

UTAH ACADEMY of Sciences, Arts & Letters

Established 1908

Annual Conference

March 18, 2023

Waterford School

UTAH ACADEMY OF SCIENCES, ARTS, & LETTERS

Annual Conference - Saturday, March 18, 2023 WATERFORD SCHOOL

9:00 a.m. – 10:00 a.m.

Check-in and Registration

10:00 a.m. – 10:05 a.m. – Dan Poole, President Waterford School

10:05 a.m. – 10:30 a.m. – Angela Banchero-Kelleher, President-Elect Distinguished Service Award Presentation Dr. Scott Abbott

> Dan Poole, President John and Olga Gardner Prize Presentation Dr. Matthew Wickman

10:30 a.m. – 11:15 a.m. Dan Poole, President O.C. Tanner Lecture "From Atomic Bombs to Nuclear Energy" By Sid Green

11:15 a.m. – 11:30 a.m. Conference Photo

11:30 a.m. – 12:00 p.m. **Poster Session**

Hallway

12:00 p.m. – 1:00 p.m.

Lunch - 611

1:00 p.m. – 2:30 p.m. **Division Breakout Session** See "Division Session Room Assignments"

See Division Session Room Assignme

- 2:30 p.m. 3:00 p.m. **Refreshment Break** Room 611
- 3:00 p.m. 4:30 p.m.

Division Breakout Session

See "Division Session Room Assignments"

5:00 p.m. - 6:00 p.m.

UASAL Board Meeting

Conference room ?

Room Assignments

POSTER SESSION:

Session: Hallway

ARTS:

Session A: Room: 609

BIOLOGICAL:

Session A: Room: 613

BUSINESS:

Session A: Room: 620

EDUCATION:

Session A: Room: 603

ENGINEERING:

Session A: Room: 615 Session B: Room: 617

HUMANITIES/PHILOSOPHY/FOREIGN LANGUAGE: Session A: Room: 612

KINESIOLOGY AND HEALTH SCIENCES Session A: Room: 618

LANGUAGES/LITERATURE: Session A: Room: 626

PHYSICAL SCIENCES: Session A: Room: 605

SOCIAL SCIENCES: Session A: Room: 614

- 1. To Access Wireless Internet:
- 2. WS Guest
- 3. Password Waterford (all lower case)

Spring Excursion:

Being Planned: More to come through emails provided from your registration. Excursion Idaho National Laboratory Idaho Falls, Idaho https://inl.gov/about-inl/visitors/

Distinguished Service Award Dr. Scott Abbott

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

Scott Abbott put himself through college working summers as a roughneck on drilling rigs in the San Juan Basin of New Mexico and Colorado. He received his doctorate in German Studies from Princeton University in 1979. After two years as a full-time lecturer at Princeton, he taught for seven years at Vanderbilt University in Nashville. He joined the Department of German and Slavic Languages at Brigham Young University in 1988. With Sam Rushforth, he co-founded a BYU Chapter of the American Association of University Professors to take on academic freedom violations. The Chapter's activism resulted in a powerful censure of the BYU administration by the AAUP Since 1999.

Abbott has been a professor of Integrated Studies, Philosophy and Humanities at Utah Valley University, where he co-founded and has led a UVU chapter of the AAUP. Abbott's books include a study of Freemasonry and the German novel; a book of what he calls "fraternal meditations" written after his brother's death of AIDS; conversations spanning a decade while riding mountain bikes with botanist Sam Rushforth; three works with Serbian novelist Žarko Radaković about travel in the former Yugoslavia and then in war-torn Serbia and Bosnia; an exploration of the meanings of barbed wire with historian Lyn Bennett; and most recently a book of collected essays from the BYU years: Dwelling in the Promised Land as a Stranger. He has translated works by Nobel Prize Awardee Peter Handke and botanist Gregor Mendel.

John & Olga Gardner Prize Dr. Matt Wickman

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

Dr. Matthew Wickman (PhD UCLA) began working at BYU in 2000. Trained in literary theory and eighteenth-century British literature, his early work focused primarily on Scottish literary and intellectual history of the eighteenth century and after. Eventually, he held a joint appointment between BYU and the University of Aberdeen, in Scotland.

In 2012, he was named Founding Director of the BYU Humanities Center, and he spent the next decade working with colleagues across BYU's College of Humanities, and with scholars around the world in multiple disciplines, to create initiatives strengthening and promoting humanities scholarship. These initiatives included named lectures, large symposia, research groups, weekly meetings featuring scholarly work in progress, workshops, formal conversations regarding important trends in higher education, venues for student mentoring and research, and wide-ranging forms of community engagement. His term as director of the BYU Humanities Center concluded in 2022, and he assumed a new role as associate coordinator of the BYU Faith and Imagination Institute.

He is the author of more than forty articles and book chapters. Additionally, he has published two monographs – The Ruins of Experience: Scotland's "Romantick" Highlands and the Birth of the Modern Witness (2007) and Literature after Euclid: The Geometric Imagination in the Long Scottish Enlightenment (2016) – and co-edited the volume Walter Scott at 250: Looking Forward

(2021). His recent work explores literature's relationship to religious and spiritual experience. His publications on that subject include the book Life to the Whole Being: The Spiritual Memoir of a Literature Professor (2022).

O.C. Tanner Lecture

"From Atomic Bombs to Nuclear Energy" Dr. Sid Green

Atomic fission bombs developed in WWII led to fusion hydrogen bombs and a world with "assured mutual destruction" nuclear weapons capabilities. US above-ground testing, near to Southern Utah, prior to the above-ground moratorium, was followed by very successful underground testing. Commercial applications of nuclear electricity emerged, with the Westinghouse Shippingport, PA reactor in 1958 the first for the US. Although nuclear incidents at Three-Mile Island, Chernobyl, and Fukushima happened along the way, nuclear energy now provides about 10% of world electricity and 20% of US electricity. Most importantly impacting US nuclear energy are the high costs and long times for large gigawatt power plant construction, leading to small-scale and even micro-scale nuclear plant plants of fail-safe designs being considered. Although not presently with unanimous agreement, safe nuclear energy is an exceedingly important part of the energy transition to reduce carbon emissions.

Sidney Green is founder and President of Enhanced Production, Inc. and is Research Professor at the University of Utah where he holds an appointment in Mechanical Engineering. He is a founder and past President/CEO of TerraTek in Salt Lake City, a well-known engineering firm that was acquired by Schlumberger in 2006. He has published many papers, holds a number of patents, and has given many invited presentations. He has served as Director for a number of companies, served on Government Committees and University advisory boards, and has testified at various Congressional hearings. He has served on a number of National Research Council/National Academies committees. Mr. Green has a BS and MS in Mechanical Engineering. He attended the University of Pennsylvania graduate school, and he received the degree of Engineer from Stanford University in Engineering Mechanics in 1964. He has received the Outstanding Engineer award for the State of Utah, Entrepreneur of the Year from the Mountain West Venture Group, the Professional Engineer Award from the Missouri Univ. of Science and Technology, and the Honorary Alumni Award from the University of Utah. He is a past member of the Greater Salt Lake Chamber of Commerce Board of Governors, he is a Fellow of the American Rock Mechanics Association, and is chair of the Utah Academy of Engineering and Science. He lives in Salt Lake City, Utah with his wife of sixty-two years, and is a member of the National Academy of Engineering.

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 <u>http://www.utahacademy.org/</u>.

Utah Academy Officers

Daniel Poole	President
Angela Banchero-Kelleher	President-Elect
Rachel Keller	Past-President
Jim Godfrey	Arts Chair
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CoCo James	Member at Large

Poster Presentations <u>Poster Session</u> Division Chair: Jacque Westover Utah Valley University

SESSION A: Session Leader: Jacque Westover

Biological Sciences

Title: Ability of phage penetration in *Staphylococcus aureus* biofilms and potentially act synergistically with antibiotics

Presenters: Allexis Koplin, Rainey Hughes, and Yeshi Dudde Authors: Allexis Koplin, Rainey Hughes, and Yeshi Dudde Affiliation: Weber State University:

Title: Brain-eating amoeba rescue-of-infection model using drug combinations Presenter: Isaac Roy

Authors: Daniel Clark, Isaac Roy, Karissa Baeur, Antonio Fazio, Kennedy Lewis, and Kemri Stilson Affiliation: Weber State University

Title: CRISPR Deletion of Viral Receptors

Presenter: Rylan Schmanski Authors: Daniel Clark, Dylan Salas, Rylan Schmanski, Branden Brooks, Bryson Taylor, and Mason Masters Affiliation: Weber State University

Title: Ditch the Stress: How Mindfulness Activities Affected Perceived Stress and Mood in University Students During the COVID-19 Pandemic

Presenter: Dylan Gardner Authors: Jayden Peacock, Korina Ziegler, Colton Davis, and Dylan Gardner Affiliation: Southern Utah University

Title: Generation and characterization of zebra fish model to examine the pathophysiological mechanisms and treatment of Wolfram Syndrome 2 Presenters: Rosemary Mwithiga, Youssef Harraq, and Reign Krieger Authors: Rosemary Mwithiga, Youssef Harraq, Reign Krieger, and Hung Yu Shih Affiliation: Utah Tech University

Education

Title: How and What Principals need to know to support Special education teachers Presenter: Mallory Poole Author: Mallory Poole Affiliation: University of Utah

Title: Looking for what Educators Need to meet the Needs of English Language Learners Presenters: David R. Byrd, Shernavaz Vakil, and Melina Alexander Authors: David R. Byrd, Shernavaz Vakil, Melina Alexander, and Denise Wright Affiliation: Weber State University

Engineering

Title: The Arduino Platform as a Cost-Effective Field Data Collection Tool

Presenter: Jake Olvera Authors: Jake Olvera, Madeline Wilkerson, and Jacqualine Grant Affiliation: Southern Utah University

Physical Science

Title: Oxidation of Indoline with Ruthenium(III) Chloride

Presenter: Wyatt Evans Authors: Matthew Prater and Wyatt Evans Affiliation: Southern Utah University

Title: Natural Language Processing with Quantum Computers

Presenter: Thomas Draper Author: Thomas Draper Affiliation: Brigham Young University

Title: Study of the Photophysical Properties of N,N'-bis(salicylidene)-1,2-ethylenediimine in Polar Solvents

Presenter: Jackson Reese Authors: Jackson Reese and Hussein Samha Affiliation: Southern Utah University

Title: Direct One-pot Grignard Formation and Addition to Imine Electrophiles

Presenter: Kaden Jensen Authors: Kaden Jensen, Austin Flynn, and Matthew B. Prater Affiliation: Southern Utah University

Title: Superhydrophobicity of Micro-patterned PDMS

Presenters: J. Fielding Hokanson, and Russell M. Bodily Authors: J. Fielding Hokanson, Russell M. Bodily, and Christopher F. Monson Affiliation: Southern Utah University

Title: Conservation of the Endemic Coral Pink Sand Dunes Tiger Beetle, *Cicindela albissima* biology?

Presenter: Kate Ehlert Authors: Kate A. Ehlert, Dylan T. Gardner, Kayla C. Walker, Fredric R. Govedich, Bonnie A. Bain, Samuel A. Wells, and Rachel T. Bolus Affiliation: Southern Utah University

Title: Changes in Intrinsic Tryptophan/Tyrosine Fluorescence (ITF) as a Method to Study Conformational Changes in Oxidized Proteins

Presenter: Steven Rimmasch Authors: Steven Rimmasch, and Tracy Covey Affiliation: Weber State University

Title: Nucleophilic Aromatic Substitution of Nitrophenyl Sulfonates with Grignard Reagents

Presenter: Ashley Hartwig Authors: Ashley C. Hartwig, and Nathan S. Werner Affiliation: Southern Utah University

Social Sciences

Title: Utah's Conspiracy Theory Beliefs

Presenter: Trevin Nielsen Authors: Trevin Nielsen, McKenna Benson, Jose Patino, Braden Johnson, and Emma Wallace Affiliation: Snow College

Title: Commonalities between women's birth stories, What makes experiences similar or different between women?

Presenter: Tricia Thalman Authors: Tricia Thalman, Morgan Smith, Kylie Bloomquist, and Kade Simmons Affiliation: Snow College

Title: Recognizing Sexual Assault

Presenter: Whitney Nielson Authors: Whitney Nielson, Eliana Hadley, Nettie Graham, Kelsie Tippets, and Sydney Morrill Affiliation: Snow College

Title: Establishing and clarifying a modern definition of cyberstalking as well as analyzing the different applications between men and women

Presenter: Jessie Romo Authors: Jessie Romo, Azlyn Ristine, Landen Nielsen, and Alaric Martinez Affiliation: Snow College

Title: Law and Order Effect and Implications

Presenter: Ayden Bash Authors: Ayden Bash, Kalynn Livingston, and Danielle Noorda Affiliation: Snow College

Title: And How Does That Make You Feel? The Importance of Mental Health Conversations Among Elementary School Students in Upper-Grade Levels and Their Parents

Presenter: Denisse Zepeda Author: Denisse Zepeda Affiliation: Salt Lake Community College

Title: The Aftermath of Rape

Presenter: Adyson LeeMaster Author: Adyson LeeMaster Affiliation: Brigham Young University

Title: Does Combat Experience Affect One's Religious Beliefs?

Presenter: Allye Baker Author: Allye Baker Affiliation: Salt Lake City Community College

Title: Let's jam: Can music alter the response to a stressor?

Presenter: Ryan Coburn Authors: Ryan Coburn, Vitaliy Walker, Tatiana Leroy, Austin Booth, Bethany Blair, Brittney Stockholm, Crystal Tejada, Hannah Momoh, Lorely Olguin, and Manuel Quijas Ornelas Affiliation: Utah Valley University

Title: Understanding Drug-Related Harm Reduction Practices

Presenter: Ellie Llewelyn Author: Ellie Llewelyn Affiliation: Salt Lake Community College

Title: Insecure Attachment: Predictor of Antisocial Personality Disorder

Presenter: Maria Balaceanu Authors: Maria Balaceanu, Alyssa English, Dannelle Larsen-Rife, Ed Wu, Grace Carsey, Ives Hong, Rosemary Mwithiga, Youssef Harraq, and Tara Caplin Affiliation: Utah Tech University

Title: Understanding Us - Street Tai Chi

Presenter: Kassidy Drage Authors: Kassidy Drage, Luis Valentan, and Francesco Vales Affiliation: Salt Lake Community College

Title: The Attachment Doula Dynamic: A Mediation Analysis of Pain Management During Labor and Delivery

Presenter: Grace Carsey Authors: Grace Carsey, Dannelle Larsen-Rife, Ed Wu, Alyssa English, Youssef Harraq, Rosemary Mwithiga, Miles Yablonovsky Ives Hong, Tara Caplin, Jake Leaverton, Hunter Mitchell, and Maria Balaceanu Affiliation: Utah Tech University

Title: What Values Are Preferred in a Potential Mate, and Which Values Are a Deal Breaker When Absent?

Presenters: Sydney Muller, Adrienne Shelley, Aftyn Marker, Corbyn Anderson, Tristan Heber, Breana Barson, and Breena Bailey Authors: Sydney Muller, Adrienne Shelley, Aftyn Marker, Corbyn Anderson, Tristan Heber, Breana Barson, and Breena Bailey Affiliation: Snow College

Title: Exploring the Prevalence and Determinants of Academic Dishonesty Among College Students: A Survey Study

Presenters: Jay Berry, Tiana Stanley, and Valeria Perdomo Authors: Jay Berry, Tiana Stanley, and Valeria Perdomo Affiliation: Snow College

Title: Women, Weight, and the Workplace

Presenter: Niko Dawson Authors: Niko Dawson (Mentor: Dr. Brandon Koford) Affiliation: Weber State University

Oral Presentations

<u>Arts</u>

Division Chair: Jim Godfrey Utah Valley University

SESSION A:

Session Leader: Jim Godfrey

1:00 p.m.

Title: Music Paintings and the Fashioning of an Early Modern Cardinal in Rome: The Case of Cardinal Francesco Maria del Monte Presenter: Charlotte Poulton Author: Charlotte Poulton Affiliation: Utah Valley University

1:15 p.m.

Title: Towards an Invention of Style: Encoding Aspects of the Twentieth-Century Post-Tonal Tradition for use in Contemporary Classical Solo Piano Improvisation Presenter: Evan B. Whitfield Author: Evan B. Whitfield Affiliation: Southern Utah University

1:30 p.m.

Title: Romantic Ballet and the Rejection of the Male Gaze Presenter: Roxanne Gray Author: Roxanne Gray Affiliation: University of Utah

1:45 p.m.

Title: Sylphs Supporting Sylphs: Confronting Gender Binaries in the Classical Ballet Canon Presenters: Jamie A. Johnson and Christa St. John Authors: Jamie A. Johnson and Christa St. John Affiliation: Utah Valley University

2:00 p.m.

Title: Visualities of Identity, Citizenship, and Place in Monument to the Rohwer Deceased Presenter: Jacob Jensen Author: Jacob Jensen Affiliation: University of Utah

2:15 p.m.

Title: Susan Chen and the Conditional Acceptance of Asian Americans Presenter: Natalie Bond Author: Natalie Bond Affiliation: University of Utah

2:30 p.m. Break

2:45 p.m.

Title: Active Analysis and the Acting Classroom Presenter: Michael Shipley Author: Michael Shipley Affiliation: Utah State University

3:00 p.m.

Title: The Relationship Between Music Instruction and Academic Performance Presenter: Douglas Stump Author: Douglas Stump and Laura Peterson Affiliation: Southern Utah University

3:15 p.m.

Title: Maya Deren's "Ritual in Transfigured Time": An Example of Avant-Garde Dance Presenter: Fiona Barnard Author: Fiona Barnard Affiliation: Utah Valley University

Biological Sciences

Division Chair: Daniel Clark Weber State University

SESSION A: Session Leader: Daniel Clark

1:00 p.m. Welcome

1:15 p.m.

Title: Chimeric Autoantigen Receptor (CAAR) T cells as a Novel Immunotherapy for Autoreactive B Cells in Graves' Disease Presenter: Mackenzie Hansen Authors: Authors: Mackenzie Taylor, Abigail Johnson, Hunter Lindsay, Joshua Bennett, Kim L. O'Neill, and K. Scott Weber Affiliation: Brigham Young University

1:30 p.m.

Title: Toxic Metal Sequestration Using Microfluidics Presenters: Jacob Kjeldahl Jensen and Christopher F. Monson Authors: Jacob Kjeldahl Jensen and Christopher F. Monson Affiliation: Southern Utah University

1:45 p.m.

Title: A Genetic and Morphological Review on Southern Utah Bumblebees - *Bombus morrisoni* and *Bombus nevadensis* Presenter: Isaac Sorensen Authors: Isaac Sorensen, Jake Olvera, and Jackie Grant (Brigham Young University) Affiliation: Southern Utah University

2:00 p.m.

Title: An examination of the highly variable P8 region (trnL intron) in the genus *Equisetum* Presenter: William Speer Author: William Speer Affiliation: Salt Lake Community College

2:15 p.m.

Title: Effects of Tea Tree Essential Oil on *Escherichia coli* and *Staphylococcus aureus* Presenter: Robert T. Eakins

Authors: Robert T. Eakins, Jed Whetten, Taylor Roney, Quinn Legere, and Olga R. Kopp Affiliation: Utah Valley University

2:30 p.m. Break -

<u>Business</u> Division Chair: Taowen Le Weber State University

SESSION A:

Session Leader: Taowen Le

1:00 p.m. Welcome

1:15 p.m.

Title: Desired Leadership Traits in First Bosses: A Study of Extant Leadership Theories Presenters: James C. Brau (BYU) and Jameson L. Brau (Gonzaga) Authors: James C. Brau (BYU) and Jameson L. Brau (Gonzaga) Affiliation: Brigham Young University

1:30 p.m.

Title: An Econometric Analysis of Diversity: Perceptions of Emerging Adults towards Corporate Social Responsibility Metrics

Presenters: James C. Brau, Jameson L. Brau (Gonzaga), and Sabrina Volpone (Univ of Colorado)

Authors: James C. Brau (BYU), Jameson L. Brau (Gonzaga), and Sabrina Volpone (Univ of Colorado)

Affiliation: Brigham Young University

1:45 p.m.

Title: An Empirical Examination of Inventory Turnover Along the Supply Chain Presenters: Peter Christensen, James C. Brau , and Rebekah Inez Brau Authors: Joseph J. Henry (Rowan Univ), Peter Christensen, James C. Brau, and Rebekah Inez Brau) Affiliation: Brigham Young University

2:00 p.m.

Title: Can Environmental Messaging Reduce Product Returns? Presenter: Aaron Brough Authors: Aaron Brough and Ryan Hamilton (Emory) Affiliation: Utah State University

2:15 p.m.

Title: Unattended In-Home Delivery under Varying Scenarios of Technology-Enabled Anonymity Presenter: James C. Brau Authors: James C. Brau, and Hugo A. DeCampos (Univ of Central Oklahoma) Affiliation: Brigham Young University

2:30 p.m. Break –

2:45 p.m. Title: The Impact of ADHD and ASD on Learning in a Principles of Finance Class

Presenter: James C. Brau Author: James C. Brau Affiliation: Brigham Young University

3:00 p.m.

Title: A Framework for the Integration of CFA and CFP Exam Preparation into an Undergraduate or MBA Course of Study Presenters: James C. Brau and Peter Christensen Authors: James C. Brau and Peter Christensen Affiliation: Brigham Young University

3:15 p.m.

Title: Blockchain in Supply Chain Management: A Feature-Function Framework for Future Research Presenters: James C. Brau, John Wallace Gardner, Hugo A. DeCampos, and Krista Marie Gardner Authors: James C. Brau, John Wallace Gardner, Krista Marie Gardner, and Hugo A. DeCampos (Univ of Central Oklahoma) Affiliation: Brigham Young University

3:30 p.m.

Title: The Impact of Changing Disclosure Requirements, Competition, and Private Capital on Firm Exit Methods and Premiums Presenter: James C. Brau Authors: James C. Brau, Brigham Young University; Ninon Kohers Sutton, University of South Florida; Qiancheng Zheng, University of Massachusetts Lowell Affiliation: Brigham Young University

3:45 p.m.

Title: Comparing Self Efficacy and Grades of Students in Progressive Accounting Course Levels Presenter Jeff Davis Author: Jeff Davis Affiliation: Weber State University

Education

Division Chair Nichole Gearing Utah Valley University

SESSION A: Session Leader: Nicole Gearing

1:00 p.m.

Title: Studying the Benefits of Peer Coaching during Student Teaching Presenter: John Meisner Authors: John Rodari Meisner and Laureen Graves Affiliation: Southern Utah University

1:20 p.m.

Title: Strengthening Teaching Self Efficacy of Adjunct Faculty Through Training and Community of Practice Presenter: Todd Wente Author: Todd Wente Affiliation: Ensign College

1:40 p.m.

Title: Improving Teaching Self Efficacy Among New Adjunct Instructors through a Focused Innovation. Presenter: Todd J. Wente Author: Todd J. Wente Affiliation: Ensign College

2:00 p.m.

Title: Sharing Experiences to Cultivate a More Open Mind about Teaching: A Co/Autoethnography of Pre-Collegiate Teaching Experiences Presenters: William J. Davis, and Abigail Julian Authors: William J. Davis, and Abigail Julian Affiliation: Southern Utah University

2:20 p.m.

Title: Social Studies, Culture, and the Utah Dual Langauge Immersion Program: A Preliminary Didaktik Analysis Presenters: William J. Davis, Jiazhen Yan, Ruohan Gao, and Ziyao Zhou Authors: William J. Davis, Jiazhen Yan, Ruohan Gao, and Ziyao Zhou Affiliation: Southern Utah University

2:40 p.m. Break

3:00 p.m.

Title: Mirrors, Windows, and Doors Strategy: Equity-centered assignments in teacher education to prepare culturally responsive teachers Presenter: Andrea Garavito Martinez Author: Andrea Garavito Martinez Affiliation: Weber State University

3:20 p.m.

Title: Math Pals: Connecting Discorse and Feedback Presenters: Megan Kimberling and Nicole Gearing Authors: Megan Kimberling and Nicole Gearing Affiliation: Utah Valley University

Engineering

Division Chair: Ali Siahpush Southern Utah University

SESSION A: Session Leader: Ali S. Siahpush

1:00 p.m. Welcome

1:15 p.m.

Title: Effective Thermal Conductivity of Porous Copper Foam Saturated with Eicosane Phase Change Material Presenter: MaryJo Taylor Authors: MaryJo Taylor and Ali S. Siahpush Affiliation: Southern Utah University

1:30 p.m.

Title: Boiling and Cavitation Experiment for Engineering Undergraduate Labs Presenter: Savanah Higley Authors: Savanah Higley and Ali S. Siahpush Affiliation: Southern Utah University

1:45 p.m.

Title: Plane Wall Radiation Shielding Presenter: MaryJo Taylor Authors: MaryJo Taylor, Michael Forbes, Tori Thomas, and Ali Siahpush Affiliation: Southern Utah University

2:00 p.m.

Title: Lumped Method Transient Conduction Heat Transfer Presenter: Sergio Reyescordova Authors: Sergio Reyescordova, Ethan Arnold, Kaden Allred, William Miller, and Ali Siahpush Affiliation: Southern Utah University

2:15 p.m.

Title: Heat Transfer Of A Fluid And A Water Reservoir Using A Constant Temperature Presenters: Sota Nakahama, and Adam Smith Authors: Sota Nakahama, Adam Smith, Aaron Chancellor, Ammon Heaton, and Ali Siahpush Affiliation: The Southern Utah University

2:30 p.m. Break

3:00 p.m.

Title: Studying Natural Convection Through Melting A Slab Of Ice Presenters: Manuel Gaspar, Toby McMurray, Matthew Bayreder, and Slater Emery Authors: Manuel Gaspar, Toby McMurray, Matthew Bayreder, Slater Emery, and Ali Siahpush Affiliation: Southern Utah University

3:15 p.m.

Title: Infinite Length Fin Heat Transfer Analysis of Aluminum Rod in Unforced Air Presenter: Jameson Griffiths Author: Lee Bistline, Jameson Griffiths, Tommaso Manghera, Rebecka Mose, Kadyn Tucker, and Ali Siahpush Affiliation: Southern Utah University

3:30 p.m.

Title: Natural Convection Over a Heated Vertical Plate Presenter: Drew Hatch Authors: Jordan Peterson, Drew Hatch, Braeden Brown, Jordan Katnik, and Ali S. Siahpush Affiliation: Southern Utah University

SESSION B:

Session Leader: Mohamed Askar (SUU)

1:00 p.m. Welcome

1:15 p.m.

Title: Comparative Analysis of Urban Railway Construction: High-Speed Train from Salt Lake City, UT to Las Vegas, NV

Presenters: Regan Robins, Jake Richins, Jet Richins, and Kordell Baker Authors: Mohamed Askar, Jared Baker, Reagan Robins, Jake Richins, Jet Richins, and Kordell Baker Affiliation: Southern Utab University

Affiliation: Southern Utah University

1:30 p.m.

Title: Quality Control System for Heavy Civil Construction Projects: Cedar City Water Tank Case Study Presenters: Tanner Woodruff, Porter Weston, and Tanner Wright Authors: Mohamed Askar, Jared Baker, Tanner Woodruff, Porter Weston, and Tanner Wright

Affiliation: Southern Utah University

1:45 p.m.

Title: Constructability Assessment Model for Heavy Construction Projects: Garnet Interchange, Clark County, NV Case Study Presenters: Maxwell Mansfield, Eddy Ngoie Authors: Mohamed Askar, Jared Baker, Maxwell Mansfield, and Eddy Ngoie Affiliation: Southern Utah University

2:30 p.m. Break

Humanities, Philosophy, and Foreign Language

Division Chair: Thomas Terry Utah State University

SESSION A: Session Leader: Thomas Terry

1:00 p.m.

Title: "Make Haste Deliberately: The Historical American Aversion to Inoculations and its Ramifications" Presenter: Thomas C. Terry Author: Thomas C. Terry Affiliation: Utah State University, Logan

1:20 p.m.

Title: Hegel's Relation to Metaphysics Presenter: Alexander James Author: Alexander James Affiliation: Adjunct Instructor, Department of Philosophy, Utah Valley University

1:40 p.m.

Title: Ethnographic Study of Mormon Faith Difference Presenter: Kim Abunuwara Author: Kim Abunuwara Affiliation: Utah Valley University

2:00 p.m.

Title: Dissolving The Twin World Problem Presenter: Jordan Robert Author: Jordan Robert Affiliation: Brigham Young University **2:20 p.m.** Q & A/Discussion

2:30 p.m. Break

Kinesiology and Health Sciences

Division Chair: Tracy Fawns Utah Tech University

SESSION A:

Session Leader: Tracy Fawns

1:00 p.m.

Title: Developing Nursing Student Clinical Judgment Skills Through Active Learning Simulation Experiences Presenter: Carolyn Lewis Author: Carolyn Lewis Affiliation: Utah Tech University

1:20 p.m.

Title: The Effects of Probiotics of Group B Streptococcus Rates in Pregnant Women Presenter: Taylor Eakins Authors: Jake Reed, Hailey Tennessee Schellenberg, Robert Taylor Eakins, and Michaela Gazdik Stofer Affiliation: Utah Valley University

1:40 p.m.

Title: Using Substance Abuse Counselor Interview as An Engaged Learning Component of An Online Health Promotion Course Presenter: Linnette Wong Author: Linnette Wong Affiliation: Weber State

2:00 p.m. Q & A/Discussion

2:30 p.m. Break

Language and Literature

Division Chair: Keith Lawrence Brigham Young University

SESSION A: Session Leader: Keith Lawrence

Women Novelists and Social Issues

1:00 p.m.

Title: Exodus to Eden: Biblical Journey Narratives in *My Antonia* Presenter: Emma Fox Author: Emma Fox Affiliation: Brigham Young University

1:30 p.m.

Title: Margaret Hale's Strike Against Immoderate Male Feelings: Emotional Responsibility in *Elizabeth Gaskell's North and South* Presenter: Madison Maloney Author: Madison Maloney Affiliation: Brigham Young University

2:00 p.m. Q & A/Discussion

2:30 p.m. Break

Physical Sciences

Division Chair: Chris Monson Southern Utah University

SESSION A: Session Leader: Chris Monson

1:00 p.m.

Title: Quantitative Analysis of Mitragynine in Commercial Kratom Products Presenter: Naomi Elmer Authors: Naomi Elmer, Amanda Myers, and Edward Walker Affiliation: Weber State University

1:15 p.m.

Title: Holey Frit: Patterned PDMS for Protein Filtration Presenter: Kylee Stoddard Authors: Kylee M. Stoddard, Fielding Hokanson, Hunter Cook, and Christopher F. Monson Affiliation: Southern Utah University

1:30 p.m.

Title: Manganese Desert Rose Nanoparticle Synthesis Presenter: Taytum Stratton Authors: Taytum Stratton, Simon Langlois, Nakelle Goldie, and Christopher Monson, and Elizabeth Pierce Affiliation: Southern Utah University

1:45p.m.

Title: Collisional Losses and Reduction of Thrust in the Nozzle of a VASIMR Presenter: Benjamin Miera Authors: Benjamin Miera, and Phil Matheson Affiliation: Utah Valley University

2:00 p.m.

Title: Electrophoretic Stripping Presenter: Logan Larsen Authors: Logan Larsen, and Christopher Monson Affiliation: Southern Utah University

2:15 p.m.

Title: Experimental and Theoretical Analysis of Resonance Energy Transfer Among Methylene Blue and Rhodamine 6G in Aqueous Solution. Presenter: Hamza Samha and Jacob Dean Authors: Hamza Samha and Jacob Dean

Affiliation: Southern Utah University

2:30 p.m. Break

3:00 p.m.

Title: On the Schrödinger Equations of Atoms in Lower Dimensions Presenter: Chin-yah Yeh Author: Chin-yah Yeh Affiliation: Salt Lake Community College

3:15 p.m.

Title: Cooling a Monolignol of Lignin to Near Absolute-Zero as a Novel Alternative Method for Refining Organic Fragments Presenters: Seth Weston and Hannah Chappell Authors: Seth Weston, Hannah Chappell, and Jacob Dean Affiliation: Southern Utah University

Social Sciences

Division Chair: Emily Putnam Salt Lake Community College

SESSION A:

Session Leader: Emily Putnam

1:00 p.m.

Title: Rising Irreligion in the Beehive State: Why Disaffected Latter-day Saints in Utah are More Likely to Abandon Religion Than Switch Denominations Presenter: Rick Phillips Author: Rick Phillips Affiliation: University of North Florida

1:15 p.m.

Title: Pedestrian Safety at Night: A Case Study of Public Space Lighting Presenter: Sabrina Waite Authors: Sabrina Waite and Jamie Spinney Affiliation: Southern Utah University

1:30 p.m.

Title: Staring Into the Abyss: The Origins of Serial Killer Behavior Presenter: Peyton Kosman Author: Peyton Kosman Affiliation: University of Utah

1:45 p.m.

Title: Recovery Support Services in Substance Use Treatment Completion Presenter: Brett Bartruff, DSW. Author: Brett Bartruff Affiliation: University of Pennsylvania

2:00 p.m.

Title: Sisters in Struggle: The Resistance of Women in Hip Hop Presenter: Theresa A. Martinez Author: Theresa A. Martinez

Affiliation: University of Utah

2:15 p.m.

Title: From "Model Minority" to "Model Targets" Presenter: Huiying Hill Author: Huiying Hill Affiliation: Weber State University

2:30 p.m. Break

2:45 p.m.

Title: Using Facebook and Reddit to code support group member posts: What we can learn about the needs of patients with Postural Orthostatic Tachycardia Syndrome (POTS) Presenter: April Law Author: April Law Affiliation: Utah Valley University

3:00 p.m.

Title: Internalized Stigmas: Public Transit and the Tragedy of Preconception Presenter: Lizzie Jensen Author: Lizzie Jensen Affiliation: Utah State University

3:15 p.m.

Title: Perceptions of Water Use at Weber State University Presenter: Zoey Krumroy Author: Zoey Krumroy Affiliation: Weber State University

3:30 p.m.

Title: Increase of Pain Sensitivity and Anxiety Presenter: Hunter Mitchell Author: Hunter Mitchell Affiliation: Utah Tech University

3:45 p.m.

Title: Profiling Characteristics of Gun Violence in the Intermountain West Area Presenter: Daniel Kim Authors: Daniel Kim, and Yong Seog Kim Affiliation: Utah State University

POSTER ABSTRACTS

Biological Sciences

Title: Ability of phage penetration in *Staphylococcus aureus* biofilms and potentially act synergistically with antibiotics

Authors: Allexis Koplin, Rainey Hughes, Yeshaswini Dudde, and Daniel N. Clark Affiliation: Weber State University

Antibiotic resistance is a problem of great concern in the medical community, with bacterial resistance to antibiotics increasing proportional to their use; antibiotic use has never been higher. Staphylococcus aureus bacteria such as methicillin resistant S. aureus (MRSA) can cause fatal infections and are known for antibiotic resistance. The problems due to this resistance are compounded when the infecting bacteria form a biofilm. Biofilms are thick sticky layers of bacteria and their secretions, and they are difficult for antibiotics to penetrate. Biofilm formation is common in hospital settings, such as on stents, catheters, and IV lines. Biofilms also make antibiotic treatment risky due to incomplete killing - the most resistant bacteria survive exposure. Interestingly, there is some evidence that bacteriophage (the viruses that infect bacteria) can break up biofilms, which may make them more susceptible to antibiotics. We induced a biofilm formation using a bioreactor, TSB broth, and the Rosenbach MRSA strain. Once the biofilm formed we tested concentrations of antibiotic (oxacillin and vancomycin) with a phage (phage K) to determine MRSA killing. A Tecan plate reader was used to evaluate bacterial growth via absorbance measurements at 595nm as well as visual cloudiness. It was found that combinations of antibiotic and phage increased MRSA killing compared to phage or antibiotic alone. This research is designed to find more efficient ways to treat MRSA. Bacteriophage used in combination with antibiotics may be able to better clear a biofilm infection compared to antibiotics alone while reducing the risk of antibiotic resistance.

Title: Brain-eating amoeba rescue-of-infection model using drug combinations Authors: Isaac Roy, Karissa Bauer, Antonio Fazio, Kennedy Lewis, Kemri Stilson, and Daniel N. Clark

Affiliation: Weber State University

Naegleria fowleri, a free-living amoeba capable of causing fatal human infections of the central nervous system, is commonly known as the "brain-eating amoeba". The organism is the causative agent of primary amoebic meningoencephalitis (PAM), an extremely rare and typically fatal infection. The danger of this organism is largely due to the rapid deterioration of brain tissue that occurs upon infection, and diagnosis of infection largely occurs post-mortem. Of 154 documented cases in the United States, only 4 people have survived *N. fowleri* infection. Typical PAM treatment requires an empirical approach, by testing drugs with unknown efficacy. We are testing five drugs that the CDC mentions as potentially useful: amphotericin B, azithromycin, fluconazole, miltefosine, and rifampin. To evaluate which single-drug and combination-drug treatments will be most effective in clinical settings, we are using a rescue-of-infection model where cultured human HeLa cells are infected over several days until ~50% cytotoxicity is observed. Rescue tests were performed by adding drugs and observing the cell viability of the infected human cells (apoptosis levels). Combinations of drugs were able to kill *Naegleria* and protect HeLa cells from cell death. These results provide a greater understanding of the pathogenesis and treatment of this devastating infection.

Title: CRISPR Deletion of Viral Receptors

Authors: Dylan Salas, Rylan Schmanski, Branden Brooks, Bryson Taylor, Mason Masters, and Daniel N. Clark

Affiliation: Weber State University

Enterovirus 71 (EV71) and herpes simplex 1 (HSV-1) are viruses that cause skin lesions in humans. EV71 is a virus that causes hand foot and mouth disease (HFMD) and

primarily affects young children, sometimes fatally. HSV-1 is a lifelong infection, causing genital herpes and cold sores, which affects 50 to 80 percent of US adults. In this experiment, we use CRISPR to edit the human genome in cultured cells (HEK293 and HeLa) to decrease the infectivity of these two viruses by deleting their receptors. To delete these receptor genes (*ANXA2, SCARB2,* and *SELPLG for EV71,* and *NECTIN1* and *HVEM* for HSV-1), a guide RNA (gRNA) was designed for each receptor. Plasmids that express each gRNA and the CRISPR cutting enzyme, Cas9, were transfected into human cells using the base plasmid All_in_one_CRISPR. This plasmid contains an mCherry fluorescent protein and a hygromycin selectable marker for the selection of edited cells. To confirm knockout, DNA was extracted and sequenced and compared to the wild-type genome. Several patterns of knockout were observed, including off target edits. Infection assays compare infectivity in parent cells versus receptor-deleted cells via microscopy and gene expression levels by RT-PCR. Because viruses use combinations of receptors, and the end goal is to determine which receptors are most critical for attachment and entry into cells in order to target those receptors for virus inhibition.

Title: Ditch the Stress: How Mindfulness Activities Affected Perceived Stress and Mood in University Students During the COVID-19 Pandemic

Authors: Jayden Peacock, Korina Ziegler, Colton Davis, and Dylan Gardner Affiliation: Southern Utah University

Mental illnesses are a large concern in educational campuses, especially since the outbreak of COVID-19 and the impact it had on student lives, both social and mental. PURPOSE: Determine the effectiveness of mindfulness activities (paying a compliment, positive weekly reflecting with gratitude, coloring pages, and progressive muscle relaxing) on decreasing stress levels post-activity (PA) and one week (W) after. METHODS: Students participated in an event where they took a self-reported intake (IN) survey measuring their current stress levels. Then, they were allowed to participate in four different activities of their choosing (paying someone a compliment, reflecting on good things that happened to them during the week, coloring pages, and being led in a muscle relaxation routine). After they had completed the activities, a self-reported PA survey was given to measure their change in stress levels. Each person was sent another self-reported survey in one week to measure which activity, when practiced for that week, had the greatest effect in lowering their stress levels. RESULTS: There were two activities with significant decreases in stress between the IN, PA, and W surveys: coloring pages (IN v. PA: p=0.021; IN v. W: p<0.001) and progressive muscle relaxation (IN v. PA: p<0.01; IN v. W: p=0.002). The other two were not found to have significant decreases between the three surveys: paying a compliment was found to have a significant decrease in IN v. PA (p=0.024), however, it did not show the same trend in the IN v. W (p=0.164). Positive weekly reflection did not have any significant decreases (IN v. PA: p=0.70; IN v. W: p=0.129). CONCLUSION: Because there were activities that were more effective in decreasing perceived stress levels, they should be employed in educational campuses over long periods of time.

Title: Generation and characterization of zebra fish model to examine the pathophysiological mechanisms and treatment of Wolfram syndrome 2

Authors: Rosemary Mwithiga, Youssef Harraq, Reign Krieger, and Hung Yu Shih Affiliation: Utah Tech University

Wolfram syndrome 2 (WFS2) is a rare disease where patients show premature aging with degeneration in multiple tissues. Mutations in the *cisd2* gene have been identified to cause WFS2. However, it is still far from clear how *cisd2* dysfunction causes WFS2. This research project aims to establish a zebrafish model of WFS2 to understand the pathophysiological mechanism and screen potential compounds for treatment. The CRISPR/Cas9 technique was used to knock out the *cisd2* gene of zebrafish. We further confirmed the *cisd2* knockout by high resolution melting analysis. We are currently validating this knocked out model by examining the cell senescence markers analyzed in the mouse model. We will analyze the gene expression of cell cycle regulators such like *tp53*, *cdkn1ca*, *cdkn2a/b*, *ccne1* and *ccng1* by RT-qPCR as well

as the cell cycle markers *pcna* and *ki67*. The aging cells usually accompany with cell apoptosis, we will further examine apoptosis by TUNEL assay. After validation, this model will be used to study the pathophysiological mechanisms of WFS2 as well as screening for therapeutic compounds for WFS2.

Education

Title: How and What Principals need to know to support Special education teachers Author: Mallory Poole

Affiliation: University of Utah

"The key factors in creating an environment for equitable student outcomes for students receiving special education services are prepared and experienced teachers who are supported by administration leadership. When these factors are in place, the important factor, the retention of teachers in special education, becomes almost automatic. Students with academic deficits and behavioral disabilities struggle to achieve academic progress and stay at grade level. Studies in recent decades have clarified the linkage between special education teacher retention and local administrators. The finding that students with disabilities continue to struggle with poor outcomes, combined with the knowledge of the positive impact of teacher retention, suggests that effective and knowledgeable administrators are essential.

DeMatthews et al. (2020) explained that a significant body of research describes how most principals are not prepared to lead diverse teacher and student populations. This research includes leading individuals with disabilities. They argue that without the proper training and indepth study of the history of education discrimination, few principals are prepared to implement the policies necessary to promote inclusion effectively. This knowledge can help LEA principals develop appropriate (e.g., legal, practice) educational decisions to support educators and promote equitable outcomes for students.

If creating equity for all is the purpose and function of education today, then some wellidentified deficiencies must be corrected. Educational leaders at the LEA level, specifically the school principals, need more training and field experience supporting teachers of special education and working with individuals in special education. This study explores how leaders who are recognized for their support of teachers of special education are influenced by their training and preparation and how their experiences shape their leadership practices."

Title: Looking for what Educators Need to meet the Needs of English Language Learners Authors: David R. Byrd, Shernavaz Vakil, Melina Alexander, and Denise Wright Affiliation: Weber State University

English Language Learners (ELLs) are one of the fastest growing populations in schools. These students require special attention in schools and classrooms to ensure success both academically and socially. Unfortunately, too few educators feel prepared to teach ELLs effectively. Often schools and districts try professional development (PD) in order to prepare educator to more effectively deliver quality instruction to their students, including ELLs. PD is often heralded as one of the most effective ways to enhance teacher practice by enhancing the professional knowledge, skills, and attitudes of educators. One type of PD, known as the Learner Centered Professional Development (LCPD) Model is a three-phase model that links research and knowledge-based strategies with school engagement, using collaborative teams (teachers, administrators, and caregivers) to actively construct knowledge as they work together. Our study looks at the first step of implementing LCPD for ELLs in one district in northern Utah. Using grounded theory, we analyzed various data sources that described collaborative team members' ideas and needs for them to work together to improve equity and access to learning for ELLs. Our findings indicate that the various team members needed to work through some significantly convergent and divergent thoughts on the hierarchy of problems and strategies to co-construct a plan to move forward to the second phase of the LCPD model. Our findings have implication for both pre- and in-service teaching situations.

Engineering

Title: The Arduino Platform as a Cost-Effective Field Data Collection Tool Author: Jake Olvera Affiliation: Southern Utah University As conservation efforts are ramping up, the need for accurate biological field measurements becomes apparent. These measurements are usually collected using multiple specialized, expensive devices. For example, soil characteristics (temperature, humidity, and salinity) can be measured using the Aquaterr EC-350 at a price point of \$1350. Similarly, the Kestrel 3500 Weather Meter measures humidity, pressure, temperature, wind speed, and wind direction for the price of \$200. We used readily-available sensors that communicate via I2C controlled by an Arduino Uno Rev3 development board to create a single, compact device. This device can measure pressure, altitude, temperature, humidity, soil temperature, and soil humidity for under \$100. A similar approach can be taken for other projects to create custom equipment that is accurate, cost-effective, and modular.

Physical Science

Title: Oxidation of Indoline with Ruthenium(III) Chloride

Authors: Matthew Prater and Wyatt Evans

Affiliation: Southern Utah University

Indole is a biologically relevant compound used to form the amino acid tryptophan and indole alkaloids. Traditionally, indole is prepared via the Fischer indole synthesis. Indoline, the dihydrogenated derivative of indole, is often made through a variety of methods, including transition metal catalysis, organocatalysis, and radical cyclization. We hypothesized that Ru(III) could oxidize indoline to indole, and be reduced in the process. Our earliest reactions had a lustrous metal precipitate, indicating reduction had taken place. Indole was then isolated to confirm its production. Current work is focused on developing a catalytic cycle by using a secondary oxidant.

Title: Natural Language Processing with Quantum Computers

Author: Thomas Draper

Affiliation: Brigham Young University

The first real natural language processing algorithm to be run on a quantum computer was released in 2020, sparking great research interest. English sentences can be parsed according to grammatical rules. The meaning of a sentence is a function of its words' meanings and their grammatical relations. We compute this meaning using quantum circuits with two main parts: representing word meanings and applying grammatical relations. After optimizing circuit gate parameters with a machine learning method, the circuit predicts a truth value for the sentence. We give an example of this process, walking through the quantum circuit corresponding to the sentence "Romeo who loves Juliet dies".

Title: Study of the Photophysical Properties of N,N'-bis(salicylidene)-1,2-ethylenediimine in Polar Solvents

Authors: Jackson Reese and Hussein Samha

Affiliation: Southern Utah University

The effects of water, methanol and ethanol as solvents on the spectroscopic properties of N,N'bis(salicylidene)-1,2-ethylenediimine (Salen) Schiff base were studied. The absorption and emission of Salen were recorded in solution mixtures of; water-acetonitrile, methanolacetonitrile and ethanol-acetonitrile. The position and intensities of the absorption bands are sensitive to the solvent ability of hydrogen bonding. The use of water-acetonitrile solvent mixture significantly enhances the intensity of the absorbance band of Salen centered at 404 nm. The enhancement occurs at the expense of the absorbance band around 317 nm as indicated by an appearance of one isosbestic point at 336 nm. This $\pi \rightarrow \pi^*$ electron transition produces a strong emission at 505 nm that was not observed in pure acetonitrile solution. Methanol and ethanol show the same effect.

Title: Direct One-pot Grignard Formation and Addition to Imine Electrophiles Authors: Kaden Jensen, Austin Flynn, and Matthew B. Prater Affiliation: Southern Utah University

Grignard reagents are commonly used in organic synthesis. The magnesium causes the carbon to be nucleophilic. It has been shown that an organohalide, in the presence of magnesium, will form a Grignard reagent. Traditionally, addition of a Grignard to an electrophile occurs via a two-step process: preparing the Grignard reagent and adding it to the electrophile. We propose to form the organomagnesium nucleophile in the presence of the imine electrophile, allowing it to directly add and form an alkyl amine. Preliminary results have been promising.

Title: Superhydrophobicity of Micro-patterned PDMS

Authors: J. Fielding Hokanson, Russell M. Bodily, and Christopher F. Monson Affiliation: Southern Utah University

Superhydrophobic surfaces can prevent fogging in lab goggles, eyeglasses, and mirrors, improving optical clarity in humid conditions. These surfaces also prevent icing on airplane wings, reducing damages and crashes. Superhydrophobic surfaces are surfaces on which water has a contact angle greater than 90 degrees. Such surfaces are commonly created using micropillar patterning; spaces between these pillars create a superhydrophobic effect as air repels water. Whereas some have used carbon nanotubes coated with Zinc Oxide, we have patterned polydimethylsiloxane (PDMS) to make superhydrophobic layers. Unpatterned PDMS is somewhat hydropholic layer of PDMS by combining PDMS, magnesium, and hexane into a slurry and spinning it onto a glass slide. Once spun, slides are baked to evaporate hexane and polymerize PDMS, and a reaction with HCl removes Magnesium. Data is quantified via contact angle (using a goniometer) and light scattering (using a homemade light scattering instrument). The micropatterns created by the magnesium allow for contact angles ranging from 80-120 degrees.

Title: Conservation of the Endemic Coral Pink Sand Dunes Tiger Beetle, *Cicindela albissima* Authors: Kate A. Ehlert, Dylan T. Gardner, Kayla C. Walker, Fredric R. Govedich, Bonnie A. Bain, Samuel A. Wells, and Rachel T. Bolus

Affiliation: Southern Utah University

Coral Pink Sand Dunes, located in southwestern Utah, is a unique desert dune system that has a number of endemic species including the Coral Pink Sand Dunes Tiger Beetle, Cicindela albissima. This species of tiger beetle has adapted to the unique conditions found in this dune environment. Geographical separation between this system and other similar systems has resulted in the speciation of this tiger beetle, but it has also meant that this species is potentially sensitive to any changes in its environment. Anthropogenic impacts such as recreation and climate change have resulted in fluctuations in the number of individuals of C. albissima. This study has focused on monitoring the population of adults and larvae of this sensitive species to ensure its continued survival. This project is supported by the BLM, Utah DNR, US Fish and Wildlife, University of Utah and Southern Utah University.

Title: Changes in Intrinsic Tryptophan/Tyrosine Fluorescence (ITF) as a Method to Study Conformational Changes in Oxidized Proteins Authors: Steven Rimmasch, and Tracy Covey Affiliation: Weber State University

"Determining protein structure is of extreme importance as it pertains to drug development, discovery of protein function, and identifying disease states in cells. Similarly, identifying different conformational changes proteins experience plays a role in all the previously mentioned disciplines as well as how the cell recognizes and reacts to these altered proteins. Protein structure and subsequent conformational changes can be determined with a high degree of accuracy through methods such as X-ray crystallography, Cryo-EM, and NMR. However, these methods are time consuming, difficult, and require expensive equipment. Here, we aim to develop a lower resolution Intrinsic Tryptophan/Tyrosine Fluorescence (ITF) based method to determine changes in protein structure due to oxidation and relate this to how proteins are selectively digested. Bovine Serum Albumin (BSA) has been used as our model protein to determine changes in protein structure. Our results show that hydrogen peroxide treated BSA has a concentration dependent change in ITF compared to non-treated BSA. This suggests that oxidized BSA undergoes a conformational change that alters the exposure of its tryptophan and tyrosine residues to the solvent. For this presentation, I will discuss my work using ITF as a fast, easy, low-resolution method to probe structural changes in BSA and other proteins exposed to various conditions."

Title: Nucleophilic Aromatic Substitution of Nitrophenyl Sulfonates with Grignard Reagents Authors: Ashley C. Hartwig and Nathan S. Werner

Affiliation: Southern Utah University

The hypothetical nucleophilic aromatic substitution reaction of Grignard reagents with 2nitrophenyl tosylate, 4-nitrophenyl tosylate, 2,4-dinitrophenyl tosylate, 2-nitrophenyl mesylate, 4-nitrophenyl mesylate, and 2,4-dinitrophenyl mesylate were studied. The Grignard reagents evaluated were methylmagnesium chloride, ethylmagnesium chloride, iso-propylmagnesium chloride, tert-butylmagnesium chloride, n-pentylmagnesium chloride, cyclopentylmagnesium chloride, cyclohexylmagneium chloride, and benzylmagnesium chloride. The Grignard reagent was introduced to a solution of the sulfonate under an atmosphere of argon gas. Different reaction solvents and temperatures were explored. Ultimately, the desired product of nucleophilic aromatic substitution was not observed in any of the experiments conducted. All reactions completely consumed the sulfonate starting material. Some reactions yielded a complex mixture of products, while others yielded the homocoupling product of the Grignard reagent. Further investigations would focus on the isolation and identification of the minor reaction products of the complex mixture.

Social Sciences

Title: Utah's Conspiracy Theory Beliefs

Authors: Trevin Nielsen, McKenna Benson, Jose Patino, Braden Johnson, and Emma Wallace Affiliation: Snow College

Our group's research efforts are centered around finding the traits that could lead to a belief in conspiracy theories among Utah residents. We are interested to see if residents in Utah are more likely to have a strong belief in conspiracy theories compared to those of other states. We want to see if the results correlate directly with the religious culture attached to the region, as well as finding correlation with other physical, ideological, and personality traits such as race, sexual orientation, political ideology, social media usage, etc. The method we will use to acquire this information is a survey distributed to Utah locals in the Ephraim area that will give us a general understanding of these locals' backgrounds. These subjects will fill out these previously mentioned background questions and give answers on a scale based on how strongly they feel about specific topics. We will ask participants about different conspiracy theories and their willingness to believe in them. We will then ask for the subjects' thoughts on some of the most well-known and controversial conspiracy theories, and will even place a couple counterfeit theories to see if people are willing to believe in these as well. We will then compare the results of Utah residents with the results of studies done on the general American population to see if

there are any notable differences in Utah residents. We suspect that Utah residents, compared to people from other states, will be more inclined to have stronger beliefs in support of conspiracy theories due to the doubt in authority outside of the ideological beliefs they support. Our hope is that during this process we can find logical reasons to help explain why people believe in the things they do and gain a better understanding of this underdeveloped research topic.

Title: Commonalities between women's birth stories, What makes experiences similar or different between women?

Authors: Tricia Thalman, Morgan Smith, Kylie Bloomquist, and Kade Simmons Affiliation: Snow College

There are a lot of unknowns and fears for both men and women surrounding pregnancy and the birthing experience. Due to the variety in experiences of women's birthing stories, learning more about birth through parenting books can help ease some of these fears. Where parenting books fall short is sharing real world experiences from a wide variety of mothers in different situations. Age, religion, medicine, and other factors all play a role in pregnancy and delivery. These factors may not be accounted for in other research (Callister, 2022). Some topics that are commonly researched include labor and delivery process, treatment in hospital, and differences among races. Another widely explored variable is trauma associated with pregnancy and birth. We are looking at factors that have not been thoroughly researched such as religious affiliation, coping strategies of mothers during childbirth, relationship status, support from family, and how these factors tie into topics that have been previously studied. After collecting and evaluating this data from a variety of mothers, we will create a database as a resource for future parents to utilize as they prepare for this new stage in their lives. The database will be easily accessible and will include personalized birthing stories for future parents to gain knowledge from. With this research we hope to improve the birthing experience.

Title: Recognizing Sexual Assault

Authors: Whitney Nielson, Eliana Hadley, Nettie Graham, Kelsie Tippets, and Sydney Morrill Affiliation: Snow College

"The definition of sexual assault has been changed and distorted throughout time. With this widespread modification, we wanted to define the generational and gender differences between definitions. Previous research has been done within workplaces and school locations, while focusing on feelings of safety and resolutions of sexual assault. This research is valued and respected, but there is a lack of unification in the varying definitions. We will gather information through a survey given to people aged 18 and above and of all genders and races available to us. We hypothesize there will be differences between generations and genders and what they believe constitutes as sexual harassment. As in older generations will probably view fewer actions and behaviors as sexual harassment. Another section of research we hope to contribute to is the fear of actions perceived.

We recognize that our research is limited to the population of Utah, and a sample which is predominantly white and middle class. There is also the possibility that those we survey may not be transparent in their answers. However, this research is still important as sexual harassment is becoming more of a problem in everyday life. Conducting this survey and the resulting study will be able an important step towards more insight into how differing opinions towards sexual harassment shape our society.

Title: Establishing and clarifying a modern definition of cyberstalking as well as analyzing the different applications between men and women

Authors: Jessie Romo, Azlyn Ristine, Landen Nielsen, and Alaric Martinez

Affiliation: Snow College

The purpose of our research is to redefine and modernize the term "cyberstalking" and to take into consideration modern social media and technological advancements. We feel our research is necessary because the current definitions are misused and specific for certain social media

platforms, for example; "insta-stalking, Facebook stalking, social media stalking, and cyberbullying" Our research is necessary to better educate anyone using the internet and will benefit future generations. We will also note the different uses and applications of cyberstalking between men and women. Current definitions of cyberstalking tend to focus on electronic communication and harassment or physical harm, but as a part of our research, we are going to imply that cyberstalking doesn't have to include harassment or contact with the victim. In addition to benefiting future generations, our research could be helpful for legal cases of cyberstalking. We plan to distribute surveys to college students in Utah as our methodology to collect data and social definitions of cyberstalking. We also plan on getting information from the subjects that include their age, gender, race, and other defining characteristics and behaviors that could be relevant to our study. In one of the surveys, we will ask them what they think the definition of cyberstalking is, what they believe cyberstalking to be, what social media platforms they use, and how often they check social media. With the second survey we distribute, we will have students examine scenarios to determine whether or not they consider the actions to be cyberstalking based on their own opinion. While our research progresses we hope to gain insight from professional sources and institutions to accomplish our objectives further.

Title: Law and Order Effect and Implications

Authors: Ayden Bash, Kalynn Livingston, and Danielle Noorda

Affiliation: Snow College

Within the courtroom, biases and presumptions of innocence and guilt have been a major concern for those in the fields of criminology and psychology, particularly the effect media has on presumptions and juror decision making. Research suggests that exposure to "CSI" and other related media has no direct effect on jurors decision making (Kim, Barak, and Shelton, 2009; Haves-Smith and Levett, 2011) and in contrast, other research suggests that exposure to pre-trial publicity does affect juror decision making (Hoetger, et al. 2022). With the synthesis of this, we hypothesize that there is a possible presence of a pro-prosecution bias when exposed to dramatized criminal programs and pre-trial publicity of which we call "The Law and Order Effect". To test this we will survey Snow College students whether they watch dramatized crime programs and an estimation of how much time they spend watching the related media. We will have three groups, two of which will be exposed to shows and dramatized legal proceedings that influence biases (one where the defendant is innocent and other where the defendant is guilty). The control group will consist of people who will be exposed to a neutral program. After they watch the corresponding media they will be given a mock court proceeding of which they will judge whether the defendant is guilty or innocent and judge accordingly on a scale of how much they believe the defendant is guilty or innocent.

Title: And How Does That Make You Feel? The Importance of Mental Health Conversations Among Elementary School Students in Upper-Grade Levels and Their Parents Author: Denisse Zepeda

Affiliation: Salt Lake Community College

"As adults, we decide whether or not we get help to address our mental health concerns, but what about those who are vulnerable and dependent on us, like the children in our lives? How are we helping children understand and navigate their emotions in this tumultuous world? Are conversations about emotions being held at home or are they yet another task for their teachers at school? How does having mental health conversations between elementary school students in upper-grade levels and their parents affect their academic performance? The purpose of this study is to investigate if having mental health conversations between elementary school children and their parents affects their academic performance. The study included 88 students in grades 4th - 6th (9 - 12 years of age) from a public school in a city of Utah, United States. Due to students this age being a vulnerable population, participation in this study was restricted to parent's approval. A survey was implemented during two weeks in November and December of

2022. The results showed that having mental health conversations at home positively impacts student's academic performance.

Keywords: mental health, elementary school children, conversations at home, education, academic performance

Title: The Aftermath of Rape Author: Adyson LeeMaster Affiliation: Brigham Young University

Certain characteristics of rape affect the likelihood that a survivor will develop Post-Traumatic Stress Disorder (PTSD); those researched in this literature review include intoxication at the time of the rape, whether or not the survivor knew the perpetrator, and if the perpetrator used a weapon. It was found that intoxication at the time of the rape increased the likelihood that the survivor would develop chronic PTSD; the survivor knowing the perpetrator increased the percentage of development of PTSD; and the perpetrator using a weapon also increased the likelihood that the survivor would develop PTSD. It is also discussed the extent to which PTSD affects the survivors biologically, sociologically, and psychologically.

Title: Does Combat Experience Affect One's Religious Beliefs?

Author: Allye Baker

Affiliation: Salt Lake City Community College

Does military combat affect one's spiritual beliefs? Are people who experience combat more likely to use their faith as a means of coping, or are they more likely to abandon or question their beliefs? Previous studies have shown religion to help with the trauma that goes with experiencing combat, however their faith is still negatively affected by it. With moral injury (MI) being common among active military personnel as well as veterans it is important to understand how MI affects a person and how we can help mitigate those affects and potentially prevent them. My methods in answering these questions were to go through various peer reviewed journals about the subject as well as conducting a survey on three different social media platforms. There is a lot more research needed to be done regarding these matters to effectively say that combat has an impact on a person's religion, however through my surveys I found that most people were religious prior to joining the military experience and either had no changes in their beliefs or changes in their beliefs varying from the importance and frequency it held in their life to their actual ideologies, such as going from religious to spiritual.

Title: Let's jam: Can music alter the response to a stressor?

Author: Ryan Coburn, Vitaliy Walker, Tatiana Leroy, Austin Booth, Bethany Blair, Brittney Stockholm, Crystal Tejada, Hannah Momoh, Lorely Olguin, and Manuel Quijas Ornelas Affiliation: Utah Valley University

In a stressful situation, the human nervous system reacts with the fight or flight response. Physiological indicators of the fight or flight response include an increase in body temperature, heart rate, and sweating (Sriram et.al, 2012). Recent research has found a correlation between chronic exposure to stress and the development of mental illnesses such as anxiety and depression. Furthermore, chronic stress has the potential to change the anatomy of the brain along the hypothalamic pituitary adrenal axis (HPA), an important part of the neuroendocrine system that plays a role in the release of stress hormones, and helps regulate moods, emotions, and sexual behaviorisms (Ramiz, et.al., 2013).

As college can be quite stressful, developing healthy coping mechanisms might positively influence the students' academic performance and improve and maintain their psychological and physiological well-being (Skowronek, 2014). Music can effectively relieve nervousness, promote mental health, and positively affect students' psychological state (Chi, 2020). Current research on stress-related outcomes shows that music intervention can result in stress reduction (de Witte et. al, 2020).

The present study focuses on measuring physiological responses (including heart rate, heart rate variability, electrodermal skin response, and body temperature) to stressful situations (a mathematical calculation task, Kirschbaum et al. 1993) while being exposed to two music genres. We hypothesize that relaxing music will reduce the stress response, while fast, upbeat music will increase the stress response in response to the mathematical calculation task. The study employs a within-subjects repeated measures design. After obtaining the baseline physiological measures (no music), the participant will be exposed to relaxing music and then fast upbeat music. We will compare the impact of music genre on the human stress response. Findings on the impact of music genre on the stress response can provide insight on potential ways manage stress.

Title: Understanding Drug-Related Harm Reduction Practices

Author: Ellie Llewelyn

Affiliation: Utah Valley University

This research study is intended to identify the impact of drug-related harm reduction on public health in the state of Utah. Harm reduction focuses on unbiased compassion for those struggling with addiction. Harm reduction provides drug users safe resources to replace other harmful means of drug administration that may result in negative health effects. I have been studying the harm reduction resources currently in place and how they compare to other states using secondary data analysis. The goal of this analysis is to better understand the positive and negative influences of harm reduction resulting from addictive behavior. As a part of this analysis, I will explain the laws and restrictions on harm reduction for drug users. I will also include examples of harm reduction methods used today.

Title: Insecure Attachment: Predictor of Antisocial Personality Disorder

Author: Maria Balaceanu, Alyssa English, Dannelle Larsen-Rife, Ed Wu, Grace Carsey, Ives Hong, Rosemary Mwithiga, Youssef Harraq, and Tara Caplin Affiliation: Utah Tech University

There is an association between attachment styles formed in childhood and behaviors and relationships experienced in adulthood. The attachment one develops through the childhood years will impact how he perceives and understands the world surrounding him (Fonagy, 2003). Insecure attachment is associated with antisocial behaviors and characteristics, which start displaying as early as childhood years (Bachmann et al., 2019). One important cause of insecure attachment is neglectful and callous caregiving. The lack of positive, emotional involvement of primary caregivers reinforces antisocial behaviors in children (Kochanska et al., 2009). The care children are attended with has a crucial impact on the child's development. Personality disorder traits start developing in childhood (Taka-Eilola et al., 2020). During the first 18 months of life, the quality of the parent-child relationship can predict if a child will display antisocial behaviors later on in life (Shi et al., 2012). If the primary caregiver displays emotional unavailability, the child will be left without the tools needed to properly process and regulate emotions, such as stress (Shi et al., 2012). If the child is deprived of these crucial skills, his development can be endangered. The child becomes prone to develop disorganized attachment. The mother-child relationship is of utmost importance and when the child's emotions and needs are misunderstood and neglected, it can cause the child distress. The child will have a hard time developing a healthy stress control system (Taka-Eilola et al., 2020). The feeling of disconnect between the mother and child can negatively impact the child long-term, causing attachment difficulties which can further lead to psychiatric disorders in adulthood. This paper focuses on insecure attachment and the negative impact it has on an individual's behaviors and interpersonal relationships in adulthood. This paper includes several research studies demonstrating a connection between insecure attachment and behavioral and relational issues.

Title: Understanding Us - Street Tai Chi Authors: Kassidy Drage, Luis and Valentan, Francesco Vales

Affiliation: Salt Lake Community College

Understanding Us is a non-profit organization that provides several programs focusing on individuals experiencing homelessness. They currently run a Tai Chi program three days a week at an outdoor public location. The organization has asked student researchers to collect and analyze data about program participants. We have gathered preliminary demographic survey data to help the organization better understand the population they are serving and meet the needs of participants. To date, we have collected around 100 responses. In addition to the demographic survey data, we have also included anecdotal examples and interview responses from participants in the Street Tai Chi program.

Title: The Attachment Doula Dynamic: A Mediation Analysis of Pain Management During Labor and Delivery

Authors: Grace Carsey, Dannelle Larsen-Rife, Ed Wu, Alyssa English, Youssef Harraq, Rosemary Mwithiga, Miles Yablonovsky Ives Hong, Tara Caplin, Jake Leaverton, Hunter Mitchell, and Maria Balaceanu

Affiliation: Utah Tech University

Inadequate pain management during labor and delivery may be traumatic and can contribute to the development of negative maternal and neonatal health outcomes (Beck et al., 2011; Garthus-Niegel et al., 2014). Infants of mothers who reported unmanaged pain during labor and delivery were more likely to have lower Apgar scores (Lothian, 2011). The presence of a doula during labor and delivery seems to have positive effects on both the mother and infant and is associated with lower rates of cesarean section and decreased use of pain medication (Bohren et al., 2017). The relationship between attachment and pain perception during labor and delivery is also welldocumented (Leong et al., 2018). However, the relationship between attachment style, the presence of a doula, and pain management during childbirth is not well understood. Research suggests that individuals with avoidant attachment styles avoid seeking support and have difficulty expressing their emotions (Mikulincer and Shaver, 2007). Therefore, it is possible avoidant attachment styles may feel uncomfortable with the close physical and emotional support provided by doulas. This additional stress may influence pain perception during labor and delivery. Conversely, those with anxious attachment styles tend to seek excessive social support Mikulincer and Shaver, 2007), thus the presence of a doula may have a positive impact on pain management. Participants (N=136) reported on their first birth, their adult attachment anxiety and avoidance using the Relationship Structures Questionnaire (ECR-RS), and pain experienced during labor and delivery. Mediation analysis and regression models will be conducted to determine if attachment mediates the influence of doula presence on pain during labor and delivery. Findings from this study may have implications for individualized care and in the prevention of traumatic obstetric experiences related to pain, and the associated negative maternal and neonatal outcomes.

Title: What Values Are Preferred in a Potential Mate, and Which Values Are a Deal Breaker When Absent?

Breana Barson, Breena Bailey

Authors: Sydney Muller, Adrienne Shelley, Aftyn Marker, Corbyn Anderson, Tristan Heber, Breana Barson, and Breena Bailey

Affiliation: Snow College

This study investigates what people look for in both short-term and long-term partners, what traits are most important, why people may have these preferences and which traits people are willing to overlook. We are going to look at which values people most desire, and which values are a deal breaker when not apparent. In today's generation, dating seems to be the biggest struggle. People struggle with the thoughts of "Why do my relationships always fail?" and "Why am I so undesirable?" By doing this research, we hope to help answer some of those questions. Some variables we are going to look at include; Religion, gender, political party, short-term vs long-term relationships, and parents' relationship to each other throughout their childhood. In

order to maximize the effectiveness of our research, we plan to send out a survey via link and QR code to any willing participants between ages 18-25. Our research is based on a past research done by Professor David Buss in 1985 on Human Mate Selection. Buss stated, "Opposites are sometimes said to attract, but in fact we are likely to marry someone who is similar to us in almost every variable". While this study was done over 30 years ago, we believe that there are some findings that still hold true in our generation today. However, there are some things Buss found that we believe may be different as well. We believe that due to the secluded culture we are surrounded by, people may value having similar religious and political beliefs more than someone who is kind and understanding as Buss found. Due to our study being a new establishment, we will require more research before we can draw any conclusions.

Title: Exploring the Prevalence and Determinants of Academic Dishonesty among College Students: A Survey Study

Authors: Jay Berry, Tiana Stanley, and Valeria Perdomo

Affiliation: Snow College

Academic Dishonesty, a popular trend among college students has taken many forms through the decades. Anton Skshidlevsky mentions in his article on Proctoredu "According to a survey conducted by the CollegeHumor website, among 30,000 respondents, 60.8% of college students admitted to committing some form of cheating. Moreover, 16.5% of them didn't feel guilty about it" (2022). More recently it has taken the form of E-Cheating (Electronic cheating) through websites such as ChatGPT, Quizlet, and simple Google searches. While this has professors concerned about the future of education, modern problems require modern solutions. There are websites designed to prevent E-Cheating through similar electronic means like Turnitin, Proctorio, Testing Center, Oral tests, and Lockdown Browsers. However, the use of electronics in the classroom is becoming more and more a part of the education system. With these changes and the exposure that upcoming generations have to electronics, new rules may need to be set to keep students away from the temptations of academic cheating. What do college students consider to be academic cheating (fraud, plagiarism)? Can academic dishonesty be justifiable? What kinds of measures are appropriate in preventing academic dishonesty? Specifically, the research question we would like to explore would be: What is academic dishonesty (fraud, plagiarism), and can it be justifiable? To conduct this study on the frequency, reasoning, and ways of academic dishonesty we will be administering a series of surveys among the Snow College population, asking students and professors what academic dishonesty is, if they've participated in academic dishonesty, if they've seen academic dishonesty, and if they think it can be justified. Along with that we'll be giving scenarios where academic dishonesty is taken place, and discover how they react to the given situations.

Title: Women, Weight, and the Workplace

Authors: Niko Dawson (Mentor: Dr. Brandon Koford)

Affiliation: Weber State University

"Extensive effort has gone into researching the gender pay gap and what forces could be responsible for this societal disadvantage. Meanwhile, studies have shown an overall negative relationship between income and resulting weight, concluding that obesity rates are higher at lower levels of income. However, not much research has been conducted to analyze that the causality runs in the reverse direction: perhaps weight bias at the workplace causes lower incomes among heavier people. Using the most recent quantitative data from the National Health and Nutrition Examination Survey, this research uses an interval regression model of income on weight with additional control variables to examine the effect of weight bias on income for men and women, finding that for women, weight decreases annual household income."

Oral Presentations <u>Arts</u>

Title: Music Paintings and the Fashioning of an Early Modern Cardinal in Rome: The Case of Cardinal Francesco Maria del Monte Author: Charlotte Poulton

Affiliation: Utah Valley University

The display of paintings in seventeenth-century Roman palaces was integral to the social virtue of splendor intended to convey the owner's social, political, and, in the case of cardinals, ecclesiastical importance. Recent research has shed additional light on the careful consideration given to the particular rooms in which paintings were to be hung and viewed based on the rank and status of guests who were admitted into those spaces. In this case, we must reevaluate the presence of music paintings in the collections of Rome's intellectual and cultural elite. These paintings have been too often dismissed as a minor genre of merely descriptive representations of contemporary music practices. This paper investigates the social, cultural, and political implications of the display of music paintings by Caravaggio and Antiveduto Grammatica in the palace of Cardinal Francesco Maria del Monte. Parallel examinations of music paintings in the palaces of Marchese Vincenzo Giustiniani and cardinals Francesco and Antonio Barberini reveal similar patterns of display. These men were associates of Cardinal del Monte and all were powerful patrons at the forefront of progressive developments in both painting and music in early seventeenth-century Rome. I demonstrate that while paintings of musical subjects are relatively few in number, surprisingly, they were hung in prominent locations in the private residences of Rome's most powerful and influential cardinals. The complexities of their subject matter and strategic display suggest that music paintings were instrumental in helping Cardinal del Monte achieve splendor and fashion himself as a leading arbiter of taste in both painting and music in Rome..

Title: Towards an Invention of Style: Encoding Aspects of the Twentieth-Century Post-Tonal Tradition for use in Contemporary Classical Solo Piano Improvisation

Author: Evan B. Whitfield

Affiliation: Southern Utah University

The innovations produced from the evolution in Western musical practice during the early twentieth century coincided with a decrease in the continuation of nineteenth-century classical improvisation traditions. This phenomenon coincidentally negated the legitimate development of twentieth-century classical piano improvisation. As the modern composer (e.g., Schoenberg, Stravinsky, Debussy) began profound explorations away from the late nineteenth-century Romantic tonal tradition, advancements in twentieth-century Western piano improvisation eventualized from the avant-garde movements in free-jazz and the works of serialist and indeterminate post-modern composers after 1945 (Cage, Stockhausen, Berio, et al.). The inevitable musicological question is: what would early twentieth-century classical piano improvisation have sounded like, if it had been allowed to flourish, adapting to a new environment of musical modernity from 1900 onwards? From my background as a contemporary improvising pianist, I proposed an experiment of purposeful programming, with the attempt to answer this fundamental, historical quandary. Akin to a computer software engineer, I began by encoding the most compatible musical techniques (those which elicited a high degree of probable synthesization for improvisational use) associated with the pioneering efforts of the post-tonal twentieth-century tradition, such as polymodality, octatonicism, pandiatonicism, polyrhythm, polytonality, and polymeter. These were then linked with a selection of established techniques of keyboard improvisation, such as parallelism (planing), contrapuntal invention (fugal and canonic), polyharmonic chordal arraying, and chromatic transpositional modulation. Once these mechanical processes were formatted, the next step involved constructing a new type of form and the use of graphic score realizations. The final step was the creation of thematic material from which an improvised development would transpire. A practice-as-research methodology was used to document the cumulative stages of programming. This paper will present a successful synthesization of early twentieth-century compositional techniques into an innovative codex for a new model of contemporary classical piano improvisation.

Title: Romantic Ballet and the Rejection of the Male Gaze

Author: Roxanne Gray

Affiliation: University of Utah

Romantic Ballet is often defined by the ethereal female ballerina, on the tips of her toes, wrists soft and broken, head titled coquettishly. The sylph is an icon, and she sets the stage for ballet as we know it. She bears the burden of feminist ridicule and is often blamed for the gender inequalities still steeped in contemporary ballet. Or rather, the male gaze by which she was formed is criticized. This article seeks to shift the perspective that women in the arts have spent centuries exclusively being manipulated and shaped by men. Flipping this narrative requires analyzing Marie Taglioni and Fanny Elssler's work and words in the context of existing French Feminist Theories, such as Saint-Simonianism. By viewing the female body as a site of resistance, we can assert a rejection of the male gaze in Romantic Ballet, seek to understand the historical context of the era accurately, and more fully analyze the contributions of women to early ballet as revolutionary beings.

Title: Sylphs Supporting Sylphs: Confronting Gender Binaries in the Classical Ballet Canon Authors: Jamie A. Johnson and Christa St. John

Affiliation: Utah Valley University

Ballet has a long history of perpetuating gender binaries in pedagogy and performance. Twentyfirst-century ballet, however, continues to evolve to include more expansive gender expressions and identities. Many works from the classical ballet canon emphasize heteronormative relationships and represent females as chaste, unobtainable, and otherworldly. To contribute our voices to the evolution of gender in ballet, we reimagined a historic piece for an ensemble of undergraduate college students and conducted an IRB-approved study. In the case study, we explored how an all-female-identifying cast alters a work that seems to idealize cisgender relationships and a hypermasculine figure. We collected data generated by movement research, practitioner observations, and post-experience surveys. In the process, we confronted classic repertoire norms and historical gendering practices. As Linda Caruso Haviland eloquently states, "There are no reconstructions of the past in the present that are ideology-free and all reconstructions construct a picture of the past that equally reflects what was and who we, as reconstructors and recontexters, are." Reimagining canonical ballets provides an opportunity to present historic works while supporting a spectrum of gender identities and expressions.

Title: Visualities of Identity, Citizenship, and Place in Monument to the Rohwer Deceased Author: Jacob Jensen

Affiliation: University of Utah

The profoundly nuanced Monument to the Rohwer Deceased, 1944, has been subjected to repeated simplifications through documentary photography in archives, the addition of further monuments in Rohwer Memorial Cemetery, and comparison to other monuments nationwide. In contrast to more generalized memorials to the incarceration, the monument is a testament to the diversity and myriad experiences of Japanese Americans during World War II. Mixed visualities clue the viewer into the identities and struggles of the inmates of Rohwer Relocation Center, a wartime concentration camp (often referred to euphemistically as a relocation or internment camp) in Arkansas. Traditionally American features emphasize the desire of immigrants to gain or retain citizenship. Buddhist and Shinto iconographies defy the precedent of adopting Christianity as an integral part of assimilation. In this presentation, I discuss the monument through formal analysis, culturally specific visualities, and theories on localization to present a more rounded narrative of the incarceration, and provide an interesting counterpart to contemporary art questions on the Japanese American displacement. Photography of the monument by different generations and ethnic groups plays an integral role in relocation memory work, but advances a different understanding of the experience. My research attempts to distinguish national, personal, and other agendas of storytelling through consideration of current

practices and methodologies of localization, memory work, and research on archives and monuments.

Title: Susan Chen and the Conditional Acceptance of Asian Americans

Author: Natalie Bond

Affiliation: University of Utah

Recent events in the United States have drawn attention to challenges and complexities that exist for Asian American people surrounding identity and acceptance. Contemporary artist, Susan Chen, responds to the topic of Asian American lived experience through painted portraiture. This paper argues that through artwork created during the Covid-19 pandemic, Susan Chen addresses the conditional acceptance of Asian Americans in mainstream American culture. To support this argument, the paper first introduces the artist's identity and practice. It then explores Chen's work on Asian American experience during the Covid-19 pandemic, focusing on how the artist addresses racialized blame. Finally, it addresses Asian American female representation and how acceptance of Asian American women is conditional upon balanced cultural beauty standards. The artist's motivation for creating pandemic art includes a desire for a broader representation of Asian Americans, awareness of Asian American issues, and social change. Susan Chen's work speaks to these issues in a contemporary context and with powerful visual storytelling. This project's findings include a close visual analysis of Susan Chen's works, which demonstrates her personal interest in Asian American issues. By depicting herself and others responding to racial prejudice and blame during the pandemic, Chen calls attention to the conditional nature of acceptance for Asian American people. Additionally, an analysis of her work through lenses of race and gender demonstrates how conditional acceptance is present at the intersection of Asian American and female identities due to beauty standards, especially those surrounding skin color, hair color, and dress.

Title: Active Analysis and the Acting Classroom

Author: Michael Shipley

Affiliation: Utah State University

Konstantin Stanislavski is considered to be the creator of modern acting technique, but his methodology changed radically over his career. Much of American actor training is based on Stanislavski's early work, characterized as Cognitive Analysis (or intellectual analysis). Late in his career he began to work with an embodied method which has become known as Active Analysis (in contrast to the previous Cognitive Analysis). Since it was most commonly used as a part of preparing a play for performance, Active Analysis is often referred to as a "rehearsal technique" yet how can we expect actors to engage with a rehearsal technique that may seem at odds with their previous training, likely based on some legacy of Stanislavsky's early work? Is it possible to introduce the concepts of Active Analysis into the acting classroom to better prepare actors for more in-depth and skillful use of the same concepts when rehearsing a play, providing an embodied approach to both training and rehearsing? This paper will describe a design for an embodied approach to an acting class based on the tenets of Active Analysis. This course, focusing on improvisation, events, and action, was created at Utah State University and will include feedback from students and observations from practicing teachers.

Title: The Relationship Between Music Instruction and Academic Performance

Author: Douglas Stump and Laura Peterson

Affiliation: Southern Utah University

The Covid-19 pandemic of 2020 is creating the need for many school districts to consider how to prioritize school budgets during a time of reduced funding. With school administrators placing greater emphasis on making data-driven decisions, it is critical to understand current research on music instruction and academic performance and how best to apply these studies in making policy and curriculum changes within our schools. The purpose of this paper is to advocate for music as core curriculum through a review of current studies that address the benefits of music

instruction in the areas of overall academic performance and intelligence, mathematics, language learning, acquisition and reading, brain function and cognition, and student wellbeing. Music instruction provides clear academic and developmental benefits toward meeting state mandated performance goals while providing equal access for students of low socio-economic and disadvantaged groups.

Title: Maya Deren's "Ritual in Transfigured Time": An Example of Avant-Garde Dance Author: Fiona Barnard

Affiliation: Utah Valley University

"Ritual in Transfigured Time" is a short dance film choreographed and directed by Maya Deren. The film was released in 1946 during the post-war era. Maya Deren utilized early modern avantgarde characteristics to create her work. Avant-garde works are created to derail art from a traditional position. Maya Deren, through modern dance and the avant-garde commonalities, produced a work that is a product of American post-war culture. Therefore, "Ritual in Transfigured Time" demonstrates the cultural affluence and individualities of the post-war era. Through the New Historicism perspective, I will analyze five avant-garde characteristics and how those characteristics are reflected in "Ritual in Transfigured Time." The five characteristics I will discuss are (1) exotic themes, (2) distortion of time and space, (3) spiritual transformation, (4) naturalism, and (5) addressing the social conflicts of the time. A review of written source material and a critical analysis of a YouTube video of "Ritual in Transfigured Time" will fully realize the purpose of this study and answer the following questions: (1) What is the New Historicism perspective and how does it inform a discussion of dance, (2) What are the characteristics and commonalities of modern avant-garde, and (3) Through a critical analysis of the movement, what characteristics and commonalities are seen in "Ritual in Transfigured Time"? These questions will provide the information needed to determine if Mava Deren's work was informed by avant-garde principles.

After researching, reviewing, and analyzing "Ritual in Transfigured Time" and written source materials, I can conclude that dance is a product of a culture. Through the lens of New Historicism, Maya Deren's choreographic choices demonstrate all five avant-garde characteristics and commonalities to speak to the cultural climate of the post-war era.

Biological Sciences Oral Presentations

Title: Chimeric Autoantigen Receptor (CAAR) T cells as a Novel Immunotherapy for Autoreactive B Cells in Graves' Disease

Authors: Mackenzie Taylor Hansen, Abigail Johnson, Hunter Lindsay, Joshua Bennett, Kim L. O'Neill, and K. Scott Weber

Affiliation: Brigham Young University

Graves' disease is the fourth most common autoimmune disease in the US. The main cause of Graves' disease is the overstimulation of the thyroid gland by thyroid stimulating hormone receptor (TSHR)-specific antibodies produced by autoreactive B cells. Current therapies for Graves' disease include antithyroid drugs, radioiodine therapy, and surgery, but these do not address the underlying mechanism of the autoimmune response. Our aim is to generate a targeted method to attack the disease using engineered chimeric autoantigen receptor (CAAR) T cells. Our CAAR T cells contain varying epitopes of TSHR that autoreactive B cells will recognize, bind to, and activate. The activated CAAR T cell will then kill the autoreactive B cell. We will compare our candidate CAAR T cells to see which epitope expresses and binds most effectively. We will also perform cytotoxicity assays to measure the targeting and killing ability of our CAAR construct against B cells from Graves' disease patients. The use of CAAR T cells specifically targeting autoreactive B cells would open a new avenue of treatment for Graves' disease and potentially other autoimmune diseases.

Title: Toxic Metal Sequestration Using Microfluidics

Authors: Jacob Kjeldahl Jensen and Christopher F. Monson

Affiliation: Southern Utah University

Toxic metals, including mercury, lead, and cadmium, are pollutants in many waters world-wide. While many current strategies for heavy metal removal involve flocculation and precipitation, they also require holding ponds and significant amounts of time. Microfluidics offer the ability to remove metals specifically based on reduction potentials. While microfluidics are inherently low capacity, they offer scalability and the opportunity to run with low power use. A microfluidic device is being developed that should run on solar power, potentially offering the ability to remove metals in a quasi-equilibrium fashion.

Title: A Genetic and Morphological Review on Southern Utah Bumblebees - *Bombus morrisoni* and *Bombus nevadensis*

Authors: Isaac Sorensen, Jake Olvera, and Jackie Grant

Affiliation: Southern Utah University

Bumblebees serve an important role as pollinators and many species are in decline. Effective conservation efforts rely on accurate species identifications that can be difficult. Southern Utah is home to many species - including *Bombus morrisoni* and *Bombus nevadensis*, which are challenging to differentiate despite being in different subgenera. Both species' ranges overlap greatly and have characters that require time to understand and differentiate. We have observed that these species are inadequately represented in Southern Utah and other databases due to being misidentified. Digesting one species' cytochrome c oxidase subunit I (COI) sequence and allowing them to run through a gel has been used to differentiate the two.

Title: An examination of the highly variable P8 region (trnL intron) in the genus *Equisetum* Author: William Speer

Affiliation: Salt Lake Community College

Sequences covering the highly variable P8 region of the chloroplast trnL intron from 68 Equisetum specimens representing 17 species and 1 hybrid taxon were examined in this study. P8 sequence lengths ranged from 47 to 82 bp, with an average length of 71.2 bp. The length variation was mostly due to several mostly contiguous indels that were observed among the Equisetum species. These were mainly in a nucleotide region that was difficult to align between subgenera but not within subgenera. One indel reliably separated subg. Equisetum from subgenera Paramochaete and Hippochaete. Indel patterns were consistent among conspecific sequences except for E. palustre, E. scirpoides, E.laevigatum, E. myriochaetum, E. hyemale/E. praealtum, and E. ramosissimum which had identical indel patterns, as did E. giganteum/E. xylochaetum and E. variegatum. Sequences had a high average A-T content of 79.2%. Nucleotide positions more in the middle of the P8 appeared to exhibit higher variability and were more difficult to align while positions closer to the 5' and 3' ends seemed to be more conservative and easier to align. The predicted secondary structures for the P8 region tended to be very variable between subgenera and, except for the monotypic subg. Paramochaete. Phylogenetic analysis of the P8 sequences used the maximum likelihood optimality criterion. Specimens representing subg. Equisetum were distinguished from subg. Hippochaete and the monotypic subg. Paramochaete (E. bogotense) with E. bogotense nesting in subg. Hippochaete. Conspecific specimens did group together in many cases; interspecific relationships within subgenera were generally not well resolved and often polytomous. However, P8 data did tend to reliably separate subgenera Equisetum and Hippochaete, though the position of subg. Paramochaete is somewhat questionable.

Title: Effects of Tea Tree Essential Oil on *Escherichia coli* and *Staphylococcus aureus* Authors: Robert T. Eakins, Jed Whetten, Taylor Roney, Quinn Legere, and Olga R. Kopp Affiliation: Utah Valley University

Melaleuca alternifolia (tea tree) leaves have been used throughout many cultures around the world to help heal wounds and injuries because of its anti-inflammatory and anti-microbial

properties. Some essential oil companies claim that tea tree essential oil contains purifying capabilities for air and contaminated surfaces. Essential oils are purified by many methods, the most popular being steam distillation. The essential oils, once purified, are sold to customers so they can use the oil to benefit from the plant's physiology and metabolic processes. In attempts to inform the scientific community about the antibacterial properties of the essential oil, we tested whether tea tree oil possesses the ability to fight common infections to any significant degree. We grew *Escherichia coli* and *Staphylococcus aureus* and measured the zones of inhibition in response to different concentrations of the essential oil. We also tested two different brands of tea tree oil, dōTERRA and Lagunamoon. We found that dōTERRA tea tree oil exhibited antibacterial properties while the Lagunamoon oil did not.

Business

Title: Desired Leadership Traits in First Bosses: A Study of Extant Leadership Theories Authors: James C. Brau, and Jameson L. Brau (Gonzaga)

Affiliation: Brigham Young University

In this paper we document the extant theories of business leadership and partition them into main threads (e.g., Great Man Theory, Trait Theory, Contingency Theory, etc.) Next, we examine the socio-cognitive literature on Generation Z and formulate hypotheses of desired leadership traits in first bosses. We then conduct a comprehensive survey gathering data from 700+ undergraduate college students, asking them what preferred traits they would like to have in their

first boss upon graduating from college. Empirical analyses are then conducted to test the various hypotheses pertaining to the extant leadership theoretical camps.

Title: An Econometric Analysis of Diversity: Perceptions of Emerging Adults towards Corporate Social Responsibility Metrics

Authors: James C. Brau, Jameson L. Brau (Gonzaga), and Sabrina Volpone (Univ of Colorado) Affiliation: Brigham Young University

The focus of this study is to examine emerging adult perceptions of diversity issues. We use a sample of 1,149 students and ask questions pertaining to how important diversity is in their ideal first job. The dependent variables are derived from a corporate social responsibility database and focus on diversity issues. We employ a set of econometric tests to find correlations between demographic independent variables and six dependent variables as well as an aggregate Diversity Index dependent variable. The tests show that gender and political affiliation are robustly correlated with the dependent variables.

Title: An Empirical Examination of Inventory Turnover Along the Supply Chain Authors: Joseph J. Henry (Rowan Univ), Peter Christensen, James C. Brau, and Rebekah Inez Brau)

Affiliation: Brigham Young University

Inventory turnover may directly, or indirectly, impact a firm's supply chain neighbors. If firms in the supply chain can collaborate, it is possible that neighboring firms' inventory systems both become more efficient.

However, if a supplier must stock up on extra inventory to satisfy the downstream customer, the supplier's inventory system may become less efficient. We perform our analysis to determine if there are positive or negative externalities associated with inventory turnover along the supply chain. We test two mutually-exclusive hypotheses, the Displacement Hypothesis, specifically that suppliers and customers have negatively-correlated inventory turnover ratios [ρ (ITC , ITS) < 0] and the Integration Hypothesis, that suppliers and customers have positively-correlated inventory turnover ratios [ρ (ITC , ITS) > 0]. We perform econometric analyses to verify whether a firm's neighbors' inventory turnover is a statistically-significant driver of the firm's inventory performance, and, if so, in what direction that relationship lies. Our testing includes pairwise correlation analyses, as well as multivariate models at the firm-specific and industry

levels. Our empirical evidence provides robust support for the Integration Hypothesis.

Title: Can Environmental Messaging Reduce Product Returns?

Authors: Aaron Brough (USU) and Ryan Hamilton (Emory)

Affiliation: Utah State University

Many consumers have come to expect that the process of returning a product will be free and easy, and product returns are increasingly common--last year, approximately one in six items purchased in the U.S. was ultimately returned. A high rate of product returns is problematic for two reasons. First, product returns harm the environment; they involve additional energy and resource consumption as returned products are repackaged and transported, and many returned products end up in a landfill. Second, returns place a heavy financial burden on retailers; paying for return shipping, inspection, restocking, reselling, and reshipping quickly erodes profit margins and may even create a net loss, especially when a returned product cannot be resold. In this research, we propose eco-messaging (reminding consumers of the environmental impact of their decisions) as an inexpensive but effective method of reducing return rates. We provide evidence that eco-messaging creates anticipated guilt by making salient environmental costs that might otherwise be neglected. We further show that eco-messaging may be more effective among liberals than conservatives. These findings can help retailers improve profit margins and have important implications for fighting climate change.

Title: Unattended In-Home Delivery under Varying Scenarios of Technology-Enabled Anonymity

Authors: James C. Brau and Hugo A. DeCampos (Univ of Central Oklahoma) Affiliation: Brigham Young University

Whereas many companies have explored attended in-home delivery as one solution to challenges associated with last mile delivery, few have explored unattended in-home delivery. This paper examines consumer willingness to allow unattended in-home delivery under various scenarios of anonymity enabled by technology. Specifically, we study how blockchain-enabled anonymity of sellers, delivery companies, and consumers can influence consumer willingness to allow unattended in-home delivery of a nutritional product in this last mile service triad. Hypotheses build on agency theory and the potential for information asymmetry and opportunism. The analyses are based on data from 784 responses to an online survey of end-consumers who were randomly assigned to treatments in a scenario-based experiment. The results indicate that blockchain-enabled anonymity of the delivery. These findings hold regardless of whether the consumer and seller are known or anonymous to one another. We also find that the joint anonymity of the seller and the consumer significantly decreases the likelihood of a customer allowing unattended in-home delivery.

Title: The Impact of ADHD and ASD on Learning in a Principles of Finance Class Author: James C. Brau

Affiliation: Brigham Young University

We analyze the impact Attention-Deficit/Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder(ASD) on academic performance in an undergraduate introductory finance course. We implement univariate and multivariate econometric models on a sample of over 800 students from the Winter 2023semester at a large, private university. Prior research by Brau, et al. (2016, 2017) identifies factors that correlate with university student course grades. We employ the same research structure as the Brau, et al. papers with the innovation of adding dozens of questions that deal with ADHD and ASD tendencies, as well as anxiety and depression characteristics.

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Brau, J. C., Brau, R. I., Owen, S. R., and Swenson, M. J. (2016). The Determinants of Student Performance

in a University Marketing Class. Business Education Innovation Journal (8:2), 21-31. Brau, J. C., Brau, R. I., Rowley, T. D., and Swenson, M. J. (2017). An Empirical Analysis of Success Factors in an Introductory Financial Management Class. Journal of the Academy of Business Education (18), 231-284.

Title: A Framework for the Integration of CFA and CFP Exam Preparation into an Undergraduate or MBA Course of Study Authors: James C. Brau and Peter Christensen Affiliation: Brigham Young University In this paper we first perform an exhaustive literature review of the extant peer-reviewed, academic research on the Chartered Financial Analyst (CFA) or Certified Financial PlannerTM (CFP®) designations. This review motivates the potential benefits for students to work towards one or both of the designations. We then propose a framework and curriculum for integrating a CFA or CFP® program into an undergraduate or MBA curriculum. We use as our case study a large, private university in the western United States. Using 13 years of data on CFA enrollment and passing rates, we find that the students who completed the proposed curriculum achieved an average 72% passing rate on the CFA Level I examination compared to a national average over the same years of 39%, a statistically significant difference beyond the one percent level. We also present enrollment and depletion data for the CFP® capstone class for its first four semesters.

Title: Blockchain in Supply Chain Management: A Feature-Function Framework for Future Research

Authors: James C. Brau, John Wallace Gardner, Krista Marie Gardner, and Hugo A. DeCampos (Univ of Central Oklahoma)

Affiliation: Brigham Young University

Blockchain technology offers numerous venues for supply chain applications and research; however, the connections between specific blockchain features and future applications have been unclear to date in its evolution. We advance the understanding of blockchain in supply chain management by providing a new research framework built on unique blockchain features as applied across core supply chain functions. Our framework is a 4 x 9 feature-function matrix that integrates four supply chain functions (i.e., logistics, purchasing and supply management, operations/quality, and customer relationship management) with nine blockchain features (i.e., traceability/provenance, accessibility, visibility, immutability, distributed/shared ledger, validity, peer-to-peer transacting, pseudonymity, and programmability). Our feature-function framework is supported by a structured systematic review of reviews using PRISMA methods. We use the framework to present a future blockchain research agenda in supply chain management.

Title: The Impact of Changing Disclosure Requirements, Competition, and Private Capital on Firm Exit Methods and Premiums

Authors: James C. Brau, Brigham Young University and Ninon Kohers Sutton, University of South Florida; and Qiancheng Zheng, University of Massachusetts Lowell Affiliation: Brigham Young University

Changing disclosure requirements and the evolution of US markets in the 21st century have created historic shifts in the exit strategies and payoffs for private firms. Prior literature demonstrates that firms choosing to exit by going public earn a greater premium than comparable firms that sell via mergers and acquisitions. We document that important changes in regulation, competition, and private financing in US markets are associated with a reversal in this pricing trend: firms that sell out earn higher risk-adjusted premiums than firms that conduct IPOs. Our findings are robust to regression discontinuity, propensity score, and Heckman methods which

all control for endogeneity concerns. We also document that several of the relevant explanatory factors in the prior literature have reversed their effects on both choice of exit and exit premium. We believe we are the first to document this reversal in the economics of the exit decision.

Title: Comparing Self Efficacy and Grades of Students in Progressive Accounting Course Levels Presenter Jeff Davis

Author: Jeff Davis

Affiliation: Weber State University

Self-Efficacy has a long, rich research history and is defined as an individual's judgments of their own capabilities to perform an action. In other words, "How confident am I that I can do well on this test, in this sporting event, in this game, on this assignment, or in this course?" Confidence in one's abilities is an important aspect of success. Confidence usually increases as one increases their preparation, experience, and history of success. Confidence in an action usually has a positive relationship with how well a person enjoys doing the specific action. On the other hand, as an individual learns more and has more experience in a particular task, they also become more aware of the complexities, difficulties, and challenges of completing that task successfully. Thus, the more one knows, the more a person may realize how much more they need to learn, develop, and apply to continue to have success. For example, confidence in your abilities in a sport or musical talent will increase, but moving from high school level, to college level, to professional level, means competing against better competition in all aspects of the sport or musical performance. This study measures and compares self-reported answers to ten selfefficacy questions for new, intermediate, and advance accounting students. The research reports self-efficacy differences in the course levels of the students. It also studies whether higher selfefficacy has a positive relationship with higher grades as reported by some prior research.

Education

Title: Studying the Benefits of Peer Coaching during Student Teaching

Authors: John Rodari Meisner and Laureen Graves

Affiliation: Southern Utah University

"In the fall of 2021, student teachers were placed in peer coaching groups. This decision was grounded in peer coaching research (Knight, 2009; Neubert and McAllister, 1993; Showers and Joyce, 1996) which has shown a benefit to preservice teachers in a variety of intent was that these arrangements would provide support in a way that is typically missing during student teaching. Student teachers were asked to complete two different surveys following each peer coaching meeting. We sought to understand the impact and potential value of peer coaching. While peer coaching was indeed found to be valuable by student teachers, what we did not expect was that the state-mandated performance assessment would negatively impact the student teaching experience. This study looks into that impact on student teachers and student teaching (PPAT) was prominent during the student experience and had a negative impact. This was seen in responses to prompts about their feelings, challenges, goals, and advice needed. As a result, in an attempt to mitigate this impact and relieve some of the stress on student teachers, in following semesters, they were permitted to take three work days off from student teaching to focus only on the completion of the various tasks of the PPAT.

Implication: PPAT is adding undue stress and distracting student teachers from the important work and growth that is intended for student teaching."

Title: Strengthening Teaching Self Efficacy of Adjunct Faculty Through Training and Community of Practice Author: Todd Wente Affiliation: Ensign College For this study several adjunct faculty members were invited to participate in a training protocol that included introduction of two constructivist teaching strategies and two community of practice meetings within the business faculty group. Instructors were evaluated on how their expression of teaching self-efficacy changed as measured with the Ohio State Teacher Efficacy Scale (12 item variant). Quantitative measures showed measurable gains in teaching self-efficacy among newer instructors. Qualitative measures suggested that all instructors became more comfortable discussing their self-efficacy, especially regarding using constructivist strategies after the protocol was implemented.

Title: Improving Teaching Self Efficacy Among New Adjunct Instructors through a Focused Innovation.

Author: Todd J. Wente

Affiliation: Ensign College

New Adjunct Instructors often express feelings of being unprepared for the challenges of teaching in a collegiate environment, especially if they have not had the opportunity to go through a strong teaching skills program. Without such a program, they must do what they are familiar with from their own programs, which is often heavily lecture based and not taking advantage of the insights that come from and understanding of both constructivist strategies and andragogical principles. This study demonstrates that a focused unit of study can improve instructors' overall sense of teaching self-efficacy in a short period of time. Statistically significant evidence from qualitative analysis of pre and post surveys based on the Ohio Teaching Self Efficacy Scale is further supported by qualitative analysis from Community of Practice meetings which included both new and experienced instructors.

Title: Sharing Experiences to Cultivate a More Open Mind about Teaching: A

Co/Autoethnography of Pre-Collegiate Teaching Experiences

Authors: William J. Davis and Abigail Julian

Affiliation: Southern Utah University

Teacher learning is paradoxical: teacher preparation programs and courses seek to influence teacher learning at a given point in time, yet teacher learning is an ongoing experience influenced by past, ongoing, and anticipated experiences. In response to research documenting the ways teachers' own experiences as K-12 or pre-collegiate students result in teachers teaching the way they were taught; teacher educators have conceptualized at least some of their research and teaching as an intervention against the detrimental impacts of K-12 school experiences. However, scholarship also has identified influences on teacher learning like parents, as well as teaching experiences students have in teaching internships, peer tutoring, and other pre-collegiate experiences. These additional influences, along with assertions in the literature that the expectations of the current era contribute to fundamentally different experiences with teachers and teaching in schools, suggest that teacher educators have much to learn about the ways in which the incoming education students' experiences shape their understandings of teaching. The purpose of this collaborative autoethnography between a teacher educator an undergraduate student is to examine influential pre-collegiate experiences outside of K-12 schools, in particular experiences teaching in non-formal education (NFE) programs. We developed a series of five prompts that we responded to individually, meeting via Zoom to discuss our experiences and teacher learning. Our collaborative and iterative analysis revealed four categories related to our non-formal education teaching experiences: 1) how teacher learning was impacted by particular contexts in which it took place; 2) how our experiences revealed different and broader notions of teaching than we observed in our formal education experiences; 3) how certain contradictions shaped, and perhaps inhibited, our learning as teachers; and 4) what we learned from the teaching we did in NFE programs.

Title: Social Studies, Culture, and the Utah Dual Language Immersion Program: A Preliminary Didaktik Analysis

Authors: William J. Davis, Jiazhen Yan, Ruohan Gao, and Ziyao Zhou Affiliation: Southern Utah University

Culture and language learning are inextricably linked, though the nature of their relationship is disputed. Descriptions of the relationship could be considered along a continuum, ranging from essentialist perspectives like E.D. Hirsch, Jr.'s cultural literacy to theories of bilingual learning and multicultural education. The relationship between culture and language learning has taken on increasing importance in Utah, where a state-sponsored dual language immersion (DLI) program in multiple languages continues to grow. Utah's DLI program has been designed for native speakers of language to learn a target language, including Chinese, Russian, and Spanish, among others. Students participating in the program spend half of the day learning language and content in English, with the other half spent learning language and content in the target language. As a result of this split, the responsibility for teaching content areas like social studies, where standards can deal with different aspects of culture, may also be divide between teachers. These divisions raise questions about which cultures, and what aspects of culture, are being taught. The purpose of this study is to explore the formation of DLI students as language learners, and the role culture may play in this formation. We conducted this examination by employing a Bildung-centered Didaktik analysis of the K-6 social studies standards and the online supports DLI teachers receive. Our goal has been to investigate how and why culture is taught within the program, rather than merely focus on what the explicit curriculum requires. In addition, we draw from interviews from a case study of teacher learning and professional development in a Chinese DLI program to contextualize our findings. Our preliminary analysis has revealed that the target language is typically used to teach about living in Utah, with the target culture rarely a topic of study despite the potential for cross-cultural comparison.

Title: Mirrors, Windows, and Doors Strategy: Equity-centered assignments in teacher education to prepare culturally responsive teachers

Author: Andrea Garavito Martinez

Affiliation: Weber State University

In this presentation, I focus on how I use the equity-centered approach to facilitate assignments and activities that prompt teacher candidates to examine their assumptions of self and others. I refer to this strategy as "mirrors, windows, and doors." Mirror activities are designed for individuals to look inward through self-reflection). Windows activities where they look outward using an equity- and asset-based lens, and then doors refers to the praxis of applying what they have learned through inward and outward reflection. This strategy for assignments and activities in teacher education prepares teacher candidates to work with culturally and linguistically diverse students. They learn to interrogate bias, use an asset-based view of students, and value the experiences of students from marginalized groups. More importantly, they learn that through continuous learning and pushing themselves through reflection, they will become better and more effective teachers.

Title: Math Pals: Connecting Discorse and Feedback

Authors: Megan Kimberling and Nicole Gearing

Affiliation: Utah Valley University

Throughout the past year, Dr. Gearing and I have been working to create a program called Math Pals. Math Pals uses a program called Explain Everything to digitally connect an Elementary Student to a College Student. Through this program, we use a virtual whiteboard and a voice recording feature to communicate with our math pal. The Elementary students are given a math task and try to solve it. They are able to record themselves writing and talking while working out the problem. Then their digital whiteboard is shared with their math pal at UVU. The UVU student watches their recording and sees how their math pal did with the math task. They can then record feedback, extra instruction or extra help to their elementary student. This has been an amazing program that gets young students excited for learning math, and college students more hands on experience teaching and guiding a student to success.

Engineering

Title: Effective Thermal Conductivity of Porous Copper Foam Saturated with Eicosane Phase Change Material

Authors: MaryJo Taylor and Ali S. Siahpush

Affiliation: Southern Utah University

A detailed experimental study has been performed to evaluate the effective thermal conductivity of a solid/liquid phase-change thermal energy storage system that includes porous copper foam. The phase-change material (PCM) and metal foam were contained in a vertically oriented test cylinder that is cooled at its outside boundary, resulting in radially inward freezing. As the PCM freezes, the solid/liquid interface moves inward from the surface of the test cylinder, and a thermal resistance layer is built up, resulting in a reduced heat transfer rate between the system to be cooled and the PCM. The porous copper reduced the insulating effect of this thermal resistance layer. In the freezing case study, a one-dimensional mathematical model was developed, which considered heat conduction as the only mode of heat transfer. Experimental results were used in the Heat Conduction and Heat Balance Integral methods to evaluate the effective thermal conductivity. Also, six analytical models were used to predict the effective thermal conductivity. The results of this study are discussed in terms of the effectiveness of the metal foam as a heat transfer enhancement device.

Title: Boiling and Cavitation Experiment for Engineering Undergraduate Labs

Authors: Savanah Higley and Ali S. Siahpush

Affiliation: Southern Utah University

The phase-change process is an important concept to understand in fluid mechanics and thermodynamics as a mechanical engineering undergraduate. To better understand this process, experimental demonstrations are needed, but the required equipment is often too expensive to implement in an undergraduate lab. In this experiment, an inexpensive and practical apparatus was used to measure the lower than atmosphere pressure that water begins to boil at various temperatures. The experimental data were then compared to published values and theoretical values calculated by using the Clausius-Clapeyron and Magnus equations to show the success of the experiment. This experiment proved to be an accurate way to predict the pressure at which water begins to boil, as the experimental values were very close to the published and theoretical values. Further uses of this experiment include a fluid mechanics lab on cavitation or a thermodynamics lab on saturation pressure.

Title: Plane Wall Radiation Shielding

Authors: MaryJo Taylor, Michael Forbes, Tori Thomas, and Ali Siahpush

Affiliation: Southern Utah University

This experiment modeled radiation shielding by using an aluminum plate as a radiation shield. The shield is placed between two parallel thin sheets of aluminum. One aluminum sheet is uniformly heated and the other one is not heated. The temperatures of each metal sheet are recorded after the heat source turns on until the system reaches steady state (3-6 hours). The experiment was repeated after placing a thin sheet of aluminum between the original aluminum sheets as a radiation shield to reduce the thermal radiation heat transfer. The experiment was repeated four times for varying distances between the aluminum sheets. Using the rate of heat transfer coming from the heating source, the temperature of the back plate is calculated and is used to determine the theoretical temperatures. These theoretical temperatures are then compared to the experimental temperatures. When spacing was smaller, theoretical calculations yielded imaginary numbers. It was found that the expected heat transfer rate coming from the heating source was expected to be 24 Watts but using experimental values the actual heat transfer rate was only 2 Watts. This was due to heat loss through convection. Even with this loss, the aluminum plate still shielded the radiation heat transfer, and with larger spacing the shielding

Title: Lumped Method Transient Conduction Heat Transfer

Authors: Sergio Reyescordova, Ethan Arnold, Kaden Allred, William Miller, and Ali Siahpush Affiliation: Southern Utah University

In this experiment, we tested multiple configurations of aluminum and examined their validity as a lumped system. For a material to meet the requirements of the lumped system, it must have a uniform temperature throughout. To test this validity, each configuration was submerged in hot water then immediately cooled in ice water. The experimental change in temperature of the configurations were recorded and used with the log-incomplete response of the temperature change to find the time constant. The time constant was used with the lumped system analysis heat transfer equations to evaluate the heat transfer coefficient of the fluid. This was then used to evaluate a Biot number, which must be less than or equal to 0.1 for the lumped system analysis to be valid. The Biot numbers of each trial were found to be less than 0.1, verifying that all the configurations can be considered lumped systems.

Title: Heat Transfer Of A Fluid And A Water Reservoir Using A Constant Temperature Authors: Sota Nakahama, Adam Smith, Aaron Chancellor, Ammon Heaton, and Ali Siahpush Affiliation: The Southern Utah University

The development of thermal science technologies throughout time has been greatly aided due to advancements in heat transfer analysis. Therefore, efficient heat transmission is critical to the continued advancement of technology. In such a broad field as heat transfer analysis, there exist many exciting opportunities for undergraduate research. The objective of this project was to set up and test a preliminary design for a heat exchanger to be used for undergraduate engineering research. In a heat exchanger, a working fluid heats or cools another fluid without any mixing occurring between the two fluids. To replicate this concept, the system consisted of a constant temperature bath connected to a water reservoir. The working fluid was delivered in a counterflow configuration from the Constant Temperature Bath fluid reservoir to heat or cool the water in the container (cooler). Temperatures were recorded with thermocouples at specific locations within the system and water bath, and compared to the ambient temperature. Tests were performed for heating and cooling to better understand the efficacy of the design. The heat loss in the system to the surroundings was significant and proved to be the single largest inhibitor of accurate results. A future study using this preliminary design must be focused on limiting this loss of energy.

Title: Studying Natural Convection Through Melting A Slab Of Ice

Authors: Manuel Gaspar, Toby McMurray, Matthew Bayreder, Slater Emery, and Ali Siahpush Affiliation: Southern Utah University

Natural convection, though very complex, is an important concept in heat transfer, as it helps explain many of the earth's natural systems. The purpose of this experiment was to study natural convection by melting a slab of ice and comparing the result to an analytical solution. Specifically, the mass flow rate of the melting ice was measured and predicted. The average measured mass flow rate was 280.79 g/hr while the predicted was 172.56 g/hr. These values exhibited a 62.72% error. This large percent error could be attributed to a multitude of factors including improper enclosure conditions around the ice slab, and assumptions associated with the analytical approach.

Title: Infinite Length Fin Heat Transfer Analysis of Aluminum Rod in Unforced Air Authors: Lee Bistline, Jameson Griffiths, Tommaso Manghera, Rebecka Moses, Kadyn Tucker, and Ali Siahpush

Affiliation: Southern Utah University

This paper describes an analysis that was performed on a cylindrical fin exposed to unforced air to better understand the coefficient of convective heat transfer (h). It was designed to compare

the analytical solution of heat transfer through a fin to experimental fin results. The experiment was set up by making a fin from a 0.5-inch aluminum rod. The fin was exposed to the air and heated at the base by a heating pad. The heated plate was insulated to prevent heat loss to the environment. Thermocouples attached at specified distances from the heat source measured the temperature throughout the rod. To analyze the heat transfer through the rod, steady-state and transient conditions were modeled using MATLAB to predict the transient heat transfer. When comparing the finite difference numerical model against the data collected during the experiment, the results strongly supported the accuracy of using such an analysis to predict fin behavior.

Title: Natural Convection Over a Heated Vertical Plate

Authors: Jordan Peterson, Drew Hatch, Braeden Brown, Jordan Katnik, and Ali S. Siahpush Affiliation: Southern Utah University

In natural convection, the temperature difference between a fluid and a hot surface causes a change in fluid density. In the case of a heated vertical plate suspended in air this density change causes buoyancy forces to push the air up. The upward movement of air causes an airstream that allows natural convection to occur. The thermal boundary layer thickness is the perpendicular distance away from the surface where ambient air is unaffected by convection. The goal of this project is to investigate the natural convection boundary layer thickness over a vertical plate using imaging techniques, theoretical analysis, and experimental measurements. In this experiment, an aluminum sheet (8-in by 8-in) receives constant uniform heat flux from a heating source and heats to approximately 75ËšC. Schlieren imaging is used to visualize the thermal boundary layer of the heated vertical plate. Preliminary thermocouple experimentation showed the maximum thermal boundary layer thickness is approximately 1 in with a heat supply of 30 W. This testing assists in determining the thermocouple spacing for the final experiment. Thermocouples will be attached to a rod at regular 1/8-in intervals. The temperatures measured by the thermocouples will determine the boundary layer thickness by determining how far away from the plate the measured temperature is the same as ambient air temperature. This project is a work in progress and further calculations will determine a theoretical boundary layer thickness of the plate. The result will be compared to the boundary layer thickness measured in the experiment. The experimental heat transfer coefficient will also be compared to theoretical values.

Title: Comparative Analysis of Urban Railway Construction: High-Speed Train from Salt Lake City, UT to Las Vegas, NV

Authors: Mohamed Askar, Jared Baker, Reagan Robins, Jake Richins, Jet Richins, and Kordell Baker

Affiliation: Southern Utah University

Construction is a significant contributor to the USA economy. Constructing a high-speed transit train from Northern Utah to Las Vegas will significantly reduce the amount of traffic on Interstate 15. By putting a High-Speed Train route, other means of cargo routes will be developed to be able to speed up the transit of goods from one state to the other. The model discusses three alternative railway routes to select which of the three alternate designs is ideal for construction. This will be determined by analyzing several criteria of selection, including construction time, life cycle costing, risk, speed of the train, revenue, environmental impact, and land acquisition. Each of these criteria will be given a relative weight according to their effects on the constructability. After analyzing each route and after giving weighted averages to each of the factors, an overall score can be given to the route alternative that would reflect the constructability of the route. This study is a substantial help to the design-build project as it is invaluable information to the owner as it summarizes which route is most effective overall. The research's primary goal is to try and find the best routes through the rough terrain between Cedar City, Utah and Mesquite, Nevada. With there being lots of elevation changes, the research is trying to come up with the most feasible route that will accommodate the most people but not

compromise the whole purpose of putting a high-speed train in for quick transport through the state of Utah.

Title: Quality Control System for Heavy Civil Construction Projects: Cedar City Water Tank Case Study

Authors: Mohamed Askar, Jared Baker, Tanner Woodruff, Porter Weston, and Tanner Wright Affiliation: Southern Utah University

Tracking and carefully observing an array of quality control factors help a construction company ensure the quality of projects while also meeting time and budget constraints. Based on the tracking of quality control, many companies are impacted in a positive way when quality control is met. Construction quality control is a system of management that ensures that deliverables meet the standards and guidelines set by the client at the beginning of the construction process. This can include a number of criteria, such as completing the project within the scope of work. In the end, quality is decided by the client, regulatory bodies, and EPA guidelines. Quality control and quality assurance are two equally important arms of construction quality. While assurance refers to setting quality management expectations, quality control refers to the plans and procedures that achieve high-quality outcomes. Quality control in construction seeks to solve problems, provide high-quality results, and prevent issues from coming up again in the future. A quality control model will be developed, and the defined steps will be followed in sequence. The previous water tank had settled, and a better quality system could protect it from settling again.

Title: Constructability Assessment Model for Heavy Construction Projects: Garnet Interchange, Clark County, NV Case Study

Authors: Mohamed Askar, Jared Baker, Maxwell Mansfield, and Eddy Ngoie Affiliation: Southern Utah University

Reconstruction of ramps and other required improvements decrease congestion, generate healthy travel settings along the vital corridor, and develop strength and economic opportunities throughout the community. The research develops a model to discuss the constructability assessment of the reconstruction of the on- and off-ramps to provide adequate acceleration, replacement of the existing I-15 bridges, modification to the US 93/SR 604 intersection, and intersection improvements at US 93/Apex Great Basin Way, including coordination of design efforts with the City of North Las Vegas on the future relocation of SR 604. These improvements will enhance the storage length for turning traffic, accommodate crossing roadways, vertical clearance, and adequate width for future widening of I-15 to three lanes in each direction, and provide access and satisfactory traffic operation in conjunction with the adjacent I-15/US 93 interchange. The model discusses three alternative designs in order to determine which of the three alternate designs given is ideal for construction. This will be determined by analyzing several criteria of selection, including time, cost, risk, safety, and environmental impact. Each of these criteria will be given a relative weight according to their effects on the constructability. After analyzing each design and after giving weighted averages to each of the factors, an overall score can be given to the design alternative that would reflect the constructability of the design. This study is a substantial help to the design-build project as it is invaluable information to the owner as it summarizes which design is most effective overall.

Humanities, Philosophy and Foreign Language

Title: "Make Haste Deliberately: The Historical American Aversion to Inoculations and its Ramifications" Author: Thomas C. Terry Affiliation: Utah State University, Logan "Joel Valdez languished 11 days in a Houston hospital, waiting for surgery after being shot six times during a robbery. Ray DeMonia of Cullman, Alabama, reportedly contacted 43 hospitals in three states searching for an open cardiac ICU bed for him and eventually died. Three hospital groups in Salt Lake City, swamped with Covid-19, postponed 'not immediately life-threatening surgeries' causing William, 11, born with multiple heart defects, to have two surgeries canceled in early November 2021. All fell victim to what CDC director Rochelle Walensky called an 'epidemic of the unvaccinated."

This is nothing new. In 1721, Rev. Cotton Mather, of Salem Witch Trials notoriety, supported the then-experimental inoculation procedure of variolation to combat a smallpox outbreak brought in Boston. A bomb was hurled through the window of his home at 3 a.m., failing to detonate. Attached was a note: 'Cotton Mather . . . I'll inoculate you with

In 1776, Congress forbade physicians from inoculating soldiers for smallpox. George Washington defied them, believing the Continental Army had 'more to dread "from the disease 'than the Sword of the Enemy," completing the successful and mandatory mass inoculation of his army in January 1777.

In late 2020, government officials postponed vaccine Emergency Use Authorization decisions for the Thanksgiving holidays, ignoring the example of a Thanksgiving Day 76 years earlier when U.S. and allied soldiers liberated the Natzweiler-Struthof Nazi concentration camp near Strasbourg, Germany, rather than pausing for a turkey feast.

This article looks at vaccine hesitancy in American history, aided and abetted by politicians and confusing, contradictory, and sometimes deadly public health behavior by the CDC and FDA, including repeated reauthorization of the infamous Tuskegee Study of Untreated Syphilis of 400 poor Black men in Alabama from 1932 until 1969 and the denial that AIDs could be transmitted through transfusions."

Title: Hegel's Relation to Metaphysics

Author: Alexander James

Affiliation: Adjunct Instructor, Department of Philosophy, Utah Valley University The sense we have of the subject-matter of metaphysics, inherited from both antiquity and the modern period, is of a subject that deals either with the transcendent first-cause --- and if not with one that is transcendent, then one that is only immanent --- or, on the other hand, if not addressing the topic of the first-cause, as a subject constituted by its occupation merely with ontology, the theory of categories, or transcendental philosophy. I call this the 'standard frame of reference for getting the subject-matter of metaphysics into view. I suggest this 'either-or has influenced the way we think about the possibilities for interpreting Hegel's own relation to metaphysics, in the sense that this 'either-or has provided a template through which commentators have explored Hegel's own relation to metaphysics. Indeed, the standard space of options for thinking about Hegel and Metaphysics tends to map on to the possibilities outlined by just this 'either-or. Yet, I want to suggest that Hegel's philosophy is in no small part the effort to overcome just this sense of the possibilities for thinking about the subject-matter of metaphysics. That is, his philosophy is committed to overcoming what I am calling the 'standard frame of reference for thinking about the subject-matter of metaphysics. For Hegel, it is neither the case that metaphysics is a subject-matter dealing either with a metaphysical first-cause that is either transcendent or immanent, or, on the other hand, merely with a general ontology or with a theory of categories or with a transcendental philosophy (i.e., a theory of the mind's immanently necessary categories).

Title: Ethnographic Study of Mormon Faith Difference

Author: Kim Abunuwara

Affiliation: Utah Valley University

"This project researches the effect of religious difference on Mormon parent-child relationships. Jana Reiss's Next Mormons Survey (2019) details these differences. While many millennial Mormons are believers like their elders, their belief is softer on traditional Christian teachings like 'Jesus was literally resurrected and rose from the dead" or 'There is life after death' Reiss writes, 'the percentage who aren't sure that God exists has doubled from the oldest generation to the youngest (16). Jeffrey Nielsen's editorial 'LDS Church Losing Youth to its Moral Conscience: Why the LDS Church should be more accepting of LGBTQ and Transgender People recounts how frequently his students speak to him about feeling alienated from their Mormon parents.

This UVU study conducted surveys with local volunteers asking Mormon parents and children about their habits when talking about religion. Interviewees were informed that their words would be recorded and used in subsequent performances. Researchers curated the interviews and then were video-taped reading select passages. Researchers were also video-taped reflecting on their experience with the project. These performances will furnish an interfaith website--a safe place where visitors can explore and reflect on differing views without the complex emotions that accompany a relational encounter.

The goal of ethnographic performance isn't illusionism but to activate audience contemplation. For example, the performer's physical type often doesn't match that of the person interviewed; the words may indicate a middle-aged man, but the performer/researcher is a young woman. This incongruity causes the audience to consider the whole exchange as well as the individual viewpoints. Jill Dolan writes,

The opposite of parody or satire which are mean and mocking, the monologue performance invites understanding of otherness. Leads to a more generous compassionate attitude toward difference."

Title: Dissolving The Twin World Problem

Author: Jordan Robert

Affiliation: Brigham Young University

The twin world thought experiment has, it seems, stripped away Gottlob Frege's conception of sense and reference as argued by philosopher like Burge, Kripke, Putnam, and Donallin this, however I suggest can be resolved by appealing to Wittgenstein's distinction between a sign and symbol in his philosophy of logic. Once we understand what it is that picks out an object in logical space, we can therefore, see how philosophers can ensnare themselves in the so called "meaning" and "referent" nexus that plagues so much of epistemology and philosophy of mind. I suggest that we revisit Wittgenstein to clarify the meaning of this distinction showing that via Wittgenstein's picture theory of meaning that the sense in which our signs, e.g., "aluminum" change from world 1 to world 2 lies not in the object (reference) or in the meaning (use), but the possibility of the sign in reference (symbolizing). This is the result of a misunderstanding of logical space, and significant use. Once we bring into view what makes symbolizing possible via our signs (an ideograph or that temporal object perceivable to the senses) we can free ourselves of being puzzled by such thought experiments and dissolve the problem "like a lump of sugar in water" (Wittgenstein, Philosophy).

Title: Dissolving The Twin Word Problem

Author: Jordan Robert

Affiliation: Brigham Young University

The twin world thought experiment has, it seems, stripped away Gottlob Frege's conception of sense and reference as argued by philosopher like Burge, Kripke, Putnam, and Donallin—this, however I suggest can be resolved by appealing to Wittgenstein's distinction between a sign and symbol in his philosophy of logic. Once we understand what it is that picks out an object in logical space, we can therefore, see how philosophers can ensnare themselves in the so called "meaning" and "referent" nexus that plagues so much of epistemology and philosophy of mind. I suggest that we revisit Wittgenstein to clarify the meaning of this distinction showing that via W.'s picture theory of meaning—that the sense in which our signs, e.g., "aluminum" "change" from world 1 to world 2 lies not in the object (reference) or in the meaning (use), but the possibility of the sign in reference (symbolizing). This is the result of a misunderstanding of logical space, and significant use. Once we bring into view what makes symbolizing possible via our signs (an ideograph or that temporal object perceivable to the senses) we can free ourselves of being puzzled by such thought experiments and dissolve the problem "like a lump of sugar in

Kinesiology and Health Sciences

Title: Developing Nursing Student Clinical Judgment Skills Through Active Learning Simulation Experiences

Author: Carolyn Lewis

Affiliation: Utah Tech University

Nursing students who attend Utah Tech University participate in four semesters of active learning through simulation. The simulation experiences provide hands-on experience with low and high-fidelity mannequins to help the students develop and solidify important clinical judgement skills that are tested on the National Counsel Licensing Examination for Registered Nurses (NCLEX-RN), and that are also essential to the nurse's success in the clinical practice setting. This presentation will describe the six facets of clinical judgement, and will discuss the specific hands-on simulation activities that are used to target development in each of the six areas of clinical judgement. Nursing clinical judgment skills are categorized into six main areas: 1) Recognize Cues; 2) Analyze Cues; 3) Prioritize Hypotheses; 4) Generate Solutions; 5) Take Action; and 6) Evaluate Outcomes. During each semester of the nursing program, students take care of simulated patients' clinical problems. The faculty control the patient simulators out of sight behind a two-way mirror. The high-fidelity mannequins can speak and manifest real signs of distress including adventitious breath sounds, irregular heart rhythms, thready pulses, pupillary changes etc.

During simulation, students are required to assess the patient, recognize problems, take actions to address the problems, call the physician for medical orders, gather supplies, manage their patient's care, and document their interventions in a time-pressured environment that simulates a real patient care setting. After the simulation experiences, students have a chance to debrief and complete self-reflection and goal setting.

Title: The Effects of Probiotics of Group B *Streptococcus* Rates in Pregnant Women Authors: Jake Reed, Hailey Tennessee Schellenberg, Robert Taylor Eakins, and Michaela Gazdik Stofer

Affiliation: Utah Valley University

Group B Streptococcus (GBS) is a bacterial species commonly found in the vaginal tract of ~40% of pregnant women (Ho et al., 2016). GBS positive women are not sick, but can pass the bacteria to the infant during birth leading to possible complications for the child. GBS infection in the infant can lead to an increased risk of the infant developing sepsis, pneumonia, meningitis, and in some cases death (Ho et al., 2016). Pregnant women are tested for GBS using a vaginal swab when they are 36 weeks pregnant. According to CDC guidelines, patients who are GBS positive will be administered antibiotics 4 hours prior to delivery. Pre- and intrapartum antibiotics can adversely affect the development of the infant's immune system resulting in an increased risk for allergies, asthma, obesity, and eczema (Lamont et al., 2020). A hypothesized solution to combat GBS colonization in pregnant women is the use of taking probiotics prophylactically to prevent GBS from colonizing, and/or eliminating GBS after it has infected the vaginal tract. There have been few clinical trials done on the effects of probiotics on GBS, with only two taking place in the United States (Aziz et al., 2018; Hanson et al., 2014). We hypothesize that if pregnant women take a probiotic every day beginning at week 28, they will have a decreased likelihood of contracting GBS. We have currently enrolled 9 pregnant women to participate in our study and are actively collecting data to address our hypothesis. Participants take a vaginal swab at week 28 to test for the presence of GBS. At that point

probiotics are given to participants and one capsule will be taken daily until the end of their pregnancy. At 36/37 weeks of pregnancy, the patient's provider will perform another vaginal swab to test for GBS.

Title: Using Substance Abuse Counselor Interview as An Engaged Learning Component of An Online Health Promotion Course

Author: Linnette Wong

Affiliation: Weber State University

Substance Abuse Prevention is a senior level online course for students seeking a Bachelor's degree in Health Promotion. Historically, this course had the learning objective of helping students study legal and illegal drugs from a pharmacological, historical, psychosocial, and behavioral perspective with an emphasis on primary prevention concepts and responsible consumerism. In recent years, the addition of a substance abuse counselor interview as a key component of the course has established a link between engaged learning and substance abuse issues. This component is a good start for students to get involved in the profession and to learn more about substance abuse issues.

Language and Literature

Title: Exodus to Eden: Biblical Journey Narratives in My Ántonia

Author: Emma Fox

Affiliation: Brigham Young University

Willa Cather's novels are known for their lyrical language, midwestern imagery, gripping immigrant characters, and diverse portrayals of the immigrant experience. While all of Cather's novels have helped establish our sense of distinctively American spaces and narrative types, My *Ántonia* creates an especially poignant version of the American frontier myth focused on the hardy but often maligned Eastern European settlers of the northcentral plains. As Cather ennobles the immigrant status of these pioneers by imagining them as biblical figures on a kind of biblical journey, she positions them as venerable models positioned to lead established Americans into a new age.

My presentation connects the immigrant experience in *My* Ántonia to distinct narratives in the books of Genesis and Exodus. Initially, the Shimerdas imagine themselves as Old World exiles who, following a long exodus, establish themselves in the "promised land" of the American Midwest. But as they learn that the new land is no Eden, that it is instead harsh and unforgiving, they struggle for physical and emotional survival. Ántonia eventually seeks Edenic promise in the town several miles from the family homestead. But in an inversion of the Eve narrative, Ántonia "falls" and is exiled from the town as well as from idyllic memories of her past. Ultimately, however, she initiates a personal exodus, reclaiming a corner of the countryside as her own and establishing a new and enduring Eden within it. Cather's final imagery in *My* Ántonia creates the text not only as a model immigrant journey but as a beacon to all Americans, a bright reminder that the raw integrity and determination of the immigrant American is and always will be the heart of the American future.

Title: Margaret Hale's Strike Against Immoderate Male Feelings: Emotional Responsibility in *Elizabeth Gaskell's North and South*

Author: Madison Maloney

Affiliation: Brigham Young University

In *Elizabeth Gaskell's North and South*, men exhibit immoderate emotion, and their excessive cowardice, sorrow, and impulsiveness leads to dark consequences. Because the men deny responsibility for their own feelings, they shrug off the attendant consequences as well, and Margaret Hale, the novel's protagonist, must manage the emotional burdens of the men around her. Predictably, as Margaret represses her own feelings so she can be more emotionally available for others, she is threatened with burnout or collapse.

North and South uses an overlaying story about workers' strikes to develop crucial undergirding themes of the masculine parading of emotion in tension with the female suppression of feeling. In the end, the novel argues that men and women should live in emotional equilibrium by assuming equal levels of emotional responsibility.

Although Margaret's familial and romantic relationships are important themes in the novel, emotional imbalances inhibit these connections. Emotional responsibility becomes a necessary remedy to create healthy, fulfilling relationships.

Physical Sciences

Title: Quantitative Analysis of Mitragynine in Commercial Kratom Products Authors: Naomi Elmer, Amanda Meyers, and Edward Walker

Affiliation: Weber State University

Mitragyna speciosa, also known as kratom, is an indigenous tree in Thailand, Myanmar, and Malaysia, with a rich folklore describing various biological activities including analgesic effects. Clinical studies suggest that Kratom tea has potential to be an effective alternative to opioids for pain relief. The active ingredients are believed to be a variety of alkaloids, with the most important ones being mitragynine (MIT), and 7-hydroxymitragynine (7OH-MIT). However, Kratom products are sold under a variety of trade names with no data regarding the chemical composition of plant material being consumed. We utilized high-pressure liquid chromatography (HPLC) to measure MIT and 7OH-MIT in a number of commercially available products. Our test results show significant differences between the MIT concentration label claims and the actual MIT contents in some of these products.

Title: Holey Frit: Patterned PDMS for Protein Filtration

Authors: Kylee M. Stoddard, Fielding Hokanson, Hunter Cook, and Christopher F. Monson Affiliation: Southern Utah University

Frits are filters that can remove micrometer-sized particulates from solution, and are typically fabricated from glass beads. We have developed a method to make frits by mixing magnesium particles and PDMS, a silicone elastomer, followed by magnesium dissolution. Our frits exhibit surprising abilities to remove large molecules from solution, at times showing the ability to exclude 66 kDa proteins and possibly smaller molecules. They are also more heat stable than traditional dialysis membranes, and so might offer significant advantages. Additional applications of the PDMS frits are being explored, including superhydrophobicity.

Title: Manganese Desert Rose Nanoparticle Synthesis

Authors: Taytum Stratton, Simon Langlois, Nakelle Goldie, Christopher Monson, and Elizabeth Pierce

Affiliation: Southern Utah University

Nanoparticles are of significance because of their small size and unique characteristics. Few studies have been conducted on the synthesis of manganese nanoparticles. This project was among the first to synthesize manganese nanoparticles, and this was done using a microfluidic device with manganese acetate as an ion source and sodium dithionite as a source of oxide. Various capping ligands were used, including FusionRed, oleic acid, green fluorescent protein (GFP), bovine serum albumin (BSA), casein, and fluorescent dyes. The FusionRed protein was expressed and purified in *Escherichia coli*. As different capping ligands were used for the manganese nanoparticles, different shapes and sizes of particles formed. Fluorescence spectroscopy and scanning electron microscopy were used to confirm that the particles synthesized were in the nanoscale size range. When FusionRed was used as a capping ligand, desert rose nanoparticles formed. In our investigations, it was noted that when water sources used for solutions were changed, the desert rose nanoparticles stopped forming. This implies that the desert rose nanoparticle fabrication process is highly sensitive to one or more trace contaminant in the water (all water sources were deionized). We are currently investigating this.

Title: Collisional Losses and Reduction of Thrust in the Nozzle of a VASIMR Authors: Benjamin Miera and Phil Matheson Affiliation: Utah Valley University A Variable Specific Impulse Magnetoplasma Rocket (VASIMR) is a potential means of powering future deep space missions. The engine uses radio waves to heat the plasma through Ion Cyclotron Heating (ICH) which then creates thrust in a magnetic nozzle. Our previous studies have modeled the increased specific impulse and thrust generated in a collisionless plasma. This work includes ion-neutral collisions in the simulation which reduce the number of ions in the plasma stream, and thus reduce thrust. This study analyzes the loss of thruster efficiency caused by such collisions in the nozzle region of the VASIMR. The simulation follows Argon ions passing through the engine and uses Monte-Carlo methods to evaluate collisions and ion losses along the ion trajectories. The collision rates are based on a background neutral density calculated from mass flow rates and ion temperatures obtained by averaging over the ion energies determined from our collisionless model. The neutral density is assumed to fall off exponentially after exiting the engine in the exhaust plume. Efficiency of the engine varies widely with initial mass flow rates and the subsequent neutral backgrounds these produce, but in a nominal run of this model, using a mass flow rate of 120 mg/second, and an initial ionization fraction of 95%, we find that the engine experiences a minimal loss of thrust.

Title: Electrophoretic stripping

Authors: Logan Larsen and Christopher Monson

Affiliation: Southern Utah University

"Cell membranes are essential parts of living cells, separating the inside of a cell from the external environment and supporting protein complexes that perform essential functions. Membrane proteins are proteins bound within the cell membrane and play a fundamental role in the upkeep of the cell, but are difficult to analyze due to their need for a membrane. To mimic cell membranes, supported lipid bilayers have been developed, which are lipid bilayers held a few nm above a flat support, often glass. Previous research has shown that a supported lipid bilayer can be stripped off of glass using fast fluid flow; the lipid bilayer will peel off of a surface and form a vesicle containing whatever fluid was used. Research has also shown that proteins within the cell membrane can be separated by charge, lining up each unique protein by running it through high voltage. We are developing a device that will combine electrophoresis and stripping by running high voltage over a supported lipid bilayer and then running fluid over the membrane to form vesicles of purified proteins. This should facilitate the separation and thus characterization of membrane proteins in the cell, allowing us to gain a better understanding of the workings of the proteins within the cell membrane. Several previous devices have failed due to water leakages and air bubbles, both of which prevent the utilization of the device. We have solved the water leakage issue, and are now working on removing the bubbles from the glass slide before we can do further testing."

Title: Experimental and Theoretical Analysis of Resonance Energy Transfer Among Methylene Blue and Rhodamine 6G in Aqueous Solution.

Authors: Hamza Samha and Jacob Dean

Affiliation: Southern Utah University

Methylene blue has the ability to sensitize oxygen in living tissue after being exposed to light at an efficiency of 50%. Due to this characteristic methylene blue is widely used as a photo-therapy agent in the fight against cancer. In order to increase the efficiency of methylene blue to greater than 50%, or expand the range in which methylene blue absorbs light, it can be combined with other light-absorbing molecules (dyes), such as rhodamine 6G. Initially, spectroscopy methods such as UV-vis and fluorescence spectroscopy were used to determine improvements in the potential sensitizing behavior. With this information these dyes were then combined and fluorescence spectra were recorded in order to determine if energy transfer via resonance energy transfer has occurred. However, several attempts proved futile, indicating that the concentration of the dye solution was not enough to form the necessary dimer needed for resonance energy transfer to occur. This prompted a computational analysis to investigate the following: at what concentration will the dimers form in order for resonance energy transfer to occur, and what conformer(s) will exist thermodynamically at the lowest possible energy state to yield the most stable dimer? Theoretically the dimer at the lower energy state will be a viable candidate for the successful transfer of energy to in turn either increase the efficiency of the sensitization of oxygen, or allow for spectra greater variety of wavelengths to excite methylene blue. In addition to a thermodynamic investigation, an analysis of ideal equilibrium conditions for monomers and dimers in aqueous conditions was considered. Furthermore, this will allow for a fitting of the data to maximize the concentration of methylene blue and rhodamine R6G in aqueous solution. This will allow for a range of concentrations that will be ideal for further future experimental investigation.

Title: On the Schrödinger equations of Atoms in Lower Dimensions

Author: Chin-yah Yeh

Affiliation: Salt Lake Community College

The Schrödinger equation of hydrogen-like atoms started the quantum era. There are only a few exactly solvable Schrödinger equations. Here we shall consider qualitative descriptions of two Schrödinger equations that are the analogs of hydrogen-like atoms in lower dimensions. In 1-D, the equation is $-\frac{\hbar^2}{2m}\frac{\partial^2\psi}{\partial x^2} + k\sqrt{x^2}\psi = i\hbar\frac{\partial\psi}{\partial t}$, and in 2-D, $-\frac{\hbar^2}{2m}\left(\frac{\partial^2\psi}{\partial x^2} + \frac{\partial^2\psi}{\partial y^2}\right) + k(\ln r)\psi = i\hbar\frac{\partial\psi}{\partial t}$. Characterizing these equations may shed light on the study of 1-D and 2-D crystals. Things we see in 2-D but not 1-D include rotation and that a closed curve can separate a space into two regions. In describing the two equations qualitatively, we shall focus on the distribution of energy levels and the behavior of degeneracies.

Title: Cooling a Monolignol of Lignin to Near Absolute-Zero as a Novel Alternative Method for Refining Organic Fragments

Authors: Seth Weston, Hannah Chappell, and Jacob Dean

Affiliation: Southern Utah University

Lignin is the second most abundant material in biomass. Break down of lignin while refining the organic fragments has potential for various applications. Lignin is composed of three monolignols each bearing methoxyphenol chromophores which absorb ultraviolet light. Characterization of the fragmentation patterns of the monolignols is essential to designing more efficient tools for the breakdown of lignified biomass, and has commonly been analyzed via enzymatic reactions. The purpose of this study is to explore a novel and controllable method that involves mass spectrometry coupled with laser spectroscopy to characterize fragmentation pathways of methoxyphenol compounds. This is accomplished through supersonic expansion, time-of-flight (TOF) mass spectrometry coupled to a high-powered laser, which reveals photochemical fragmentation pathways in a mass- and energy-resolved fashion of a compound at 2K. Advantages of this method include a more accurate analysis of intermolecular forces, molecular/electronic structure, and a number of other physical characteristics at molecular resolution. Prior to loading the sample, characteristics such as the melting point, UV-vis, molecular weight, and time-of-flight of guaiacol (2-methoxyphenol) were determined. Results show that under these conditions, fragments appear at lower energy levels compared to normal fragmentation patterns.

Social Sciences

Title: Rising Irreligion in the Beehive State: Why Disaffected Latter-day Saints in Utah are More Likely to Abandon Religion Than Switch Denominations Author: Rick Phillips Affiliation: University of North Florida The percentage of people in Utah with no religious affiliation has increased rapidly in the 21st century. Many of these Utahns are former members of The Church of Jesus Christ of Latter-day Saints (the LDS, or Mormon, church). Studies show that when Mormons abandon their faith they are less likely than other Christians to switch to a different denomination. Rather, they tend to forsake organized religion entirely. This paper uses both quantitative data and ethnographic interviews collected along the Wasatch Front to explore the underlying reasons for this pattern of Mormon disaffiliation. Findings reveal that aspects of Mormon theology, the perceived political alignment of the church, and the structure of LDS social networks make switching to a different denomination difficult for disaffected Mormons. Finally, the paper shows how the factors contributing to Mormon disaffiliation are more pronounced in Utah where Mormons make up the majority of the population than in other places where Mormons are typically a small minority.

Title: Pedestrian Safety at Night: A Case Study of Public Space Lighting

Authors: Sabrina Waite and Jamie Spinney

Affiliation: Southern Utah University

Sidewalks are a fundamental and necessary part of public space, but it is becoming increasingly dangerous to be a pedestrian, especially at night. The primary purpose of this study was to perform an audit of sidewalk and intersection illuminance in the neighborhoods immediately surrounding the campus of Southern Utah University in Cedar City, Utah. A secondary purpose was to compare measured illuminance values to a generally accepted illumination standard. A digital light meter was used to measure illuminance at street intersections and regularly spaced mid-block locations. GPS coordinates were also collected to enable mapping and spatial analysis of the illuminance data. Results suggest the pedestrian environment lacks uniformity and most sample observations fail to meet the minimum illumination standards, which means the study area poses significant pedestrian safety and security concerns, because it is too dark at night. Results also provide the information required for targeted visibility enhancements of both sidewalks and crosswalks in the study area.

Title: Staring Into the Abyss: The Origins of Serial Killer Behavior

Author: Peyton Kosman

Affiliation: University of Utah

The term "psychopath" was first coined in the late 19th century, but it wasn't until at least the middle to late 20th century that tangible progress was made in understanding this type of distinct personality. In particular, behavioral investigative units were created to study, categorize, and profile such individuals. This paper is first an exploration of the term "psychopath" as it has evolved in the 20th century with the creation of the DSM psychiatric evaluative tool, the establishment of the Behavioral Science Unit (BSU), and the development of actual profiling techniques for apprehending psychopathic killers. In addition, this study will focus on the origins of psychopathic behavior, specifically the behavior of serial killers. Using grounded theory, the study will examine the histories of specific serial killers across multiple decades to help construct a theory of the origins of serial killer behavior.

Title: Recovery Support Services in Substance Use Treatment Completion

Author: Brett Bartruff

Affiliation: University of Pennsylvania

This study aims to understand the relationship between recovery support services provided by certified peers and clients' length of time in and completion of substance use treatment. Responses to enhance treatment engagement include recovery support programs staffed by people with lived experience of substance use and recovery; however, research in this area is limited.

This study involves an archival chart review from a western state's community mental health agency with a total sample of 1,007. To test treatment effects across groups, an independent sample t-test was used to test the difference in length of treatment, and a chi-square test of independence was used to examine treatment completion. Additionally, to test treatment effects

across peer services groups, two hierarchical regression analyses were used to test the predictive value of peer services on length of stay in treatment and treatment completion. To test treatment effects in the peer-services group, multivariable regression analysis was used to test two models, one for each dependent variable.

This study's initial treatment effect testing finds that people who received any recovery support service stayed in substance use treatment for more days. However, the additional hierarchical regression analysis finds that when controlling for demographic and clinical characteristic covariates, there was no statistically significant difference in treatment length between people who received peer services and the comparison group. Among people who received recovery support services, each additional session with a peer worker predicted an 11% increase in the likelihood of completing treatment. The post hoc analysis' additional findings include the number of different kinds of peer services provided, years of education, and workforce participation as predictors of both dependent variables in the peer services group. The number of previous treatment episodes also had a statistically significant positive association with increased days in treatment for the peer services group.

Title: Sisters in Struggle: The Resistance of Women in Hip Hop

Author: Theresa A. Martinez

Affiliation: University of Utah

Women have played an integral role in all manifestations of hip hop culture from its roots in the 1970s to the present, including breakdancing and graffiti, but particularly rap music. In fact, women rappers have shaped the genre from the very beginning. In particular, while rap music has continued to serve as a reflection on and weighty culture critique of profound disparities facing African Americans and other people of color in America, it has also offered insights into the lives of Black women. In this regard, the lived experiences of Black women surviving within this context have been echoed in the voices of women hip hop artists who reflect on everything from misogyny to domestic violence to social justice. This paper focuses on a lyrical and thematic analysis of the work of four women hip hop artists' two legendary hip hop artists who emerged in the late 1980s and two contemporary hip hop artists who are already making a mark on the genre as they communicate and reflect on their sociohistorical context. The thematic analysis of our four hip hop artists will be unpacked through a theoretical lens that draws on oppositional cultures or cultures of resistance within the foundation of a Black women's standpoint voices of resistance to intersecting oppressions in their time.

Title: From "Model Minority" to "Model Targets"

Author: Huiying Hill

Affiliation: Weber State University

With the nationwide protests about "Black Lives Matter", subjects of racial/ethnic relations in the United States once again are brought to the forefront. One major reason is that we as a nation have never thoroughly and seriously deal with racial problems once and for all. This paper will examine another minority group, Asian Americans, and their experience in this racist American social structural and cultural environment. Asian Americans have been labeled as a "model minority" because of some of the subgroups' high educational and economic achievements in the past few decades. But, they still suffer racial discrimination and prejudice in different forms than that of African Americans. Especially after the COVID-19 spread to the United States, violence and physical assaults against Asian, especially East Asian Americans are sky rocketed.

The author conducted a survey and some interviews among Asian Americans, most of whom are Chinese American, to get a better grasp of the types and forms of prejudice and discrimination experienced by them and their children. The main purpose is to find out what is the fundamental underline reason that minority groups are still facing so much prejudice and discrimination in the United States. Title: Using Facebook and Reddit to code support group member posts: What we can learn about the needs of patients with Postural Orthostatic Tachycardia Syndrome (POTS) Author: April Law

Affiliation: Utah Valley University

Many patients with chronic illnesses feel that they lack resources when it comes to finding knowledgeable specialists, helpful consumer products, and support for loved ones. This research project aims to bridge the gaps of understanding between patients and their families and medical professionals by observing common patient complaints and requests for advice on social media platforms. By coding these responses and looking for commonalities, manufacturers may also benefit by learning to create better products that serve the needs of chronically ill patients. Similar studies have been performed for other areas of research. A social media study was conducted in Canada to determine social levels of hesitancy toward COVID-19 vaccines (Rotolo et al., 2022). Most Canadian citizens have been vaccinated, and researchers believe that the results of this study can help guide educational attempts for unvaccinated citizens (Rotolo et al., 2022). Perry and Park (2021) performed a qualitative analysis of Twitter feeds to search for major themes of suicidality and found that while intrapersonal and interpersonal factors were amply expressed, about half of the tweets expressed suicidality when discussing social issues such as health and politics.

This study compares posts from Facebook and Reddit to search for commonalities among patients in support groups for Postural Orthostatic Tachycardia Syndrome (POTS). After posts are qualitatively coded, a statistical analysis is performed. By discovering the most discussed support group topics, doctors, manufacturers, content creators, and loved ones can better understand the needs of patients with POTS.

Title: Internalized Stigmas: Public Transit and the Tragedy of Preconception

Author: Lizzie Jensen

Affiliation: Utah State University

Each day, the Cache Valley Transit District (CVTD) coordinates roughly 4,300 rides. In a community with over 100,000 residents, including 28,000 students, these rides represent less than 3% of daily commutes. Unfortunately, while transportation is a basic need, decades of stigmatization have made economical forms, like public transit systems, less popular. In the United States, public transit has become heavily stigmatized due to perceptions people have about the role federally funded transit systems like bus programs have in society. Many people in both urban and rural areas perceive bus systems with disdain. They are interpreted as unclean, unsafe, and only for people who cannot afford cars. To this extent, internalized stigmas impact the efficacy and usability of public transit in a wide variety of communities. In Cache Valley, the free bus systems are underutilized by residents and students alike, as they are influenced by unconscious prejudices. Although it may seem that factors like cleanliness, convenience, cost, and safety would be the main contributors to poor public transit usage, it generally is caused by much broader ideas and themes, including historical segregation, class distinctions and stereotypes, political mismanagement, convenience/timeliness, and cost. The complexity of the issue makes it difficult to approach and resolve on a universal level. Because of this, humans have an obligation to examine their judgments on public transit and evaluate whether or not utilizing available transit sources, like the CVTD, is a good move for them on an individual level. Reducing the emissions of unnecessary vehicles on the road is a critical aspect of sustainability. Reevaluating internalized stigmas can contribute to increasing the quality of life in communities, and help improve the experience of those who already rely on public transit. This essay dissects and diagnoses such issues.

Title: Perceptions of Water Use at Weber State University Author: Zoey Krumroy Affiliation: Weber State University Weber State University is known for its work in energy conservation, but with growing concern and uncertainty of Utah's water resources, there's more interest in what Weber State can be doing. This research explores WSU stakeholders' attitudes, beliefs and perceptions on water use and water conservation in Utah and participially here at WSU. This enhances the knowledge for facilities management, the Energy and Sustainability Office, and administrators in order to better serve campus needs and increase water sustainability. Nine focus groups and five one-on-one interviews were conducted. Participants included a variety of WSU faculty members, staff, students, and administrators from different disciplines and locations. Many participants value water greatly and expressed concern for the coming years, especially due to prolonged droughts and population growth. As a result, participants feel all of Utah, as well as Weber State should be doing more to conserve water - from better technology inside buildings, to the landscape outside, to a change in how water is viewed. Their suggestions reveal that many participants aren't aware of what Weber is already doing and is planning to do in terms of water conservation. So, while WSU stakeholders are interested and concerned with WSU water use, their engagement with what WSU is doing with water isn't matching their concerns. This disconnect demonstrates a need for WSU to improve its work to increase awareness and knowledge about campus water conservation, as well as for stakeholders to increase their involvement and participation in these efforts.

Title: Increase of Pain Sensitivity and Anxiety

Author: Hunter Mitchell

Affiliation: Utah Tech University

Pain is a strong and necessary feeling that triggers a signal for the body to respond to uncomfortable stimuli. This negative affect along with fear and anxiety work together to provide protection against potential threats. Pain and anxiety are critical elements of not only early development but adulthood as well. In this study we examine anxiety, depression, and pain sensitivity looking to determine whether pain is felt equally among people with certain mental health challenges. We hypothesized a correlation with anxiety and increased pain sensitivity. Our sample contained 308 participants with a mean age of 31.77 and a SD of 15.27 of these participants 77% were female. We sampled from a diverse background recruiting by use of fliers, social media, and word of mouth. Each participant filled out an online questionnaire taking about 60 minutes to complete. After completion we ran the appropriate statistical analysis to determine a correlation using SPSS. The results showed a statistically significant correlation between increased pain sensitivity and anxiety, and a trend between decreased pain sensitivity and depression. We discuss the possible implications of the findings and the need for future research to be done in this area.

Title: Profiling Characteristics of Gun Violence in the Intermountain West Area

Authors: Daniel Kim, and Yong Seog Kim

Affiliation: Utah State University

In this paper, we would like to identify the unique characteristics observed in gun violence incident data sets collected during the period of 2014 \hat{a} ^(*) 2017 in the Intermountain West Area compared with other states in the United States. We first compare the temporal characteristics in terms of weekdays, monthly, and yearly patterns of gun violence incidents in two regions. Then we identify the differences in demographic characteristics in age and gender of participants involved in gun violence incidents from two regions. Finally, we like to take societal perspectives through crime rate, strictness of firearm registration requirements, and the index of drug and alcohol use with the hope of identifying differences in their relationship with gun violence incidents between two regions.

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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.