years of events and sending out a survey to over 300 people to gather the information needed to see if there is a strong correlation between ones belief and activity in their religion and if they are more keen to believe in conspiracy theories. This survey will be distributed using QR codes around the school and a program named Qualtrics to people all over the country (USA). The questions will range from demographic questions such as: Race and religion/religiosity, and will then ask about a range of conspiracy

theories from the past 100 years. They will answer on a scale from 1-5 on how believable they are.

Title: Exploring Stress Responses to Spine-Chilling Narratives
Authors: Olivia Larson, Bailey Cox, Jacob Williams, Ash Ellenburg, and Nick Marsing
Affiliation: Snow College
Scary stories have been a common occurrence for the entirety of human history. Throughout cultures and periods, different stories and monsters have brought fear to all age groups. How do geographical location and proximity influence the creation, evolution, and cultural significance of scary stories? What mental factors contribute to the varying perspectives of fear linked to specific places in different cultures? While there are a variety of research studies developing into fear and fear responses, examiners want to start the research on what aspects of a scary story make it â€˜scary.' Specifically, examiners will focus on how location, and one's proximity to the scary story, influence the stress response their body has to the story. The research consists of having volunteers listen to pre-recorded stories instead of reading the stories to limit external factors. The stories will be based on common ghost stories and monsters here in the US. Why are individuals scared of stories such as La Llorona or vampires? Four stories will be used in total. One story will be a neutral story to give a baseline. The other stories include the Wendigo, the Skinwalker, and a ghost story local to here in Sanpete County, Utah, where the experiment will be performed. The Wendigo is a story more commonly known in the eastern United States. The Skinwalker is based in the western United States. By using Galvanic Skin Response Sensors, researchers plan to see if the location of where the story takes place influences one's fear response. As well as research where an individual has grown from a child to an adult influences their reaction to the stories. The expected results are for an individual's location and proximity to correlate directly to the designated story.

Title: Mythical Threads of Love
Authors: Jadyn Littlefield, Tylee Leishman, Elise Peery, Aiyana Santiagio, and Megan Parodi
Affiliation: Snow College
There have been different forms of love that have been shown all throughout time. Love has been portrayed with ideals that are, for the most part, unreachable. How have individuals skewed their idea of love, specifically regarding how their religious beliefs influence the acceptance of "love myths"? To find the answer to this question, a survey is what is going to be created. This survey will ask them questions about what they believe about love. The participants won't know that they are being asked about "love myths". Due to the culture, region, and popular religious demographic of the area where the survey is being created, opportunities will be given to individuals through snowball methodology, social media, and other forms of contact to provide a mixture of answers. Providing a mixed religious and cultural background to the results of this experiment is crucial to receiving unbiased and accurate results. A Spanish version of the survey is also going to be provided, and translated correctly so the phrases do not lose meaning during the translation, to those who need it in order to reach the larger demographic presented earlier. The outcome for this research is expected to be that Christians will have a stronger belief in these love myths than other religions. As well as the more active an individual is in a religion will make them believe in the love myths more.

Title: Stigma Management Communication (SMC): A Systematic Review
Authors: Tia Zebe and Sydney O'Shay
Affiliation: Utah State University
A communication theory, Stigma Management Theory (SMC), founded by Rebecca Meisenbach (2010), describes the different methods individuals use to manage stigma communicatively.

Meisenbach's (2010) SMC strategies were found to be used by adult people who had family members who misused opioids, and these strategies were accepting, avoiding, explaining, and challenging (O'Shay, 2023). Stigma affects everyone. According to Falk (2001), stigma will always exist, allowing people to ascribe differences that include or exclude people into in-groups or out-groups. People manage stigma in many ways, including through humor and support (Han et al., 2023; Lash, 2022).
A systematic review of Stigma Management Theory (SMC) was conducted to compile existing knowledge on how people communicatively manage stigma. This systematic review aimed to answer the research questions: How have applications of SMC illuminated, refined, extended, and contradicted the theory? And, what Critiques of SMC have been raised by existing applications of SMC?
To conduct this literature review, the research team used Covidence, a systematic review software that allows a research team to screen articles according to inclusion and exclusion criteria that the research team determines. In the first round of screening, 661 studies were imported to Covidence, with seven duplicate articles identified manually and 280 duplicate articles identified by Covidence. After the first round of screening, 374 studies were left to be screened for the second round. Of these 374 articles, 290 studies were found to be irrelevant. This left 88 studies to be assessed for eligibility. Of those 88 studies, 18 were found to meet the study's inclusion criteria to be used for the systematic review.
Results and analysis are still in development but will be complete and ready for presentation by the UASAL conference.

Title: The French Media on the Marshall Plan
Author: Eve Harding
Affiliation: Brigham Young University
This paper explores the French media reaction to the Marshall Plan during April of 1948 in Paris with express focus on two main newspapers. Excerpts of these two newspapers were examined in the original language of French on microfilm, and then translated by the papers' author. The two rival papers are Le Monde and L'humanité, one with a positive outlook on the plan and the other with a negative. The purpose was to explore what the media was conveying to the public and how they regarded the plan, as a hoax or as an act of charity. Le Monde presented the plan positively and praised America for their benevolence, L'humanité, regarded the plan as another way of bringing France into foreign slavery/occupation. This paper seeks to prove that the second newspaper lacked evidence to support their claim that the plan was not beneficial to the nation and examines the relationship of the two newspapers and their editors and the way that relationship influenced the papers ideologies. In conclusion the Marshall Plan was beneficial and Le Monde was better able to support their argument than L'humanité.

Title: We are not alone: Examining the impact of a tween-teen diabetes day camp
Authors: Heidi Blaylock, Carter Leuba, Aiden Hill, Christina Aguilar, Carla Cox, Eddie Hill (Weber State University), and Bethany Arrington (Old Dominion University)
Affiliation: Weber State University
Type 1 diabetes (T1D) is a chronic disease that influences all health aspects. The self-determination theory (SDT) suggests that three psychological needs of competence, autonomy, and relatedness are necessary for motivation to engage in healthy behaviors. Through medical specialty camps, these needs can be met by educating campers on how to manage T1D and realize they are not alone. The volunteer-based, five-day, inaugural REACH teen/tween camp for youth with T1D was held at WSU. Camp activities were engineered around the three basic needs described by the SDT. These needs were promoted by physical and educational activities, and meeting friends. A pre and post evaluation was given. Two measures were significant with

autonomy being the greatest, (M=3.93, SD= .75) to post test (M=4.49, SD= .56), with t(25) = -6.258, p= <.001), effect size r = 1.2 Blood glucose for Time in Range (TIR) was collected through an online platform that allowed staff to monitor campers' levels, with the week's average being 152 mg/dL. This study explored the use of SDT to examine the effectiveness of a diabetes camp for youth and hopefully result in better physical and emotional health thus mitigating the risk of complications.

Oral Presentations
Arts
Oral

Title: The power of art: Increasing multi-cultural consciousness through an online global art workshop
Author: Ran Qi
Affiliation: Southern Utah University
This research delved into the impact of two interactive virtual art workshops developed for college students in the United States and China. Students from the two countries participated in interactive learning activities to create an art project that reflects specific global issues and multiple cultures. The workshops were conducted using the internet, and asynchronous video conferencing. An essential component of the project was a virtually collaborative art-making activity designed to promote students' multicultural consciousness and global awareness while developing their artistic abilities. Students from two countries participated in interactive learning activities with peers for two weeks to create an art project. Upon completion, most students reported that they enjoyed learning the different viewpoints and art-making techniques from other countries, and pointed out that this interactive global art workshop enlivened cross-cultural interaction, broke cultural stereotypes, promoted a higher level of understanding and critical thinking about global issues, and enhanced multicultural awareness and tolerance.

Title: From East to West with Ruth. St. Denis
Author: Alyssa Arnold
Affiliation: Utah Valley University
On the brink of the twentieth century, the Progressive era was a time of change and innovation in all areas of culture (Lumen). Women were coming to the forefront as new leaders in modernization, not only in the home but at work as well. New modern dance forms were emerging to match the scale of change. Therefore, dance reflects culture (Kealiinohomoku 1). Traditionally, the Western had anxiety over the body refusing to use it in ritual, an idea adopted from the GrecoRoman ancients (Jonas 17-18). Westerners had a yearning for a display of expressivity and the exotic Art Nouveau after being saturated with an "empty" European ballet (Penney; Reynolds 3). Enter Ruth St. Denis and her incorrigible creativity to transform from an Egyptian goddess, to a peacock, to a Japanese courtesan, to a flowering tree before vast audiences (Robbins; Reynolds 21). New Historicism is the frame of analysis that explains how dance reflects culture by looking at the time and context dance took place (Purdue). A qualitative examination of Ruth St. Denis' choreography in various video clips and still photographs in the early 1900s against the backdrop of the West's new view of the body, Orientalism or anything having to do with the exotic locales of the Far East, and spirituality will provide new knowledge of how one woman single handedly brought exoticism to America through specific movement, dress, and expression. If dance reflects culture, then Western values were superimposed on an Eastern dance form. A critical analysis of Ruth St. Denis' Eastern inspired dances, Nautch, Radha, Cobra, Incense, from the New Historicism perspective will demonstrate the imposition of Western Christian values on an Indian dance form.

Title: Ballet, Film, and Mythology: A Focus on Persephone
Author: Samantha Marx
Affiliation: Utah Valley University
Goddess of Spring and Death (2023) is a dance for film co-created by three Utah Valley University undergraduates focusing on retelling of the Ancient Greek myth of Persephone and Hades through a new perspective. Throughout time, stories are often retold; however, this myth has rarely been told from Persephone's point of view. With a collaboration between the two disciplines of ballet and film, there was opportunity for a more intimate viewing of narrative-based choreography with creative camerawork and post-production editing. The purpose of this presentation is to disseminate research from the dance for camera: Goddess of Spring and Death (2023) in addition to how this collaboration affected both disciplines. The traditional myth tells of the story of Hades kidnapping Persephone to the Underworld and marrying her, typically focusing on the actions of Hades and Demeter. However, the researchers' collective focus of this narrative was to include Persephone's agency. The narrative still follows a similar plot to the original myth; however, Persephone's character was more developed as she was given the agency to go into the Underworld and eat the pomegranate of her own free will. An unlikely format for this narrative, the respective areas of ballet and film have become a popular collaboration, especially post-COVID. Stereotypically, narrative ballets are commonly performed on a proscenium stage while film works with verbal narratives. Both disciplines were challenged to explore and collaborate together in a field that is not yet standard. The experience for all on the project, including the dancers and crew, was that of gaining new learning that can be applied in the post-graduate fields.

Title: Frederic Balazs and Ernst von Dohnányi: From Budapest to the American Southwest
Author: Jackie Bodily Biggs
Affiliation: Brigham Young University
Hungarian American musician Frederic Balazs (1920–2018) enjoyed early success, receiving the prestigious Reményi prize and becoming the youngest concertmaster in the history of the Budapest Symphony at age seventeen. He graduated from the Franz Liszt Academy with honors and later worked as a concert violinist, composer, conductor, and professor in the United States. Despite these achievements, however, Balazs's life and work have yet to attract scholarly attention. This paper represents perhaps the first attempt to bring such attention by examining Balazs's interactions with legendary Hungarian musician Ernst von Dohnányi (1877–1960). Their associations not only paint an introductory picture of Balazs but also provide insights into Doh's far-reaching influence and the emigration experiences of Hungarian musicians. Balazs studied with Dohnányi in Budapest, observed his conducting of the Budapest Symphony, and felt that he possessed a spiritual kinship with Liszt. Dohnányi later helped Balazs emigrate to the United States at the advent of World War II. Once there, Balazs heard about Doh's courageous defense of Jewish musicians during the war and followed suit by collaborating with African American musicians during the Civil Rights Movement. Balazs also defended Doh's romantic compositional style. When Dohnányi left Europe at the war's end, Balazs extended both empathy and a concert invitation to Texas, where they performed together. Despite the challenges of emigration, both musicians employed optimism and humor in their music and daily life.

Title: Researching Sound Deprivation with Classical Music
Author: Chastalynn Chamberlain Martin
Affiliation: Utah Tech University
Many in the Deaf community have several ways to enjoy music including lyrics. But what happens when lyrics are taken away? Lack of hearing does not necessarily mean that one is less-

able than someone else. Facial cues are not only a big part of American Sign Language communication but also classical music. Both are described as a way to feel and express emotion. Additionally, music can be enjoyed by knowing its functions and how to adequately compose a piece. Taking disability in mind, music is also a way to surpass limits and increase potential. This paper explores a sound-deprived performance of Dohnanyi's Serenade in C Major and how the musicians involved had to work together with cues and emotion to create a worthy performance piece for the musicians themselves as well as a hearing audience.

Title: Seeing is not Always Believing: An analysis of the score errors in the Adagio from Louis Vierne's 3rd Organ Symphony
Author: Connor Larsen
Affiliation: Brigham Young University
One of the most prominent organ composers is a 20th century composer named Louis Vierne. Vierne's works are written in the dramatic French tradition, with a lot of focus given to articulation, registration, and interpretation. Unfortunately, in all these notes are many errors left behind due to Vierne's poor eyesight. This paper focuses on three types of score errors within Vierne's works, and probable solutions to each. The three types of score errors are: inaccurate editorial additions, misplaced score markings, and inconsistencies in phrasing marks. These three types of errors are especially prominent in the lyrical fourth movement Adagio of Vierne's Third Symphony.
Vierne always sought for clarity, so in identifying and navigating errors that consideration should be paramount as one prepares and studies his music. Despite being removed by over 100 years by the original composition of the piece, there are pieces of information left, that when pieced together provides a clearer picture of Vierne and his works. This list includes: interviews with some of his students, performances by those who have been trained within the French tradition in the 20th Century, logical assessments of markings in the score, and tendencies of Vierne that can be found in his other compositions.
Undeterred by these challenges, Vierne continued to compose, and his compositions are widely accepted as 'canon' in the organ repertoire. As one equips and educates themselves not only in reading music and markings from the score, but truly understanding the true intentions of Vierne, a performer can unlock a performance that reflects the composer's true artistic vision despite any of the disabilities or challenges he faced in his life.

Title: Identifying Chords in Contemporary Music
Author: Leonardo Sanjinez
Affiliation: Utah State University
North American music education typically involves a series of Aural Skills classes that help students learn to identify chords by ear. Many aural skills classes do this through harmonic dictation, but as this is primarily a method of assessment, it doesn't necessarily help students learn. In addition, since it focuses primarily on classical styles, it may not be relevant to all music. In this project, I engaged in an extensive literature review to better understand how students learn this ability and designed an experiment to improve teaching methods related to contemporary music. I read and understood many teachings such as Gestalt, which is hearing the wholeness of the chord. There are other methods such as isolating the bass note or using a test to check the chord such as the Do Ti test. A study was designed to compare student's ability to analyze chords in a test and a contemporary setting. It included multiple listening examples of songs that are like harmonic dictation, and songs that don't follow the classical norms. It also included a survey about the student's experience in identifying chords, and what methods they seem to use. This study will help us understand whether harmonic dictation works with contemporary music.

Biological Sciences
Oral

Title: Using Transfection as an Annotation-free Ground Truth for Training Noninvasive Metastatic Cancer Mapping Methods
Authors: Drew Allred and Vern Hart
Affiliation: Utah Valley University
Surgery remains one of the most common and effective treatments for a variety of cancers, especially those that form solid, localized tumors such as breast and colorectal cancers. During these treatments, the palpable lesion is surgically resected with the assumption that cancerous cells have metastasized to nearby tissues. As such, surgeons will excise a tissue margin surrounding the tumor in hopes of removing any additional cancer, thus preventing further spread of the disease. However, this process is time-consuming and requires specialized expertise from a trained pathologist to verify that all cancer has been removed. Furthermore, if the pathology report indicates that not all cancerous cells have been extracted, additional follow-up visits and surgeries are typically required. In recent years a number of non-invasive technologies have been developed which seek to map cancerous cells in whole tissues. Training and validating these methods still requires a reliable ground truth, typically provided by an annotated pathology report. We propose a simpler model in which two cell species were co-cultured to provide a heterogeneous training sample. One of these species (PANC-1) was transfected with a vector coding for a fluorescent marker to represent healthy tissue, while the other species (COS-7) remained untreated, representing cancerous cells. An experiment was then conducted using a coherent diffraction imaging (CDI) system, in which laser light incident on the cells was used to quantify phase shifts produced by each cell type. Fluorescent microscopy was then used to create a map of transfected and non-transfected cells for comparison. Results will be presented demonstrating a correlation between the phase shifts produced by the two cell types and the corresponding fluorescent images, potentially facilitating optical cell identification without the need for pathology.

Title: Bioprospecting of Antibiotics from Soil Bacteria
Authors: Cori Bailie and Dr. Olga Kopp
Affiliation: Utah Valley University
Antibiotic resistance is a growing global crisis. Nosocomial infections are concerning due to the increase in antibiotic resistance, making it essential to focus our efforts on discovering new antibiotics. Soil is teeming with a rich microbial life and many of those microorganisms produce antibiotic compounds as a defense mechanism against other soil bacteria. In the 1940s, Streptomycin was discovered in a sample of New Jersey soil. Malacidins were discovered in 2018 by researchers studying gene clusters from DNA extracted from environmental samples. These malacidins are active against methicillin-resistant Staphylococcus aureus (MRSA). The number of new antibiotics is about 60% lower than in the mid-1980s hence the potential of bioprospecting soil bacteria for antibiotic production. In this research, we test soil for the presence of bacteria with antibiotic properties against relatives of ESKAPE pathogens. Three promising colonies were isolated. Colony 7 showed antibiotic activity against *Bacillus subtilis*. Colonies 6 and 13 inhibited *Mycobacterium smegmatis* and *Staphylococcus aureus*. PCR analysis is being conducted for the identification of these bacteria. In addition, chemical analysis will also help us characterize these microorganisms. These findings have the potential to help us identify new antibiotics to treat common infections.

Title: *Equisetum bogotense*: Still phylogenetically labile after all these years

Authors: William D. Speer
Affiliation: Salt Lake Community College
The genus *Equisetum* is recognized as having 15-18 species in 2-3 subgenera. Previous phylogenetic studies have found strong support for both subg. *Equisetum* (minus the previously included *E. bogotense*) and subg. *Hippochaete*. Some of these examinations have also discussed the lability of *E. bogotense* in terms of its phylogenetic relationships. More recently, the monotypic subg. *Paramochaete* (*E. bogotense*) has been proposed. The present study reexamines rps4 gene and rps4-trnS spacer data for this genus in general and *E. bogotense* specifically using downloaded sequences from GenBank. Data matrices representing rps4 gene plus rps4-trnS spacer, rps4 only, and rps4-trnS spacer only sequence data were evaluated using maximum parsimony (MP) and maximum likelihood (ML) optimality criteria. Since the sequence data employed here consist of two partitions (the rps4 gene and the rps4-trnS spacer), partition homogeneity tests were conducted to evaluate possible incongruence between them. However, significant incongruence was not found ($p > 0.05$). Consistent with earlier studies, midpoint rooting (except for one ambiguous result) placed the root to separate both subg. *Equisetum* and subg. *Hippochaete*, though placement of *E. bogotense* was variable. Comparable with some previous examinations, MP results tended to placed *E. bogotense* in either a sister relationship with subg. *Hippochaete* or in a sister relationship with the rest of the genus. ML results differed noticeably, with *E. bogotense* in a sister relationship with the rest of subg. *Equisetum* or clearly embedded in that subgenus. Neither ML result was obtained in previous studies. A smaller set of downloaded rps4 protein sequences were evaluated also, which generated results mostly comparable to the nucleotide data with respect to optimality criteria. Genetic distance analyses for nucleotide vs. protein produced slightly differing results. These phylogenetic results, though sometimes differing with previous studies, continue to confirm the lability of *E. bogotense*.

Title: Circulation Tumor Cell Detection in Flowing Samples
Author: Vern Hart, Ellie Evans, Tyler O'Loughlin, Caroline Torgersen and Clint Flinders
Affiliation: Utah Valley University
Circulating tumor clusters/cells (CTCs) are cancer cells that are carried through the circulatory system and can be an indicator for early cancer detection. Current detection methods for CTCs involve drawing blood and lab work involving various technologies (Vidlarova *et al*., 2023). CIBEAM laboratory research aims to improve CTCs detection methods to be even less invasive and more effective in standard screening. Using convolutional neural networks (CNN) and coherent diffraction imaging (CDI) research is aimed to detect CTCs without drawing blood; thus reducing the time and means needed for initial CTC screening. Ideally this technology will help with making cancer screening a feasible part of annual or routine physicals. Previous and recent work in the CIBEAM laboratory has led to the creation of a CNN that can differentiate diffraction patterns. Diffraction patterns are created by directing light, often a laser, toward an object and collecting the light data that results with a sensor. A CNN and imaging system has been developed that can differentiate microbeads of varied sizes in water (representing intravenous fluid containing CTCs) pumped through an IV tube (representing a vein or artery). Current research is moving towards further testing and improving this system using sheep's blood and PANC-1 cancer cells. The CNN obtained 97.7% accuracy in detection between diffraction images of fluid pumped through a glass tube from a solution of 50,000 CTCs in 50 mL water with 20 uL defibrinated sheep's blood and images using the same solution without the CTCs. Continued advances are hoped to be shared. *Vidlarova M, Rehulkova A, Stejskal P, Prokopova A, Slavik H, Hajduch M, Srovnal J. Recent Advances in Methods for Circulating Tumor Cell Detection. *International Journal of Molecular Sciences*. 2023; 24(4):3902.

Title: BioArt Scholars in Microbiology and Visual Arts
Authors: Jude Agboada, Megan Capener, Natalie Pollock, Alex Robles, and Lisa Wiltbank
Affiliation: Weber State University
The BioArt Scholars program has a mission to join enthusiastic visual arts students and microbiology students in producing agar art. Here, we report our findings in four areas:
1. Microbiology students' works of agar art for the annual ASM agar art competition.
2. Art students' documentation and collaborating of agar art.
3. Microbiology growing "palette" of environmental samples that can be used for art.
4. Efforts towards timelapse documentation of the growth of agar art.
In the future, we hope to improve the documentation of timelapse videos of microbial growth, with improved environmental parameters such as humidity and temperature control to ensure better growth of microorganisms. We will also assess student outcomes from participation in the BioArt Scholars program in changing science identity and interest in art and science. This is a great opportunity for students from both fields to experience collaboration and the importance of group work and learning.

Business
Oral

Title: Measuring the Efficacy of AI-Enabled Communication: Advancing Websites Beyond Traditional Interfaces
Authors: Chong Oh and Matthew Pecsok
Affiliation: University of Utah
In an era defined by the rapid digitalization of communication, evaluating the efficacy of AI-enabled chat systems in advancing web interfaces is crucial. This study investigates the transformative impact of Generative AI on the communicative functions of the business school's website. With the integration of advanced Natural Language Processing (NLP) and Machine Learning (ML) technologies, this study seeks to evolve beyond conventional static, menu-driven interfaces to offer a dynamic, conversation-based user experience. The research meticulously measures the performance and outcomes of these AI systems, using both quantitative and qualitative methods to assess their potential to enhance engagement, increase operational efficiency, and elevate overall satisfaction for a diverse array of users. This inquiry not only contributes to the field of educational technology but also informs the wider debate on the role of AI in the modernization of web communication across multiple sectors.
We scrutinize the efficacy of AI-enabled communication systems in enriching the user experience and satisfaction across university websites, with particular emphasis on the Business School at the University of Utah. Acknowledging the imperative for efficient and intuitive interfaces in academia, the research broadens its scope to include considerations of technological sustainability and the capacity for these systems to support cross-cultural connections. A mixed-methods approach underpins the study, encompassing usability testing for a hands-on assessment of AI chat systems' functionality and cross-cultural analysis to discern their global implications. Further, we evaluate the environmental footprint of AI deployment and utilize socio-cultural research methods to dissect the intricate interactions between users and this emergent technology. Community engagement strategies also come under scrutiny to determine AI's role in fostering inclusive educational environments. The expected outcomes of this rigorous inquiry aim to refine the digital interfaces of websites and add to the substantive dialogue regarding technology's place in governance. In highlighting the potential of

Title: Moonlighting Madness: Mixing Student Learning with Paid Consulting.
Authors: Kristy Grayson, Kathryn Davis, and Phillip Garner

Affiliation: Utah Tech University
In today's competitive marketplace, higher education institutions face the challenge of attracting and retaining students while equipping them with marketable, career-ready skills. To address this issue, this study investigates the use of innovative pedagogy through applied learning activities facilitated by faculty members who integrate paid consulting work into their curriculum. Additionally, it examines student perceptions regarding incentives for their involvement in such activities. Further, it challenges the conventional notion that faculty engagement in paid consulting, commonly referred to as "moonlighting," should not include student participation. The study reveals that students display motivation to participate in applied learning activities when incentives are provided to enhance their career-ready skills in their respective fields. Notably, the study uncovers a surprising finding: faculty members perceive the incorporation of applied learning from externally compensated consulting engagements as an ethical practice. In addition, the findings reveal more nuanced insight into incentives that motivate students to participate. This research contributes to the field of applied learning pedagogy and offers insights into the perspectives of both faculty and students, ultimately imparting effective strategies for fostering career readiness in higher education.

Title: Revamping Organizational Hierarchy to Foster Innovation: The Case for
Authors: Jonathan H. Westover and Rachel Bi
Affiliation: Utah Valley University
In today's rapidly evolving business landscape, the convergence of technological advancements and the exponential growth of data has fundamentally reshaped the way organizations operate (Aghion et al., 2005). These transformative forces have emerged as critical drivers of innovation, enabling companies to gain a competitive edge and thrive in an increasingly dynamic marketplace (Aghion et al., 2005). However, despite the immense potential that technology and data offer, many organizations find themselves shackled by traditional hierarchical structures that impede their ability to adapt and innovate (Aghion et al., 2005).

This developmental conceptual paper will explore the concept of RenDanHeYi, a relatively new management model that seeks to break down the silos created by traditional hierarchies and foster a culture of innovation and collaboration. Furthermore, we will examine the four key elements of RenDanHeYi and discuss the benefits and challenges of implementing this model in organizations. Additionally, we will delve into the challenges posed by these organizational hierarchies and explores strategies to overcome them, empowering companies to embrace change, foster a culture of innovation, and seize new opportunities in the face of evolving market conditions.

Title: Tabletop Gamification in Leadership Education
Authors: Scott Hammond, Parker White
Affiliation: Utah State University
We hear it and ignore it. Once again, a study shows lecture, the most common format of university classes, is a poor way to teach (Mulryan-Kyne, 2010). Research shows Gen Z and Millennials, who are conditioned by screens, games, apps, and personal devices, learn differently (Freedman et al. 2014). Very differently.
This paper shows how a Utah State University online undergraduate leadership course has incorporated tabletop elements and virtual reality to teach leadership. Driven by research and student feedback, this class immerses students in a life-or-death survival scenario where they must collaborate with others and practice the principles of leadership they are learning.

Scott Hammond (professor) and Parker White (graduate teaching assistant) developed a

“Leadership Quest” that tests students' ability to strategize, make decisions, think critically, and solve complex problems in an Icelandic wilderness setting. To survive, teams must strengthen skills and adapt to the changing environment.
Hammond and White hypothesized that students would 1) prefer the interactive gamification course over a traditional course and 2) perform better on the final evaluation.
A post-course instrument polled students' opinions on course delivery methods and effectiveness. The results show that, on average, both types of students would gladly take another class of a similar type. A two-sided independent T-test was performed on the responses from regional and Logan campus students, and it found students from regional campuses were even more in favor of a tabletop style of learning. From these responses and improved performance on the final evaluation, it can be concluded that the Leadership Quest helps to address the aforementioned problems present in many university classes. If further research is done on gamification in learning, a good place to start could be to find out if classes that are not led by an instructor provide the same benefits to students.

Title: Compulsive Social Media Use and Happiness
Author: Jeff Clements
Affiliation: Weber State University
The social media app market is valued around $49 billion. It is clear that businesses benefit from social media. However, individuals may develop compulsive use behaviors when they engage with social media. This study looks at the cravings and withdrawals people experience when using social media, and how those phenomena contribute to compulsive social media use. In addition this research looks at the effect of compulsive social media use on a personal general happiness.

Education
Oral

Title: Picturing Disability; Access: Artifacts of Inclusion and Exclusion in Higher Education
Authors: Rachel Bryson
Affiliation: University of Utah
From prominent symbols to commonplace practices, material and cultural landscapes are saturated with messaging about access and ability. In higher education, both overt and implicit structures and policies serve to both include students, faculty, and staff with disabilities--and to notably prevent or limit their access. In this presentation, I use the highly familiar symbol of the International Symbol of Access (ISA) as a framework for understanding how texts, policies, and the built environment both enable and constrain access for people with disabilities in higher education. The ISA--or the symbol of a wheelchair user found on accessible parking spots, building entrances, and more--communicates accessibility through its presence, but its absence can also communicate a lack of access. I use the ISA to interrogate other points of access (or lack thereof) in higher education, including practices such as classroom policies, syllabus statements, and letters of accommodation. I conclude by using Jenny Davis's Conditions of Affordance model to argue for more focused attention on how we can improve and expand meaningful access for people with disabilities in higher education.

Title: Workbook Style Learning Integrated into the Classroom
Authors: Willow Park, Jayden Peacock, Caysen Crum, Karissa Stalder and Dr. Caleb Hiller
Affiliation: Southern Utah University
Work-book style learning has been a popular approach among primary and secondary schooling. It is well known that the transition between high-school and college may be a difficult transition.

The intended purpose of this study is to directly access work-book learning in a professional classroom. Throughout our analysis we aim to quantify our data by determining if it is more effective providing them a) before class, b) in class, or c) after class. After coming to a conclusion we aim to provide a better learning experience in the classroom, along with a retention of the information. We want students to feel secure in their education and take their knowledge beyond the classroom.

Title: Collaborative Practices Between Utah Teachers and Social Workers in Schools
Authors: Kristina Moleni, Andrea Garavito Martinez; Fangaafa Tu'ifua
Affiliation: Weber State University
There is limited empirical research in the United States on collaborative activities between teachers and social workers, despite the numerous calls to increase the number of mental health professionals in schools. Collaboration between teachers and social workers is crucial to maximize students academic achievement and success. Participants will share preliminary findings of qualitative interviews with classroom teachers and social workers in Utah schools on their collaborative practices for student success. Findings revealed that the perception of the types of collaborative activities expressed by the teachers can be characterized as communication-oriented collaboration and by social workers as task-oriented collaboration. The research indicates that the nature of cooperation between teachers and social workers is influenced by their comprehension of their duties and obligations, the procedure of how to work together, and the position they hold in the Multi-Tiered System of Support (MTSS) of the school. This is a segment of a broader interdisciplinary project.

Title: Exploring Student Outcomes in STEM Education
Author: Jeff Clements
Affiliation: Weber State University
Technology-focused STEM education is a rapidly changing field of study. Educators need a clear understanding of the forces shaping it, and how to respond to those changes. Our aim through this research is to explore student related outcomes in STEM higher education. We do this by examining data from colleges and universities in 21 different states in the U.S. This research shows that universities with more STEM degrees will increase students' starting salaries, which will lead to higher overall career salaries. However, this research also shows that better teaching may not lead to higher student starting salaries. In fact, choosing to attend an expensive university and major in a STEM field may be the key to increasing future career earnings.

Title: Replacing White Noise through Seeing, Sustaining and Resisting: Listening to Hear the Voices of 2nd Generation Latino/a/x Immigrants in a Digital Storytelling Workshop
Authors: Elizabeth Healey Mainoo
Affiliation: Utah Valley University
This research examines the potential uses of personal storytelling, sharing, and multimedia videomaking through a communal digital storytelling workshop. The Digital Storytelling Workshop format (Lambert, 2013) is considered for its use as an asset-based pedagogical tool that can seek to sustain cultural identity and community heritage and practices among immigrant communities. Through incorporating Django Paris and H. Samy Alim's Culturally Sustaining Pedagogy (Paris, 2012; Paris & Alim, 2014) and a LatCrit lens, the researcher examines how Digital Storytelling in a group setting acts as a pedagogical tool and through the process of sharing creates individual and collective testimonios of Latino/a/x experiences. The testimonios shared highlight the varied and nuanced experiences of 2nd generation Latino/a/x people living in Utah and reinforce the significance their perspectives bring and should have within educational theory and pedagogy as well as classroom practice. The testimonios touch on the participants

borderland experiences and examples of how they are developing their own mestiza consciousness (Anzald, 1987, 2015). The researcher uses a lens of Critical Whiteness as she sees and resists her own Whiteness in the workshop space and during the analysis and writing process. She seeks to build off the research of Cheryl Matias and Tanetha Grosland (2016) with the intention of improving teacher education programs for pre-service White educators to better prepare them for recognizing their own Whiteness and developing a Culturally Sustaining Pedagogy in their classroom.

Title: Panel Discussion: Reimagining Management Pedagogy: Innovative Approaches to Engaging Learners
Authors: Dr. Angela Schill, LynnAnn Erickson, Dr. Silvia Clark, Dr. Ruthann Cunningham, Dr. Maureen Andrade, Dr. Jill Jasperson, Dr. Yang Huo, Dr. Jacque P. Westover, Dr. Jonathan Westover
Affiliation: Utah Valley University
Management education is at a crossroads. Traditional teaching methods are no longer sufficient to meet the needs of today's learners. Students are seeking more engaging, interactive, and personalized learning experiences that prepare them for the complex challenges of the 21st century. In response, innovative management educators are experimenting with new pedagogies that emphasize active learning, collaboration, and real-world applications. This panel brings together a diverse group of management educators and practitioners to share their experiences and insights on effective, engaging, and provocative teaching methods.
Objectives:
To showcase innovative and engaging management pedagogies that foster critical thinking, creativity, and collaboration.
To explore the challenges and opportunities of implementing novel teaching methods in management education.
To provide a platform for dialogue and exchange among educators, practitioners, and students about best practices in management pedagogy.
This panel submission promises to be an engaging and thought-provoking session that showcases innovative management pedagogies and encourages dialogue among educators, practitioners, and students. The diverse expertise of the panelists, combined with the interactive format, will make for a lively and informative discussion that appeals to a broad audience.

Engineering
Oral

Title: Two Dimensional Heat Conduction in a Short Cylinder
Authors: Logan Nicholass, Daniel Hofeling, Evan Percival
Affiliation: Southern Utah University
The transient temperature charts and analytical solutions for one-dimensional (1D) conduction heat transfer for plane walls and long cylinders may be used to determine the temperature distribution and heat transfer in two-dimensional (2D) heat conduction circumstances. Using a superposition approach (also known as the product solution), the 1D solutions may be multiplied to produce the 2D solution. This concept was tested using a short cylinder, where the solution is assumed to be valid when all surfaces of the cylinder are subjected to convection heat transfer with the same heat transfer coefficient and no internal heat generation. To study this concept, a short steel cylinder was both cooled and heated to -1 °C and 45 °C, respectively. Thermocouples were placed at both ends, the center of gravity, and the outer surface of the cylinder. As the set temperature was reached, the cylinder was suspended such that the only mode of heat transfer was natural convection at the ambient temperature. The cylinder then was allowed to return to

the ambient temperature as temperature data was recorded. The analytical results, as expected, showed exponential tendencies in both heating and cooling, while the experimental data did not follow true exponential curves. This resulted in discrepancy between the analytical solution and the experimental data. The analytical solution is based on the approximation method, and the discrepancies due to the approximation are discussed in the paper.

Title: Analysis Of A Spray-Type Passive Downdraft Evaporative Cooler
Authors: Ayline Vega, Matt Lovell, Jayden Payne
Affiliation: Southern Utah University
This paper analyzes the cooling performance of a spray-type passive downdraft evaporative cooler (PDEC) and explores the relevant literature. The aim of this research is to determine the optimal water flow rate and spray nozzle arrangement for a small, low-cost PDEC system. The evaporative cooler considered in this undergraduate research uses a fan and heater at the inlet to simulate various ambient windspeeds and temperatures. Relative humidity and dry-bulb temperature at the inlet are used to predict the outlet temperature using psychrometric equations and charts. The effectiveness ratio of the system is calculated by comparing performance to the ambient wet-bulb depression and is used to predict the outlet air temperature and airflow rates.

Title: Analysis Of Air Subjected To A constant Heat Flux Within A Tube Under Forced Convection
Authors: Jacob Vinson, Joshua Brinkerhoff, Evan Percival, Manfredi Aloisio
Affiliation: Southern Utah University
This analysis aimed to verify known theoretical prediction for the convection heat transfer coefficient (h) by subjecting air to a constant heat flux while undergoing forced convection in a thin-walled copper tube. The linear relationship between the surface temperature of the tube and the temperature of airflow along the tube was also investigated. A pitot probe was used with a manometer to determine the velocity of air flowing through the tube. A constant heat flux was applied to the outer surface of the copper tube using heating tape. The temperatures of air at the inlet and outlet of the copper tube were recorded and compared to the temperatures of the outer surface of the tube. The testing was performed, first with the tube at room temperature, and second with the tube preheated to achieve steady state in a shorter time. The temperature and velocity measurements were used to experimentally determine the convection heat transfer coefficient. This value was then compared to a theoretical value. The percent difference for these values was under 2% for both methods.

Title: Solar Heating Of Water And Air
Authors: Larry Webster, Savanah Higley, Capri Franzen, Gage Van Dyke
Affiliation: Southern Utah University
Solar water and air heaters are a renewable and sustainable method to collect solar energy especially in developing countries where water and air heating techniques are inefficient or scarce. Solar heaters utilize thermal radiation to heat water or air through a closed system in a relatively short time. The purpose of this paper is to design a low-cost, multifunctional solar heater, which can be used for heating both air and water. Testing with water was performed by pumping water at a continuous rate through a small, insulated water container used as the water reservoir . The water experiments were performed in Cedar City, Utah under ambient weather conditions in October 2023. Two tests were performed using the clear plastic bottles to minimize the convection heat transfer and two tests without the bottles. During the tests using the bottles and water, the average temperature change of the water in the container was 27.5 Â°C., while the average temperature change in the container without the plastic bottles was 18 Â°C. The average efficiency of the system when plastic bottles were used as glazing was 59.8%. The air

experiments were performed in late January 2024 with a similar setup as the water experiments, but without the small container. During these tests, the average temperature increase of the air was 35.8 Â°C, and the efficiency was 5.1%.

Title: One-Dimensional Heat Conduction Through Composite Walls
Authors: Savanah L. Higley, Ali S. Siahpush
Affiliation: Southern Utah University
One-dimensional (1D) heat transfer analysis is the most fundamental assumption to make when the thermal behavior of a system is considered. This assumption states if the thickness of a material is much smaller than the height and length, heat conduction can be assumed to be 1D. This assumption can be used to simplify the conduction heat transfer analyses, including that of a composite wall. In this experiment, a simple composite wall was designed with oak wood, PLA, and acrylic in both parallel and series, and the temperature at various points were measured to verify the validity of 1D heat transfer. The experimental temperature values were compared to transient analytical values obtained through an explicit finite difference method code executed in MATLAB and steady-state analytical values obtained by applying the thermal resistance concept. This experiment proved to be a success in validating 1D heat transfer, as the experimental temperature values were similar to both the transient and steady-state analytical values. Minimal error was present in the experiment. Further uses of this experiment include a heat transfer lab demonstrating the 1D heat transfer concept.

Title: Scale Analysis Of Natural Convection Over A Heated Vertical Plate
Authors: Braeden Brown and Ali S. Siahpush
Affiliation: Southern Utah University
Scale analysis is used to estimate the order of magnitude of desired quantities when analytical or numerical solution is difficult to achieve. This paper presents a derivation of the governing equations of convection heat transfer, specifically natural convection, along with two methods of scale analysis, one derived by Bejan and the other by Capobianchi and Aziz. Both methods of scale analysis were used to verify, support, and compare the results of a previous experiment conducted at Southern Utah University. This previous experiment investigated the thickness of the laminar thermal boundary layer caused by natural convection over a heated vertical plate with constant heat flux. Scale analysis was used to estimate the thickness of the thermal boundary layer under these same conditions. Both methods of scale analysis predicted the same order of magnitude for the thickness of the thermal boundary layer as was evaluated in the previous experiment.

Humanities, Philosophy and Foreign Language
Oral

Title: Hildolf, Son of Odin
Author: Leif Ravnsen
Affiliation: Utah Valley University
Most of our knowledge about Medieval Norse Myth is filtered through post-conversion Christian scholars that had little interest in maintaining pagan belief structures. Odin, god of kingship and poetry takes center stage in poet-politician Snorri Sturluson's Edda; Tyr and Ullr were just as prominent in their own regional worship centers, yet are scarcely attested themselves. In that great gap between what once was known and what remains, we can reclaim some measure of lost knowledge by contextualizing and reinterpreting the surviving material. Hildolf, Battle-wolf, is rarely examined and even dismissed by one prominent scholar as simply another aspect of Odin. Their bias assumes that being listed among the names of Odin's sons equates to being Odin,

which has no logical basis upon examination. Free of this intellectual dead end, Hildolf can be put in his proper cosmological place. He governs the crossing of the river boundary between Asgard and Jotunheim, protects the lands of gods and men from bandits and thieves, his home is called "Counsel-island," and a disguised Odin describes him as "wise in counsel." Asgard has invested a warrior-mediator at the boundary of the realm, and in this position Hildolf shifts the commonly perceived relationship between gods and giants, civilization and wilderness, and man and animal toward something more holistic. Hildolf is also placed between Odin and Thor, representing a middle path between their respective warrior types of raider and protector. In this fractured time of partisanship and othering, we now have another symbol to help guide us toward collaboration, with those outside of us and within ourselves.

Title: The Benevolent Relationship between Humans and Trees: The Power of Storytelling
Author: Jolee Robinson
Affiliation: Southern Utah University
The presentation addresses how Emily Esfahani Smith's pillar of storytelling provides a way for others to find belonging and connection beyond their traumas and fears through the value of benevolence and the symbolic meaning of trees as they pertain to the human condition. According to Dr. Nalini Nadkarni's book Between Earth and Sky, trees symbolize humans' physical and psychological state as they endure life's traumas. Both humans and trees follow the same approach to storytelling described in Smith's book The Power of Meaning: Finding Fulfillment in a World Obsessed with Happiness and utilize the value of benevolence derived from Shalom H. Schwartz's theory of basic human values to make sense of the emotional scars their traumas have left behind. In the present society, we see this utilized in Dr. Laurel Braitman's work with various groups dealing with the journey of loss and grief, bridging the gap in our understanding of the importance of storytelling on a far-reaching level rather than a singular one.
This presentation would go well with the presentation of Dr. David Hatch as we would like to present as a panel.

Title: Trauma Reporting Behind Barbed Wire: Japanese American Internment Camp Newspapers and Violence, 1942-1945
Author: Glen Feighery
Affiliation: University of Utah
Japanese American internment was an extraordinary chapter in American history. After the attack on Pearl Harbor, 120,000 people of Japanese ancestry—two-thirds of them U.S. citizens—were forcibly removed from the West Coast and incarcerated in "relocation" camps in remote locations, including Topaz, Utah. Torn from their homes and lives by prejudice, people occupied makeshift barracks surrounded by barbed wire. Each camp became a de facto small city, and each was served by a newspaper produced by residents. These newspapers kept residents informed and, despite government control, reflected the voices and feelings of each community. Violence was rare in the camps, but on three occasions, including one at Topaz, residents were fatally shot by military guards. This research in progress lies at the intersection of U.S. history and journalism history. It explores how camp newspapers helped traumatized communities cope with the violation of their civil rights and loss of life from the shootings. Primary sources for this study are internment camp newspapers published at the time of the shootings in 1942, 1943, and 1944, as well as government records documenting government policy toward the newspapers. These sources indicate that incarcerated Japanese American journalists exercised a high degree of agency despite government control. After two of the three fatal shootings, camp newspapers not only provided factual coverage but also expressed solidarity with mourning residents. Amid crisis, these journalists helped sustain communities at the margins of a nation that had shunned

them. This work has contemporary relevance in two ways. First, it offers historical context amid an upsurge of hate crimes and discrimination against Asian Americans in the wake of the coronavirus pandemic. Second, as the United States grapples with ongoing gun violence, present-day journalists could consider ways to help communities cope with trauma and, through compassionate engagement, take steps toward healing.

Title: Well Stated, Half Solved: The Most Important Problem(s) Facing the State of Utah and Its National Echoes
Author: Thomas C. Terry
Affiliation: Utah State University
Gallup Polling's Most Important Problem (M.I.P.) question is, arguably, the most valuable longitudinal public opinion research tool available to scholars with results extending back into the mid-1930s. Between 1,000 and 1,600 Americans over 18 are asked essentially the same question almost every year (and usually multiple times as at present): "What do you think is the most important problem facing this country today." A mix of 70% cellphone and 30% landline respondents are surveyed across U.S. regions and time zones. The M.I.P.'s most salient feature – and its power and advantage – is that it is open-ended, requiring respondents to independently provide and identify their personal evaluation of what the most important issue is facing the nation without probes, prompts, or a pre-selected list of multiple-choice answers.
In June 2023, faculty members and undergraduate and graduate students in the Department of Environment and Society at Utah State University, Logan, decided to test the M.I.P. question in Utah and included it as the lead question in an environmental survey. Overall, the researchers found that nearly 80 percent of those polled identified the M.I.P. facing the State of Utah as either the environment and climate change (40 percent) or population growth and development (39.5 percent). An additional 3.8% percent thought homelessness was the M.I.P., that logically could have been added to the population growth category. Air quality issues were picked by 11.4 percent of Utahns as the M.I.P. – including pollution and its negative impacts – and was the single largest component of the environment and climate change category. Water scarcity due to population growth was a relatively distant second, selected by 6.3 percent of those surveyed, not quite half of the top concern.
The purpose of this study is to examine the findings of the Utah M.I.P. poll.

Title: From Story to History to Ritual: Anne Washburn's Mr. Burns: A Post-Electric Play
Authors: David A. Hatch and Anne Washburn
Affiliation: Southern Utah University
This presentation explores how story hardens into ritual by examining the function and implications of the multilayered references in Mr. Burns: A Post-Electric Play, by Anne Washburn. With the modernist aesthetic of "the plain reader be damned" challenging our egos, the audience is put to work tracing layers of reference back through the rituals developed by post-apocalyptic worshipers of "Burns" in reference to the "Cape Feare" episode of The Simpsons, then back through the two film adaptations of John D. MacDonald's 1957 novel The Executioners. Anne Washburn's use of the legendary referentiality of The Simpsons as a rhetorical tool inspires a critique of how reference and repetition raise common events or entertainment to the level of ritual after cultural trauma and long periods of time.
I would like to present in a panel with my two students, Lacretia Mills and Joless Robinson.

Title: The Magic of Familial Trauma
Authors: Ariel Longoria and Adena Rivera-Dundas
Affiliation: Utah State University
Trauma, the emotional response to a distressing or upsetting event, is a plot device used in a

variety of contemporary Young Adult literature. Typically, it assists in character development, motivates a character's wants and beliefs, and creates a sense of change in a story. However, the use of trauma as a literalistic trope has evolved, just as our scientific and cultural understanding of trauma has evolved. One such development is the study of how families and generations impact current demographics, otherwise known as familial or generational trauma. Familial or generational trauma is rooted in cultural, racial, economic, and social factors, spanning from one generation to the next. It impacts nearly 70% of the population according to the World Health Organization and has become a re-occurring theme in a variety of popular media. In literature, it is present in many notable texts, but not in the way many would expect. While movies and TV shows may outright identify the trauma their family has inflicted upon them, young adult literature approaches familial trauma through themes of magic or fantasy. Examples range from characters inheriting magical destinies from their all-powerful- deceased, distant, or neglectful parents. An emerging hero, who uncovers a world hidden by their family, and a destiny they cannot escape. Or characters poised by their family to defeat an all-powerful villain or perish. These tropes are not uncommon, and while intentionally or unintentionally, authors have made the themes and emotional nuance of familial trauma a common thread between their texts. However, in many of these stories, the concept of familial trauma is never addressed. It seems as though the very nature of familial trauma is replaced by magic and explained through the concept of a character's destiny. The question is, how and why are stories directed at younger audiences, using magic

Title: Reframing Empathy
Author: Emily Richael
Affiliation: Brigham Young University
There are reasons to be skeptical that empathy understood as perspective taking can afford us knowledge about the mental states of others or generate care and motivate moral action. This paper will outline how self-oriented perspective taking and other-oriented perspective taking fall short of providing us with knowledge of others' mental states. In self-oriented perspective taking, the simulation ends up excluding crucial differences between the mental constitution of the empathizer and the target. Other-oriented perspective taking attempts to account for these differences, but ultimately fails because the unconscious dispositions of a target are impossible to simulate. I will then address simulation's moral limitations by arguing that neither form of perspective taking is morally motivational. Self-oriented simulation leads to personal distress, which causes us to care about ourselves rather than the target and other-oriented simulation leads to misdirected care. Finally, I suggest that we should move towards a new picture of empathy informed by Kate Abramson and Adam Leite's idea of empathic responsiveness. This new picture will recast empathy as a mode of interaction that requires epistemic humility.

Title: Navigating Intercultural Competence
Authors: Alexia Orbezua Black and Ko-Yin Sung
Affiliation: Utah State University
With the rapid growth of online education, ensuring a robust, positive learning experience in composition courses is more important than ever. This session presents methods by which faculty can amplify their support for students during coursework and promote college-wide resources. By focusing on online Beginning Composition and Intermediate Composition (English 1010 and English 2010) courses during Fall 2023, our exploratory study involved an innovative approach to data collection: check-in assignments every three weeks and dual surveys at the middle and end of the semester. The assignments and surveys, designed for convenience with a 5-minute completion time, provided a continuous stream of feedback and support. Our findings reveal that adopting a high-context approach–where rich, detailed information that takes

into account students' unique backgrounds, cultures, and personal situations supports learning–significantly enhances instruction quality. This method, coupled with clear communication about student resources, can create an environment conducive to academic success, particularly for students from diverse backgrounds, including Latinx students who traditionally face an achievement gap. The session delves into these results, providing actionable strategies to optimize attendees' own instructional techniques. The emphasis will be on English instruction, but the implications are broad-reaching, suggesting a shift in pedagogical practices to cater to an increasingly diverse student body.

Title: High-Context Instruction: Boosting Academic Success in Online Composition Courses
Authors: Jeshua Enriquez and Roberto Rojas-Alfaro
Affiliation: Salt Lake Community College
With the rapid growth of online education, ensuring a robust, positive learning experience in composition courses is more important than ever. This session presents methods by which faculty can amplify their support for students during coursework and promote college-wide resources. By focusing on online Beginning Composition and Intermediate Composition (English 1010 and English 2010) courses during Fall 2023, our exploratory study involved an innovative approach to data collection: check-in assignments every three weeks and dual surveys at the middle and end of the semester. The assignments and surveys, designed for convenience with a 5-minute completion time, provided a continuous stream of feedback and support. Our findings reveal that adopting a high-context approach–where rich, detailed information that takes into account students' unique backgrounds, cultures, and personal situations supports learning–significantly enhances instruction quality. This method, coupled with clear communication about student resources, can create an environment conducive to academic success, particularly for students from diverse backgrounds, including Latinx students who traditionally face an achievement gap. The session delves into these results, providing actionable strategies to optimize attendees' own instructional techniques. The emphasis will be on English instruction, but the implications are broad-reaching, suggesting a shift in pedagogical practices to cater to an increasingly diverse student body.

Title: Transcendence and Benevolence: Navigating Human Values through the insights of Emily Esfahani-Smith and Viktor Frank
Authors: Lacretia Mills
Affiliation: Southern Utah University
Drawing from Emily Esfahani-Smith's lecture on "Building Cultures of Meaning" and Viktor Frankl's experiences in Man's Search for Meaning, this presentation dives into the Pillar of Transcendence and the Value of Benevolence. Although seen as a journey beyond one's self, transcendence intertwines with acts of benevolence, shaping a meaningful life. Smith emphasizes expanding identity and connecting through benevolence, while Frankl's experiences highlight the essential link between personal well-being and contributing to the greater good. This presentation illuminates the transformative power of benevolence and transcendence on individual and societal levels, emphasizing acts of kindness as bridges connecting individuals to shared humanity in the pursuit of a meaningful existence.
I will be presenting on a panel with Dr. David Hatch of Southern Utah University.

Language-and Literature
Oral

Title: *from* Befores and Afters
Author: Morgan Rose-Marie

Affiliation: Utah Valley University
This creative work is an excerpt from my non-traditional childhood memoir, in which I reconstruct my experience of my parents' explosive divorce. The manuscript begins and ends in court, where at age twelve I testified I no longer wanted to continue my relationship with my father. It is a moment that exists outside of linear time for me. To mimic the experience of trauma, I loop back to this scene throughout the book, each time getting closer to the moment I speak my truth. Between courtroom sections, I flash backward (and forward) to examine my relationships with each of my parents as I explore their relationship with each other, trying to make sense of how and why things fell apart. Written from the perspective of my younger self, I elevate the child's voice because, during the long experience as it unfolded, that voice did not count. At its heart, my memoir shows that, while lacking the language or experience to fully articulate trauma, a child is a full person whose experience of intense situations is no less complex or human than the experiences of the adults around her.

Title: *from* "Bare My Breast"
Author: Megan McComber
Affiliation: Brigham Young University
"Bare my Breast" is a lyrical essay that explores how female identity, motherhood, and inheritance are tied to the intimacy of mother and daughter. Through imagery of breasts and breastfeeding, and interwoven with biblical references and personal anecdotes, the essay focuses on the mother-daughter relationship to assess anxieties and fears surrounding hereditary breast cancer. As she grapples with the implications of carrying the BRCA1 mutation, the narrator simultaneously interrogates cultural sexualization of female bodies and breasts, worrying that her infant daughter may not only bear the burdens of a woman in a sexualized world, but do so as a carrier of the BRCA1 gene. "Bare My Breast" is the first in a collection of lyrical essays which examine through lenses of nature and the human body such themes as motherhood, loss, and the systemic oppression of women in the face of self-discovery.

Title: *from* "The Imaginary Child"
Author: Jessica Mohsen-Crellin
Affiliation: Brigham Young University
"The Imaginary Child" is part of a short story cycle that explores the state of mind of a woman yearning for and struggling to have children. As she imagines her future children, the line between her dreams and her reality blurs and her anxieties about infertility, loss, and the unknowable future are played out in dream narratives that quickly dissolve into nightmare. Inspired by real-life events, the collection walks the line between fiction and nonfiction as it questions how individual reality is shaped, especially by loss and grief. In the story "The Imaginary Child," the main character, known only as "Ruth's mother," is battling the chaotic dreamscape of her own mind to find the child she believes she has lost. The story tries to make sense of the very real grief potentially tied to imagined loss.

Physical Sciences
Oral

Title: 2D Fluorescence of Phycocyanin Bioconjugation and Its Impact on Light Harvesting
Authors: Colton Koch, Brecken Shakespeare, Tyler Holmes, Jacob Dean
Affiliation: Southern Utah University
Spirulina is a genus of photosynthetic cyanobacteria containing phycocyanin, a light-capturing pigment-protein complex. This cyanobacteria has evolved to optimize effective energy transfer in the red region (550-650nm) which is then used to help these cyanobacteria initiate

photosynthesis and provide the needed energy to sustain life. Secondary pigments can be introduced to these light-capturing pigments to potentially alter their light-harvesting capabilities. This can be through the addition of another light harvester that aids in energy transfer and shifts the range of absorption, or by modifying the native protein folding that impacts the function of the pigment network as a whole. These alterations can be either beneficial, detrimental, or not affect the protein's light-harvesting abilities. The secondary pigment chosen was diluted rhodamine-B due to its complimentary fluorescent properties and absorption in the visible light spectrum, which when introduced, can also bind non-selectively to the phycocyanin. In order to test the light-harvesting properties of the modified solution, we took dilute solutions with similar absorbance of phycocyanin, rhodamine-B, and a mixture of both, and collected UV-vis and fluorescence spectra of each solution. The mixture was then centrifuged to isolate bound "bioconjugate" structures and then new spectra were then taken of the solution. 2D-Fluorescence spectra were then taken and analyzed to study how the secondary pigment of rhodamine-B affected the light-harvesting phycocyanin and its energy transfer. We were able to see how the mixture of rhodamine-B to the phycocyanin affected the light-harvesting properties of the phycocyanin by comparing the 2D-spectrum of each solution to that of the mixture.

Title: A Device to Measure Ionic Strength in a High School Lab Setting
Authors: Abigail G. Petersen and Christopher F. Monson
Affiliation: Southern Utah University
We are building a conductivity tester that can be used in a laboratory setting to measure the ionic strength of a solution. This device is designed to be student friendly, relatively simple to build, safe, and inexpensive. It is simple enough that students can build this conductivity tester. We are incorporating this device into a lab based on SEEd standard CHEM.3.1. We hope to have tested this lab in a classroom setting and will report the results.

Title: A Microfluidic Device for the Quantitation of Dissolved Oxygen
Authors: Jedd Kjar, Mariah Clayson, Lohra Miller, Samantha Mckay, Madison J. Evans, Cameron Stokes, K. Brayden Bailey, and Christopher F. Monson
Affiliation: Southern Utah University
Dissolved oxygen concentration in aqueous environments is relevant to biological and chemical processes. Variations in oxygen levels may critically change metabolic and other chemical pathways. We developed a microfluidic device modeled after the STOx electrode to measure dissolved oxygen. The STOx electrode is the most sensitive electrochemical device currently available for the quantitation of dissolved oxygen. With our device, we sought to improve the ruggedness and reduce the cost of the STOx electrode. Using an initial prototype, we have gathered data from three locations: a lake, an irrigation reservoir, and the Great Salt Lake. Based on the initial prototype's performance, we developed a new prototype with the aim of improving response time and device precision. We are currently in the testing phases of the new device.

Title: Analysis of gravitational fields inside of a cavity throughout different dimensions
Authors: Tate Thomas and Alexander M. Panin
Affiliation: Utah Valley University
We mathematically derived equations describing the gravitational field in a symmetric cavity located asymmetrically inside 1-D, 2-D, 3-D spheres for a gravitation which itself may have 1, 2 or 3 degrees of freedom (thus may diminish with distance not necessarily as inverse square). We found that if the number of dimensions and the number of degrees of freedom of gravitation match, then the gravitational field inside the cavity must be constant and uniform throughout all space inside the cavity. Discussing the details of our calculations for matching and non-matching

cases, along with their implications, is the goal of this presentation.

Title: Artificial black holes: are they a threat to humanity?
Authors: Tate Thomas and Alexander M. Panin
Affiliation: Utah Valley University
We wanted to see if accidentally creating mini black holes in high energy particle collisions posed a real threat to humanity. To do this, we calculated some properties of such a black hole, such as its life span, radius, density, and minimum energy required. We found that it is unlikely to exist, let alone destroy the planet. Furthermore, we calculated what would happen if it were to exist, finding that it would move through the Earth with little resistance and with a small amount of Earth matter absorbed. Depending on initial velocity, the black either quickly escapes Earth or would settle orbiting it with the orbit part of which passes via Earth. It is interesting that in a simplified model of Earth as of a sphere of uniform density, the inner part of the orbit of black hole is also elliptical (as the outer is) but not Keplerian - with Earth center not at the focus but at the center of another ellipse. In the case of small initial velocity when entire orbit is inside Earth, the period of such inner orbit is constant regardless of birth location and initial velocity of black hole. The goal of this presentation is to discuss the results of our calculations and to explore potential applications to our understanding of interaction of mini black holes with ordinary atomic matter.

Title: Can a planetary system survive a host star supernova explosion?
Authors: Benjamin Miera and Alexander Panin
Affiliation: Utah Valley University
Recent searches for extrasolar planets have brought a surprising discovery – almost any star seems to have a planetary system around it. We know that massive stars end their lives in a violent supernova explosion, during which an extremely large amount of energy (~3x10^46 J) is released from the star in a very short time. Can a planetary system survive such a violent event? In this presentation, we analyze, based on known physics, the sequence of events of a type II supernova explosion – primarily the neutrino flash, gamma ray flash, and expanding plasma shell - and the effects they would have on an orbiting planet. Our calculations show that a planet is not kicked out of its orbit due to star's radiation pressure, but the momentum of exploding star shell can significantly disrupt the orbit of the planet (depending on planet's mass and proximity to the host star). We also find that the planet does not experience significant heating due to the neutrino and gamma ray flashes. Finally, we show that all stable planetary orbits around a star become escape trajectories when the star loses more than half of its mass.

Title: Can primordial black holes constitute dark matter?
Authors: Alexander M. Panin, Tate Thomas, Tensor Elmikawy, and Enrique Mendoza
Affiliation: Utah Valley University
In some scenarios of Big Bang the fluctuations of density in early universe result in the formation of various sized primordial black holes (BH). The black holes of mass range 1010 - 1022 kg are good candidates for a dark matter. How many of such black holes (say, per cubic light year) are needed to constitute dark matter? Are those black holes observable? How would they move? How much gravitational waves would they radiate? Would they evaporate, or would they grow consuming interstellar matter or galactic dust? How frequent are collisions of such black holes with stars or planets and with each other? Would they consume stars - and if so, then how quickly? In our presentation we will give quantitative answer to these questions based on known physics. We will show that due to the low number density, extremely small "cross section" of interaction of such BHs with the visible matter and very low "visibility" of such BH (due to low intensity of Hawkins radiation they emit), they indeed are very suitable candidates

for a dark matter, or at least for a part of it.

Title: Hydrophobicity of Micropatterned PDMS
Authors: J. Fielding Hokanson, Russell M. Bodily, Kylee Stoddard, and Chris Monson
Affiliation: Southern Utah University
We have developed a method to make highly hydrophobic layers of polydimethylsiloxane (PDMS) by dilution in alkane solvent and addition of sacrificial magnesium particles, followed by sonication in hydrochloric acid. Dissolution of magnesium leaves behind pillar-like PDMS structures on the surface of our substrate which exhibit hydrophobic characteristics. Hydrophobicity and layer clarity can be manipulated by changing solvent type, PDMS to solvent ratio, and percent magnesium. Aging PDMS slurry can improve hydrophobicity.

Title: Investigation of the Electronic Properties of Homobinuclear Iridium Complexes
Author: Matthew B. Prater
Affiliation: Southern Utah University
Binuclear metal complexes have garnered interest in recent decades, yet numerous details remain unexplored. While many enzymes leverage binuclear catalysis in their processes, progress in applying this phenomenon outside of enzymatic contexts has been limited. Means of improvement over mononuclear complexes generally remains unexplored. Homobinuclear complexes, featuring two identical metal centers within a single complex, pose intriguing challenges, particularly in elucidating exact mechanisms governing traditional organometallic steps such as oxidative addition, migratory insertion, transmetallation, and reductive elimination. Recent advances in the synthesis of Ir complexes offer a promising avenue for construction of novel homobinuclear complexes tailored to investigate electron transfer mechanisms, which we propose will offer insight into organometallic steps.

The synthesis of a variety of bisiridium complexes is already underway. These complexes will undergo extensive photo- and electrochemical experiments to initially decipher the impact of electron-donating and withdrawing groups on the system. This presentation will detail the background of the research, as well as ongoing efforts

Title: Analysis of Thermospheric Neutral Densities Using GOCE Satellite Observations
Author: Agustina Peck, Ivana Molina, and Ludger Scheirless
Affiliation: Utah State University
The thermosphere is a layer of the atmosphere that extends from about 90 to 500 km. Thermospheric neutral densities are critical in planning of Low Earth Orbit satellite missions, as the neutrals produce perturbations in the orbits due to drag. Because the ionosphere is embedded in the thermosphere, gaining insight into the variability of thermospheric densities improves our understanding of how the thermosphere, ionosphere, and lower atmosphere are coupled. The ionosphere, in turn, affects technologies such as HF communications and GNSS positioning.

Title: Manganese Desert Rose Nanoparticles Formation using FusionRed.
Authors: Nakelle Goldie, Taytum Stratton, Simon Langlois, and Christopher Monson
Affiliation: Southern Utah University
In comparison to other nanoparticle types, relatively few studies have investigated manganese nanoparticles. In our research project, we utilize a microfluidic device to synthesize manganese nanoparticles. Manganese acetate is the metal ion source and sodium dithionite is the source of oxide. Various proteins have been used to yield particles of different size and shape, including FusionRed, GFP, BSA and casein and mutated variants. The use of these proteins have resulted in different sizes and shapes of the nanoparticles. We primarily use FusionRed for the formation

of our desert rose nanoparticles. These nanoflowers have relatively large surface area and could therefore be useful for electrocatalysis. Making the nanoparticles without a microfluidic device gave us a broader size distribution, shorter time for nanoflower formation and led us to come up with a plausible mechanism. We propose that these nanoflowers are formed by the association between the manganese ions and a cluster of negatively-charged residues on FusionRed, leading to the formation of sheets. These sheets then interact with each other in various ways to form the petals of the desert rose nanoflowers that we see.

Title: Organic chemistry students' perceived costs and goal orientations
Author: Seunghwan Shin
Affiliation: Southern Utah University
Organic chemistry is one of the most feared and failed courses in the undergraduate curriculum. Consequently, studying what makes this course "too difficult" as perceived by students is worthwhile because these perceptions result in many students not considering STEM majors because they require chemistry courses. Our research group has investigated perceived costs in general chemistry, and this study expands our understanding of these constructs in organic chemistry. Students' perceived costs of a chemistry class can be many, such as task effort, loss of valued alternatives, emotional, and others. These costs might be overcome by students' interests and goals, yet the level of perceived costs might have a lasting impact on the students' overall perception of chemistry and their desire to pursue chemistry and other STEM careers in the future. In this study we investigated the mentioned subclasses of perceived costs, other salient perceived costs, and mastery or performance goal orientations and the impact these constructs may have on students' experiences in organic chemistry classrooms. Expanding on a previous study in general chemistry, we present the results of interviews we conducted with students in this class. Our results reveal that students struggle with the content, pace, and overall difficulty of the material. These results are not surprising; however, we also uncovered the students' deep desire to learn and understand the material, the motivating effect of having a good relationship with their professor, and many other themes that emerged from our conversations.

Title: MSR Research
Authors: Isabella Gonzalez and Angie Ordoñez
Affiliation: Snow College
The next phase of nuclear reactors is poised to revolutionize the world. These are the molten salt reactors (MSR). However, before these reactors can become operational the thermodynamic properties of the molten salts must be studied. The eutectic salt mixtures necessary for MSRs are difficult and expensive to study experimentally. The most economical method for studying these mixtures is through computational methods. Historically these methods have been limited to extrapolating from experimentally derived values. However, in this presentation, we will present a novel way to use computational methods to fully predict thermodynamic values that have never been studied experimentally. We will also report the heat capacity, coefficient of thermal expansion, and aggregation effects in a promising new eutectic mixture of LiF and UF4.

Title: Numerical Analysis of Stable Steady state solutions in a Gray-Scott model
Author: Samuel Andersen
Affiliation: Southern Utah University
We study a Gray-Scott model arising from chemistry. Using nondimensionalization, we reduce the number of parameters, we also analyze the stability of the steady state solutions of the system using numerical analysis. This shows us the final concentrations of two different species in an autocatalytic reaction.

Title: Photo-induced Reactivity of a Model Dipyrrole
Authors: Samuel Archer, Jaren Meikle, and Jacob Dean
Affiliation: Southern Utah University
Dipyrroles are a class of bicyclic and heterocyclic compounds ubiquitous in nature as subunits to biological photo-sensors. As such, these molecules have gained significant attention in the field of photochemistry due to their ability to undergo photoisomerization and photooxidation. Because of these properties and the large absorptivity in the blue region of the electromagnetic spectrum, we are able to initiate these reactions upon irradiation of blue laser light. In this study, the photochemical behavior of a model dipyrrole representative of the central pyrrole pair in natural tetrapyrrole sensors was investigated to model and quantify the mechanism and conditions of its photoreactivity.
When UV-vis spectroscopy readings were taken of the dipyrrole compound to observe the progress of the reaction over hours, transformation of the visible light absorbing feature decayed into a near-UV feature representative of a change of conjugation. Further, this transformation was found to be pH dependent and therefore protonation state dependent. Further research is currently being done to isolate the cause of formation of this unknown product and to determine the rate of conversion to this new product.

Title: Quantum Game Theory and Genuine Quantum Advantage
Authors: Noah Hebdon and Jean-Francois Van Huele
Affiliation: Brigham Young University
In recent decades, principles of quantum physics have been applied to game theory, or the study of strategic interactions between rational actors. As a result, classical games such as the penny flip and the prisoner's dilemma have been modeled with quantum systems. In such models, players may employ principles such as superposition or entanglement as they attempt to maximize their payoff.
Meyer [PRL 82, 1052 (1999)], among others, claims that the use of quantum strategies rewards a player with a 100% chance of victory against a classical player within the penny flip game. I investigate the following question: Can we attribute this quantum advantage to the use of quantum strategies, or is it more appropriately attributed to the arbitrary design of the penny flip game?
As it stands, the quantum player enjoys a greater number of plays than the classical player. Utilizing Qiskit and IBM quantum simulators to model the penny flip game, I will show that a classical player possesses a far lesser chance of victory than the quantum player when given the same advantage of multiple plays, thereby proving that quantum advantage is genuine within the penny flip game.

Title: Spatial visualization versus memorization differences among sexes in organic chemistry
Author: Lauren Jensen
Affiliation: Southern Utah University
Differences in sexes have long been speculated, yet their application in chemistry learning environments has not been well researched. Literature shows that males have larger cerebral volumes for visual capacities more often associated with hands-on projects and courses than female brains. And female brains have larger cerebral volumes for areas associated with memorization and socialization which more highly correlate with lecture-based learning. Given the high attrition of women in chemistry courses, we investigated this phenomenon in organic chemistry topics that are highly visual (e.g. chirality, Newman projections, chair conformations, bond rotations, etc.) and topics that require more memorization (e.g., functional groups, energy values associated with sterics, nomenclature, definitions, etc.). We conducted an anonymous survey with students who are currently enrolled in organic chemistry or have taken organic

chemistry in the past. The questions varied in difficulty as well as levels of visualization or memorization required. The results show correlation with the literature that males score better in the visual-based questions, and females score better in the memorization-based questions. In addition, we conducted interviews with male and female students in organic chemistry, and found that the female students self-generated various techniques to visualize 3D rotations (e.g., use their hands, draw arrows, etc). While most male students didn't adopt these techniques because they were able to do the 3D rotations in their head. With these results, we plan to design course interventions to bridge the gaps between the extremes of visualization vs. memorization-based concepts for the students.

Title: The Impact of Winter Deicing Materials on Water Quality in Weber County, Utah
Authors: Cody Ellsworth, Merick Durtschi, Caitlin Tems
Affiliation: Weber State University
In winter 2022-23 Utah measured a record breaking 30 inches of snow water equivalent, which is 216% of the average (Utah DNR, 2023). Subsequently over 370,000 gallons of deicing material were used on Utah roads to improve transportation safety (UDOT, 2023). In this study, we investigate if deicing materials applied to roadways impact the water quality of Ogden Valley and Ogden Canyon in Weber County, Utah. The primary water source for Ogden is Pineview Reservoir, which is located in the less populated Ogden Valley. We collected in-situ measurements and water samples from the South Fork and Middle Fork of the Ogden River that flow into Pineview Reservoir and along a transect of Ogden River, which flows out of the Pineview Reservoir through the heavily trafficked Ogden Canyon, to assess the impact of deicing materials on water quality between October 2022 and September 2023. Water samples were analyzed on ICP-MS for Na, Mg, Ca, K (major components of deicing materials) and additional trace elements. All elements met EPA drinking standard limits, however, Na, Mg, Ca, and K were two to three times higher in Ogden River in Fall 2022 and Spring 2023 compared to Pineview Reservoir and its inflow streams. This suggests that the deicing material impacts water quality. The concentrations of deicing materials decreased in Fall 2023, which we suggest is due to a substantial input of water to the watershed due to spring snowmelt and is supported by water discharge recorded at the Ogden River USGS Gauge Site. We hypothesize that extreme snowfall plays an important role in flushing the watershed of contaminants and improving water quality. As climate changes and if snowfall in Northern Utah is reduced as projected (Pierce and Cayan, 2012; Klos et al., 2014) this could result in deteriorating water quality in the region.

Title: UVU VASIMR Group: Instrumenting Plasma Diagnostics
Authors: Connor Stong, Tessa Miller, Ben Miera, Josh Gibbons, and Phil Matheson
Affiliation: Utah Valley University
In this study, we present the design and construction of a Langmuir probe diagnostic system for characterizing our plasma source. Langmuir probes are widely used in plasma physics to measure essential plasma parameters such as electron density, electron temperature, and plasma potential. Our probe system has been specifically designed to operate within the specific environment of our small VASIMR engine.
To enhance the plasma density and improve diagnostic capabilities, a mesh reflector has been implemented to redirect the RF energy back into the plasma, effectively increasing the energy and temperature in the system. This modification aims to create a denser and more uniform plasma, facilitating more accurate and reliable measurements.
The presentation will provide an overview of the Langmuir probe theory and its operating principles, emphasizing the importance of proper probe design and data analysis techniques. Additionally, a brief overview of the plasma system and VASIMR engine will be given.
The successful implementation of the Langmuir probe diagnostic system will enable

comprehensive characterization of the plasma source, contributing to a better understanding of the plasma dynamics and paving the way for potential applications in various areas of plasma physics and electric propulsion.

Social Sciences
Oral

Title: Exploring the Intersections of Social Impact, Systems Thinking, and Equity-Centered Design
Authors: Summer Valente, Cassie Bingham, Dr. Sean Crossland, Dr. Ezgi Sertler, and Dr. Stevie Munz
Affiliation: Utah Valley University
This interactive panel will bring together an interdisciplinary group of academic and practitioner experts in social impact education, design thinking, systems thinking, and impact measurement to discuss the intersections between these approaches. The panelists will explore how these strategies can be integrated into social impact work and how they can enhance community engagement. The discussion will also touch on the challenges of implementing these approaches, how to address them, and the potential impact they can have on creating positive social change. Additionally, the panel will provide attendees with practical insights and strategies they can apply in their work, as well as food for thought on how these approaches can be integrated into their organizations and communities. The session will be innovative, creative, and engaging, inspiring attendees to think critically about the intersections between these strategies and their potential to drive positive social change.

Objectives:
1. Participants will gain a deeper understanding of the Pathways model and its six distinct pathways and how they can be applied to develop comprehensive social impact learning experiences for students.
2. Participants will learn about design thinking and systems thinking as strategies for social impact, including the principles of design thinking, its intersection with systems thinking, and how these approaches can be applied to address complex social issues.
3. Participants will explore the importance of theory of change and impact measurement in social impact work, including how to assess impact, identify areas for improvement, and create effective social impact solutions. They will also discuss the challenges of measuring impact and how to address them.

Title: Planning for growth: Toward a mixed-use, transit-oriented, walkable urban future on the Wasatch Front
Authors: Jeremy Bryson and Charles Leech
Affiliation: Weber State University
Utah is growing, and quickly. The state has approximately 3.5 million people right now and estimates suggest that the state will be home to over 5 million people by 2050. Much of the current population and projected growth is happening on the urbanized Wasatch Front. For years, planners and policy-makers have, to varying degrees, attempted to encourage Wasatch Front growth to adopt practices that involve mixed use, transit oriented developments (TOD) with higher levels of walkability This paper will begin by exploring these “smart growth” characteristics and then proceed by examining how these planning principles have been applied in cities along the Wasatch Front. This paper will then look forward to future mixed-use, transit oriented, and walkable developments, specifically The Point and Utah City, and assess the potential impact of these developments. In short, this paper explores how Wasatch Front

communities have used smart growth principles in the past, and how upcoming developments will use those same planning tools to address the continued population growth along the Wasatch Front.

Title: Observer Observer on the Wall Who is Most Biased of Them All?
Authors: Mannie Esplin, Danielle Larsen-Rife, and Kendra Johnson
Affiliation: Utah Tech University
Observer bias of obesity is increasingly important for medical outcomes, an overestimation of weight negatively impacts the quality of care an individual receives (Phenlan., et al 2015). Thus, hurting the patient-client relationship and promoting mistrust and anxiety in the client. It was expected that female observers would provide more accurate reports of female and male participants' weight than male observers' reports of male and female participants' weight. Participants were comprised of students and faculty present at a small university in the Western United States. Participants had to be over 18 to be allowed to participate. Observers estimated participants' weight which was compared to the participants' (N=117) self-reported weight. The female observers were more accurate in their observation of weight in both female (Mean =-10.18) and male participants (Mean=-6.61) compared to the male observers' estimation of weight female participants' weight (Mean= -11.62) and female participants' weight (Mean=-10.48). These results demonstrate the gender of the observer and the gender of the participant impact the observation of weight. Female observers were best at observing weight overall. When observing weight, if an observer of the female gender is unavailable, the observations are more likely to be incorrect. Potentially with training focused on this bias, male observers may overcome this problem. Furthermore, these results also reveal a potential cultural bias relating to weight. Female participants' weight was consistently underestimated by both female (SD= 16.83) (CI= -15.23, -5.12) (p<.001) and male observers (SD=28.72) (CI=-22.54, -.6954) (p=.038) the significant p-values demonstrate the social factors potentially play a role when observing weight. Moreover, when male participants had their weight observed the same effect was not present (SD= 32.68) (CI=-22.55, -.6954) (p=.403) and (SD=36.78) (CI=-25.62,4.66) (p=.116) with a wider Confidence interval revealing a wider range of variation

Title: I Know What you Researched Last Summer!
Authors: Joshua Milliner, Jai K. Earhart, Grace Winder, and Xin Zhao
Affiliation: Weber State University
OUR time as research assistants in Professor Zhao's lab was an enriching experience, culminating in the Expert Interviews project which is aimed at enhancing a widely-used, professor updated, open-source psychology textbook. Tasked with filming, conducting, and integrating video interviews of diverse and practicing professionals, we not only enriched the textbook's content but also bridged the gap between academic knowledge and real-world application. Our responsibilities extended from performing thorough literature reviews to organizing and analyzing data, as well as learning to strategically planning our own experiments. A pivotal part of our project was the innovative use of AI technologies, including ChatGPT and Bard, to analyze textbook chapters, gauge trends among psychology students, and develop tailored interview questions for each expert. This multidimensional approach not only improved the textbook's inclusivity and relevance but also equipped us with valuable skills in research methodology, data management, and the ethical application of AI in academic settings. The project's success lies in its potential to influence psychology education nationwide, making it more representative, engaging, and aligned with current professional practices.

Title: The Demography of Apostasy, Conversion, and Retention Among Members of The Church of Jesus Christ of Latter-day Saints in Utah

Authors: Ryan T. Cragun, Bethany Gull, and Rick Phillips
Affiliation: University of Tampa, Utah Tech University, University of North Florida
This paper uses a sample of 1152 Utahans to examine the demographic characteristics of people who have switched religious denominations or forsaken religion entirely. We focus primarily on The Church of Jesus Christ of Latter-day Saints, by far the largest denomination in the state. We compare the demographic characteristics of lifelong Latter-day Saints with converts, and with those who have left the church. Using a stratified sampling strategy to adjust for Utah's population characteristics, we find that an increasing number of Utahans have abandoned organized religion and now report no denominational preference. We also find that self-identified members of The Church of Jesus Christ of Latter-day Saints are no longer a majority in the state. Our estimates show that the proportion of Utahans belonging to the church has declined from two-thirds in the early 1990s to about 42 percent today. Even more so than other Utahans, those who have left the LDS Church have not joined another denomination and describe themselves as having no religion. We discuss the implications of these findings for Utah's politics and culture.

Title: Playing with Race in Dungeons and Dragons
Authors: Christopher LeCluyse
Affiliation: Westminster University
As the fantasy role-playing (RPG) game Dungeons and Dragons (D and D) marks its fiftieth anniversary, it is more popular than ever. While the game has from its inception attracted players who do not conform to the stereotypical image of D and D players as young white cisgendered heterosexual men, its player base is arguably also more diverse today than at any time in its history. This presentation analyzes the results of semi-structured interviews with sixteen people of color who play D and D as part of a larger investigation of how the game portrays race the first study of its kind. Representing a wide range of racial, ethnic, gender identities, US geographical regions, and levels of experience, participants shared how they engage with race in the game, whether to reflect their real-world racial identities or to escape them. They identified particular fantasy races, most notably orcs and drow, that reflect real-world racial biases and discussed to what extent they use the game to engage with or challenge such depictions. While most participants portrayed their own gaming communities as inclusive and welcoming, some also shared experiences of racism and sexism at the gaming table and in gaming stores. By far the most common theme in participants' responses was of fantasy as freedom. Playing D and D and other RPGs affords people of color choices about how they signify racially that they cannot make in daily life. The ways in which RPGs cultivate agency in making such choices aligns with psychological research on the role of stories in shaping both general and racial/ethnic identity. In a fantasy realm of wizards and dragons, perhaps the greatest imaginary leap is to inhabit a world free from racism, sexism, and exclusion.

Title: "I Read the News Today, Oh Boy": Oppositional Consciousness-Raising in British Invasion Rock
Author: Theresa Martinez
Affiliation: University of Utah
British Invasion rock bands emerged within a particularly unique societal context. World War II had a significant and lasting impact on generations of British youth growing up in the economic hardship of its immediate wake. There were, in fact, quite a lot more youth to go around with a postwar baby boom of sorts, mirroring a similar boom in the U.S. These youth were, in addition, directly impacted by the change in British conscription laws which ended the draft, leaving idle a generation of working-class teenagers who would create their own unique identities. At the same time, English youth were influenced by a late 1960s zeitgeist made up of various facets,

including a counterculture that questioned authority as well as antiwar demonstrations against a brutal and costly war in Southeast Asia. These elements would have a profound influence on the British Invasion rock bands caught up in such transformation and turmoil. This paper focuses on a lyrical and thematic analysis of the work of three legendary British Invasion bands as they reflect on and respond to the sociohistorical context of their times. The paper specifically unpacks the lyrics of our British Invasion bands through a theoretical lens that evokes oppositional cultures or cultures of resistance within distinct social locations or cultural formations—a distinctive brand of oppositional consciousness-raising within a most turbulent time.

Title: College Students and Professors Perceptions of a Student with ADHD: Does the Gender Matter?
Authors: Jackson Anderson, Aonika Russell, Rick Anderson, Kathryn Sperry., Ph.D.
Affiliation: Weber State University
Attention-Deficit/Hyperactivity Disorder (ADHD) is an increasingly prevalent disorder, affecting between 3% and 12% of children and adolescents, and between 2 and 6% of the adult U.S. population (Canu et al. 2008; Lebowitz, 2016; Vance & Weyandt, 2008). The symptoms alone make it difficult for students to thrive academically (Vance & Weyandt, 2008) and mental health stigma adds a layer of arduousness through their academic journey. The present study examined the perceptions of male and female college students who have ADHD.
Participants (n = 281 students; n = 101 professors) were randomly assigned to read one of two vignettes detailing either a male or female student with symptoms consistent with ADHD. Participants were given the following measures: Attributions for ADHD Questionnaire, Anticipated Behavior Form ("How likely is it that…Eric/a will do his/her share of the workload"), Social Distance Scale ("How likely would you be to…exchange phone numbers with Eric/a"), ADHD stigma, Expectation of Disruptive Behaviors, and Deservingness of Academic Accommodations.
Findings indicated that male and female college students with ADHD were perceived similarly on several measures. Professors had more positive perceptions of the student with ADHD compared to the undergraduate participants. This was true on the anticipated behavior form, $F(1, 373) = 18.93$, $p < .001$, and on the likelihood of disruptive classroom behaviors, $t(139.40) = 6.93$, $p < .001$. Professors were more likely to agree that students with ADHD deserve academic accommodations compared to student participants, $F(1, 372) = 55.66$, $p < .001$. Consistent with the aforementioned findings, professors also had lower levels of ADHD stigma on five out of the six subscales of the ADHD stigma scale.
Findings suggest that the gender of the target did not impact perceptions of college students with ADHD, but students exhibited more negative perceptions on several measures compared to professors.

Title: Becoming Fannibals: Identity and Engagement in the "Hannibal" Fandom
Authors: Francis Vales
Affiliation: Salt Lake Community College
"Hannibal," a TV crime drama based on Thomas Harris's book series of the same name, aired on NBC from 2013 to 2015 and has garnered a large following that continues to grow even ten years after the show's debut. This paper analyzes the fandom surrounding NBC's "Hannibal;" why it has been so prolific; and how its fans interact with the show, each other, and fan-made content online. It also examines how the "Hannibal" fandom operates and the motivations, experiences, and identities of those within it. To understand the experiences of fans of "Hannibal," a 39-question anonymous Google Forms survey was promoted in social media groups dedicated to the show. A majority of participants identify as 2SLGBTQIA+, white,

neurodivergent, and having a mental health condition. Many respondents reported feeling represented or seen by “Hannibal,” being inspired by the show to create art, and feeling a part of a community in the fandom. Some people said that “Hannibal” stands out among TV shows with 2SLGBTQIA+ representation, and that the gory and horrific nature of the show is an integral part of its appeal to 2SLGBTQIA+ fans. Some participants reported a feeling of pride and accomplishment in their fan-made content, especially fan art and fanfiction. Many said that “Hannibal” helped them understand or question their gender or sexuality, and that the show and fandom have inspired them to pursue interests in psychology, film, art, and criminology. Most participants appreciate the show for its visual aesthetic, writing, and themes. Some people discuss appreciating how “Hannibal” adapted its source media, and that this adaptation provides better 2SLGBTQIA+ representation as well as more opportunities to engage with the media.

Title: Analysis of gene expression related to learning and ethanol tolerance development in honey bees (Apis mellifera)
Authors: Rachel E. Robinson, Zachary D. Tadler, Hannah M. Hughes, Chandler M. Peterson, Lindsey R. Aune, Brennan M. Brown, Jackson T. Anderson, and Timothy E. Black
Affiliation: Weber State University
Apis. mellifera are a model of learning and ethanol consumption behaviors. By analyzing the ability to develop a color bias under conditioning, we observed their ability to learn under different ethanol concentrations. Gene expression was measured using RT-qPCR. It is hypothesized that as the quantity of ethanol ingested by bees increases, there will be changes in HSP70 and BKP expression while learning capacity will decrease.

Title: Trust as the Wormhole of Organizational and Social Change and Transformation: Building Bridges and Accelerating Progress
Author: Jonathan H. Westover
Affiliation: Utah Valley University
In the vast cosmos of organizational and social change and the mysteries of the universe, there exists an intriguing parallel between the hypothetical concept of wormholes and the transformative power of trust in driving societal transformation. Just as wormholes are theoretical tunnels that connect distant points in spacetime, trust acts as a metaphorical bridge that connects individuals, communities, and organizations in the pursuit of organizational and social change and transformation.
The connection between wormholes and trust invite us to transcend conventional boundaries and explore new possibilities. Just as wormholes challenge the limitations of spacetime, trust challenges the barriers and divisions that hinder progress and organizational and social transformation. By recognizing the power of trust and nurturing meaningful relationships, we can harness the potential of these metaphorical wormholes to bridge gaps, amplify efforts, and create a future that is characterized by collaboration, equity, and positive change. Let us embark on this journey of trust, harnessing the energy of connections, and propel ourselves towards a brighter, more inclusive, and transformative tomorrow.
This developmental conceptual paper will explore the connection between wormholes and organizational and social change, highlighting the role of trust as the catalyst that propels collective action, accelerates progress, and enables the traversal of barriers and limitations.

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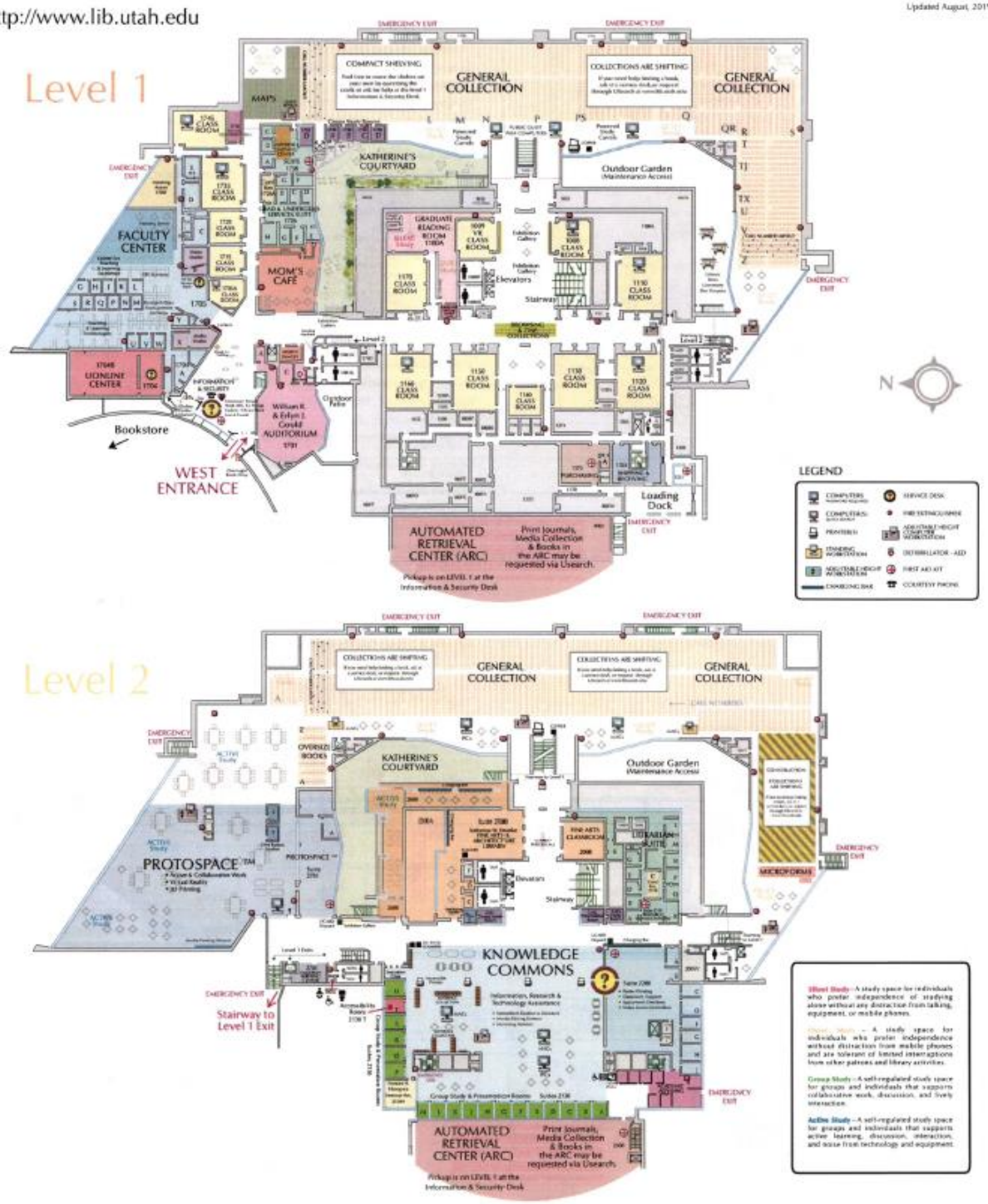

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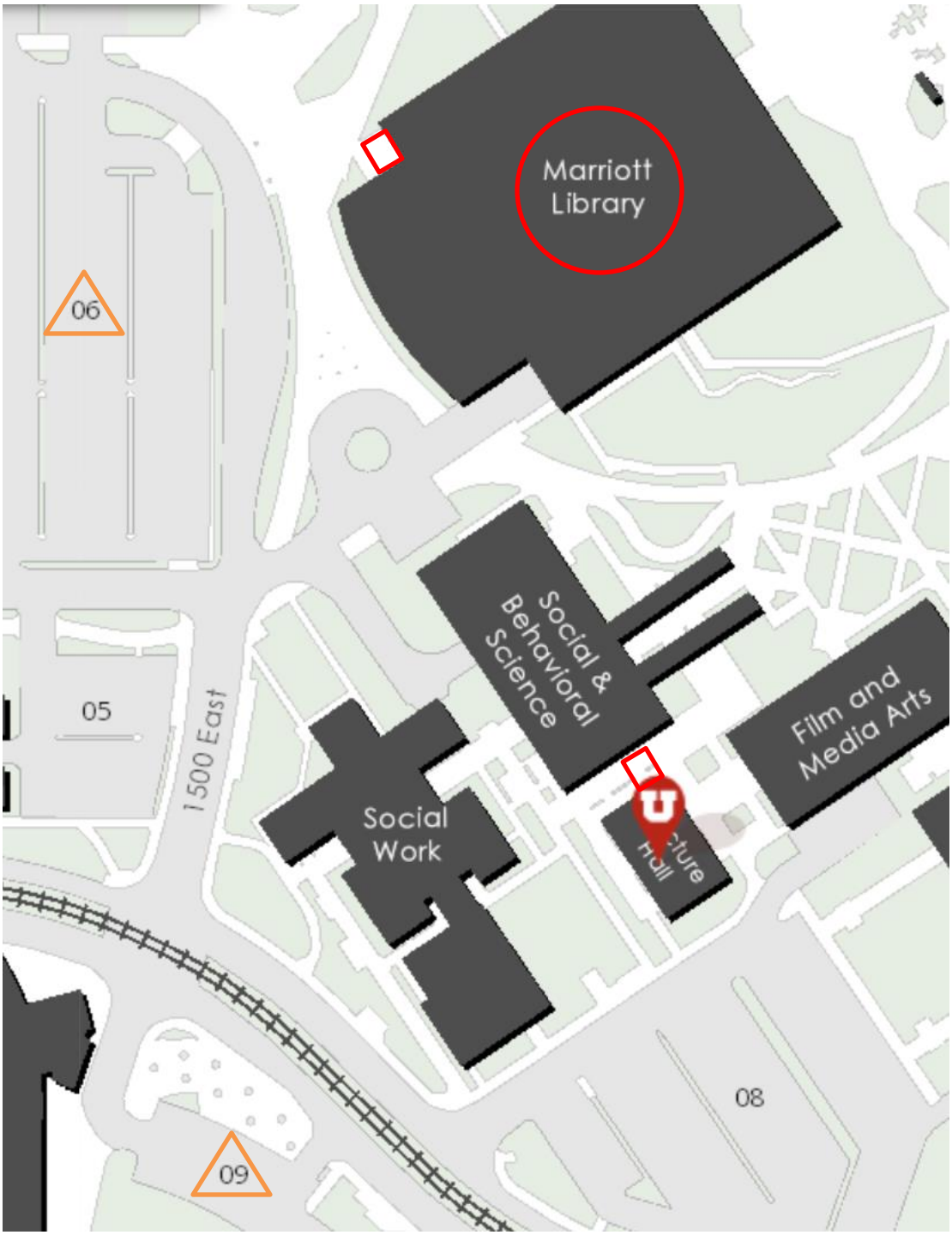

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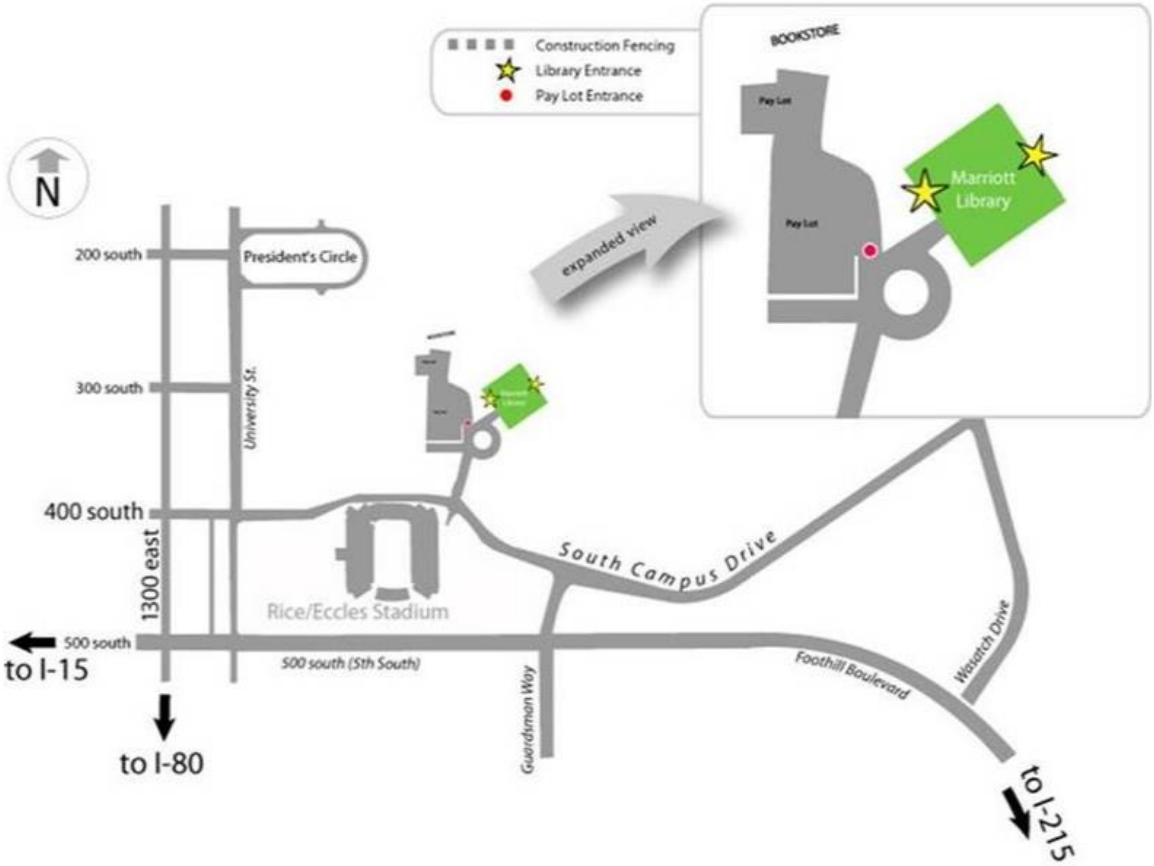
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President's Circle
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University St.
400 south
1300 east
Rice/Eccles Stadium
South Campus Drive
500 south
to I-15
500 south (5th South)
Guardsman Way
Foothill Boulevard
Wasatch Drive
to I-80
to I-215

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In Honor of Dr. James H. Wolfe

The Utah Academy of Sciences, Arts, and Letters honors Dr. Wolfe in acknowledgement of his donation to The Academy, which is used to fund and promote undergraduate research initiatives at institutions across the state of Utah.

James H. Wolfe was a brilliant mathematician and influential professor at the University of Utah for decades.

As an undergraduate, James studied at the University of Utah. He became Professor of Mathematics there after obtaining his Ph.D. from Harvard University in 1948. While living in Cambridge, James worked at MIT's radar research laboratory during WWII. His studies at Harvard involved geometric integration theory which resulted in Wolfe's Theorem, a current research topic in mathematical topology.

At the University of Utah, James was a treasured teacher who learned all of his students' names within the first few days of class and provided meticulous notes for each lecture. Cryptically, mathematical symbols used in examples always reflected the names of those dear to him, especially his wife, Martha.