

WELCOME

On behalf of the Office of Undergraduate Research, welcome to Weber State University's 14th Annual Undergraduate Research Symposium and Celebration. This symposium celebrates the scholarly, creative and research accomplishments of our students and their mentors. Faculty-student collaboration in the research process provides an opportunity for personal and professional growth that few other activities match. Together, through active research agendas and creative endeavors, our students and faculty explore the boundaries of their disciplines and expand our realm of knowledge. This partnership enhances the potential of our students to think independently, creatively and critically. Discovery through research encourages a sense of relevance and excitement in the classroom as new knowledge is applied to society, industry and education.

These presentations are evidence that the pursuit of knowledge and creative expression are an integral part of the campus culture and Weber State University. Please join us in celebrating the accomplishments of our students and their research mentors. We hope that this symposium will inspire others to continue this form of profound learning and intellectual engagement.

ACKNOWLEDGMENTS

Thank you to the individuals and organizations whose generous donations have supported undergraduate research at Weber State University.

Clayton Anderson

President Millner

Kem Gardner

Yaeko Bryner in memory of Dale Bryner

Ralph Nye Charitable Foundation

Barbara (Gail) Niklason

Gloria Wurst

Tracy Aviary

President Thompson



WEBER STATE
UNIVERSITY

Office of
Undergraduate Research

TABLE OF CONTENTS

- 4** Poster Display Listings
- 8** Oral Presentation Schedule

Abstracts

- 15** Telitha E. Lindquist College of Arts & Humanities
- 27** John B. Goddard School of Business & Economics
- 29** Jerry and Vickie Moyes College of Education
- 37** College of Engineering, Applied Science & Technology
- 43** Dr. Ezekiel R. Dumke College of Health Professions
- 55** College of Science
- 99** College of Social & Behavioral Sciences
- 125** Bachelor of Integrated Studies

- 126** Student Index
- 130** Mentor Index

SCHEDULE

Registration

9-11 a.m. | SU Ballrooms

Check-in and registration for Symposium participants.

Oral Session 1

10-11:30 a.m. | SU Third Floor

Light refreshments will be served.

Poster Session 1

10-11 a.m. | SU Atrium

Student & Mentor Luncheon

Noon-1 p.m. | SU Ballroom B

Research Scholars Recognition
Outstanding Mentor Awards
Outstanding Student Awards
Faculty & Student Sustainability Awards

Oral Session 2

1-2:30 p.m. | SU Third Floor

Poster Session 2

2-3 p.m. | SU Atrium

Light refreshments will be served.

1. **Microprocessor programming for scientific atmospheric data acquisition**
Rachel L. Berghout, John R. Warens
2. **Wireless Power Transfer**
Chad Gardner, Brad Beckman
3. **Tactile Display**
Sunny Ly, Orlando Salas, Jacolby Griffin
4. **Mobile ad hoc Network for Search and Rescue Operations**
Joshua Marchant, Christopher Mondaca
5. **Wireless Protocol Analysis using Software-Defined Radios**
Ezekiel Newren
6. **Personality and Family Structure**
Kendra Spomer
7. **Fact vs Fiction: The Influence of Learning Styles and the Testing Effect on Predictions of Memory P**
Hunter Anderson, Sabrina Badali, Joanna Reeder, Giuseppe Paucarpura
8. **Proving people wrong: Effects of perspective and presentation modality on overcoming misconceptions**
Sabrina Badali
9. **Honey, Did You Remember the Milk? Metacognitive Insight and Accuracy in Couples**
Sabrina Badali, Tiffany Page, Tess Kendall, Monika Sahleen, Giuseppe Paucarpura
10. **Relationships Between Trait Hostility, Adaptive Functioning Threats, and Narrative Meaning Making**
Julia Blumenstein
11. **Personality and Birth Order**
Kailee Brown, Laura Pastrana
12. **Effects of Xeriscaping on Surface Temperatures**
Hailey Burton, Heather Couturier, Kyia Hill, Emily Kaemmer
13. **Stress Levels and Sleep Quality in Caregivers**
Valorie Dodart, Kasie Anderson
14. **The Effects of Racially Charged Terms on Culpability in a Police Shooting**
Benjamin Gabbert, Margarita Rodriguez
15. **Paper Color and Testing Ability**
Michael Johnson, Mary Ann Moss
16. **How Does Scent Affect Attitude Towards School?**
Crystal Marker, Kass Madsen
17. **Exercise and Test Anxiety**
Yavet Murillo, Kaitlin Osborne, Regina Ward
18. **The Psychological and Biological Effects of ENDS During Baseline and Withdrawal Conditions**
Makenzie Peterson
19. **Essential oils effect in memory recall**
Tadiana Richter, Lisa Busby
20. **Challenging information, religiosity, superstition and beliefs about psychology as a science**
Monika Sahleen, Raquel Lemos, Tamara Cardon
21. **Music and Memory Recall**
Emily Tanner, Emily Hoff
22. **That Face Looks Bitter: The Impact of Taste on Judgments of Emotional Expression**
Samantha Tibbets, Rosemary Sage, Julia Blumenstein, Jesus Saavedra, John Simmons

- 23. Engaging Students in Family Life Education Throughout Undergraduate Programs (On Campus Engagement)**
 Grace Bingham, Haley Ballou,
 Michael McColley, Amber Johnson,
 Jared Brooks
- 24. Favorites & Rebels**
 Dawnelle Call, Arianne Lovell,
 Aalyah Henry, Meganne Adams
- 25. Contemporary Theory of EAMC and New Supplement Developed on this Theory**
 Noah John Erb
- 26. What It Means to Truly Listen**
 Bryan Henrie, Savannah Shapiro,
 BreeAnn Sonoda
- 27. Influence of Meal Caloric Distribution in Metabolic Syndrome Parameters Among College Students**
 Ashley Petitta, Alexis Elinkowski
- 28. Gendered Household Roles and their Impact on Relationship Outcomes**
 Ashley Vandenberg, Matthew Lefthand,
 Mark Adams
- 29. Undergraduate Research at Weber State University: A 15-Year Analysis**
 Tara Reynolds
- 30. KCACTF Scenic Design**
 Brindle Brundage
- 31. Where Words Once Were - Projection Design**
 Tiffany Campbell
- 32. The Refiner's Fire: Removing Barriers in Education for Teachers and Marginalized Community Members**
 Cheyenne Espinosa
- 33. Lighting Design Entry for We Foxes**
 Daniel Garner
- 34. An Examination of the Experiences of Nontraditional Students at Weber State University**
 Paula Andrea Lopez Alvarado
- 35. Perceptions of Mental Training to Athletic Performance**
 Tawnie Moore
- 36. Technical Direction For Deluge**
 Benjamin Reading
- 37. Business Perceptions of Veterans and PTSD**
 Melanie Jackson

1. **Potential Pain Receptors in Nemertea**
Arusa Ashfaq, Augustus Malan,
Rachel Dubose
2. **Effect of Triclosan on C. Elegans**
Madison Ballif
3. **Processing of Lead Iodide Perovskite Thin
Films for Solar Cell Application**
Heather Barton, Andrew Sandoval,
Parker Burrows
4. **Modelling of fluxes of Nitrogen,
Phosphorus, and Carbon triggered
by wild fires**
Teri Cisney, Michael Fowles,
Nicholas Shaw, Meg Baker
5. **The role of urease in carbonate
precipitation in the Great Salt Lake**
Ryan Clay, Dezmond Swain,
Emily States
6. **Determining the Kinetics for the
APH/ACY Enzymatic Pathway**
Carson Cole, David Coffman
7. **Tissue analysis of osmotic
stress on nemertean**
Rachel DuBose, Augustus Malan,
Arusa Ashfaq
8. **Bacteriophage as an Alternative Treatment
for Antibiotic Resistant Bacteria**
Dariann Gallegos, Joshua Jorgensen
9. **Assessing the biogenicity of Great Salt
Lake microbialites using geochemical
measurements**
Jess Gann, Kristen Mayfield
10. **An Investigation of the Lysogenic Phage
that infects Halomonas Isolated from the
Great Salt Lake**
Jess Gann, Carson Davis
11. **Synthesis of Anticancer Titanium
Compounds and their Efficacy**
Atherton Green, Tanner Grover
12. **Suppression of Lactobacillus
wasatchensis Growth by Organic Acids**
Ireland Green
13. **Invertebrate Diversity in Great Salt Lake
Ecosystem Revealed by DNA Barcoding**
Sabrina Haney
14. **Rhinostasis Chemically Treated Nasal
Tampon for Epistaxis Management**
Jacob Hess, Kortney James,
Dalton Facer, Barbara Trask
15. **Rapid Method for Measuring the
Effect of Prebiotics on Probiotic
Bacteria Growth**
Dana Hoffman
16. **Assemblage Composition Differences
Between Two Creeks in Ogden, UT**
Daniel Hunnel, Amber Bell,
Colton Mooney
17. **Modeled Effect of Industrial Waste in
Promontory Point Landfill Near the
Great Salt Lake**
Angela Jex, Hyrum Briscoe,
Danielle Saxer, Jessica Clark,
Philip Sandgren
18. **Experimental Demonstration of
Indium Tin Oxide for Optimization of
Thermophotovoltaics**
Alex Johnson
19. **Impact of Hobbyist Beekeeping on Flora
Along the Wasatch Front**
Evelyn Linford
20. **Distribution of Spider webs**
Gideon Lomiiko, Tyler Anderson,
Hayley Quay, Savannah Stokes
21. **The Effects of Osmotic Stress on
Hsp Concentration**
Augustus Malan, Arusa Ashfaq,
Rachel Dubose

22. **Isolation of a *Lactobacillus wasatchensis*-like isolate from an aged European cheddar cheese showing**
Isaac Martineau
23. **Anatomy and histochemistry of the Hairy Woodpecker tail apparatus**
Alexis Mathews
24. **Isolation and Characterization of Bacteria to Degrade Art Waste Solvents**
Gabriel McKay
25. **Characterization of 4-Hydroxyisoleucine in Complex Mixtures by UHPLC-MS**
Savannah Nelson, Jared Thompson
26. **Trout and Spider Distributions Along Creek Sides**
Jen O'Leary
27. **Bacteriocin Production by Bio-Protective Lab Cultures that Inhibit *Lactobacillus Wasatchensis***
Sophie Overbeck
28. **Cormorant's: Where Are They During and After Fish Stocking in Suburban Ponds in Northern Utah**
Nicholas Padilla, Jantz Arbon,
Garrett Evans, Carl Catalan, John Kendrick
29. **Is Soil Grain Size a Reliable Indicator of Soil Liquefaction Potential?**
Thomas Ruffing
30. **Metallation and Mechanochemical Synthesis of Tetraphenylporphyrin**
Brenon Severe, Hayden Sharp
31. **“Living Rock” Great Salt Lake Microbialite Display**
Dezmond Swain
32. **Fiber Type Distribution in Golden-colored Manakins (*Manacus vitellinus*)**
Karma Thomas
33. **Feasibility of Biocementing in Great Salt Lake and Uintah Basin**
Kuyler Thompson
34. **Use of Gambel Oak Acorns as Nesting Sites by *Temnothorax* Ants**
Brock Vance
35. **Characterization of the Hemolytic Activity of Probiotic *Lactobacilli***
Jayson Workman, Jesse Kupfer,
Francesco Sechi
36. **Mutation Analysis of Enteroviruses**
Serena Young, Courtney Thomas,
Connor Kendrick
37. **Yoga as an Intervention for Musculoskeletal Disorders**
Aubrey Clark, Adrienne Guymon,
Ashlyn Winmill, Haley Pearce
38. **Periodontal Disease Risk Assessment: Case Study**
Emma DeGrange, Ann Dolling,
Natasha Pruhs, Ryan Allen
39. **Photography & Self-Assessment of Ergonomics in Dental Hygiene Students**
Hannah Hoffman, Alicia Flynn,
Erika Magana, Katie Price
40. **Hand-held X-Ray Device Safety**
Morgan Hutchins, Amanda Lee,
Mckall Platt, Ashley Castellanos
41. **Incorporating Dental Loupes in Dental Hygiene Programs**
Hailey Prestwood, Kristen Benedict,
Katie Enright, Rosy Pena, Angie Davenport
42. **Implant Maintenance Practices of Dental Hygienists**
Brittany Smith, Tess Murray,
Caesie Egbert, Jordon Felter
43. **Childhood Caries Risk Assessment Practices and Fluoride Varnish Use Among Dental Hygienist**
Natalie Wood, Shelly Wood, Madison Smith,
Amy Barrett, Jaci Randall

ROOM 305

10-10:15 a.m.

Alternative Synthetic Strategies for Zirconium Metal Organic Frameworks

Jehad Abourahma

10:15-10:30 a.m.

The Degradative Effects of Horseradish Peroxidase on Microbial Biofilms

Samuel Kalis

10:30-10:45 a.m.

Inhibition of Pathogens by Probiotic Strains of Lactobacilli

Sherie Thornton, Ammon Smart, Amber Smith

10:45-11 a.m.

Preservice Teachers' Learning of Fraction Multiplication and Division

Boston Workman, Marlise Weyburn

ROOM 312

10-10:15 a.m.

Qawinaq: How International Attention Changed the Course of Maya Indigenous Resistance During the Guatemalan Civil War

Andrew Crookston

10:15-10:30 a.m.

Mormon Missionary Efforts in South Africa

Tanner Flinders

10:30-10:45 a.m.

Fall of the House of Pinkerton

Gabriel Lisonbee

10:45-11 a.m.

Justice and the Memorialization of the Rwandan Genocide

Michael Ballif

11-11:15 a.m.

Internal and External Influences on Rwandan Genocide Memory

Taylor Covey

ROOM 305

1-1:15 p.m.

Adjunct faculty: The theory behind inclusion

Lesla Landrith

1:15-1:30 p.m.

Perceptions on Education in the Tongan Community

Aulola Moli

1:30-1:45 p.m.

Understanding Parental Attitudes toward Abstinence Based and Comprehensive based Sexual Health Topic

Laura Pastrana, Alyson Rasmussen

1:45-2 p.m.

Evaluating the Effectiveness of Comprehensive versus Risk-Avoidance Sexual Education Curriculums

Alyson Rasmussen, Tina Pastrana

2-2:15 p.m.

Deluge

Robert French

ROOM 312

1-1:15 p.m.

To Frack, or Not to Frack?: A Video Debate

Katherine Quigley

1:15-1:30 p.m.

Solar Water Heating Project

Corey Collatz

1:30-1:45 p.m.

**The Collaborative Process: How law enforcement agencies
and universities research together**

Steiner Houston, Carrie Stone

1:45-2 p.m.

**Disproportionate Minority Contact in Policing:
Where does the bias lie?**

Carrie Stone, Steiner Houston

BALLROOM C

1-1:15 p.m.

The Effects of Vitamin C, Hydrocortisone, and Thiamine on the Production of Tnf-Alpha in Human PBMCs

Kaleb Eppich, Colter Cederlof, Skyler Child

1:15-1:30 p.m.

Electronic cigarettes and the Risk of Rheumatoid Arthritis

Jacob Hutchins, Caden Kendell, Macean Knowlton

1:30-1:45 p.m.

Systematic Inflammation in Electronic Cigarettes versus Traditional Cigarettes

Sebastian Lawson, Dallas Clark

1:45-2 p.m.

Elimination of Antibiotic Resistance in *Klebsiella pneumoniae* using CRISPR-Cas9 System

Erin May, Noah Fowler





TELITHA E.
LINDQUIST COLLEGE
OF ARTS & HUMANITIES

**An Examination of
the Experiences of
Nontraditional Students at
Weber State University**

Author PAULA ANDREA
LOPEZ ALVARADO

Mentor HAILEY GILLEN HOKE

Poster 34, Session 1

Communication

The purpose of this IRB approved, in-progress study, is to analyze the factors that motivate non-traditional students to attend college, chose their field of study, and the role those factors play in their current college experience. This paper will explore how non-traditional students feel about their academic experiences, classroom environment, and interactions with their professors. The data to assess the primary research questions is being gathered through semi-directed interviews. Previous research suggests that students' decision to attend school is driven by variables such as personal choice, unforeseen circumstance, and/or money-related issues. In fact, when students face financial issues that interfere with their academic journey, financial aid helps to delay the decision to drop, but it does not prevent it (Chen & Res, 2014). A priori results indicate that the two factors which influence non-traditional students' choice of major are how long it will take to complete the degree, and the benefit of that degree in obtaining a quality job. Other preliminary findings show that some non-traditional students have a similar college experience to that of traditional students regardless of their non-traditional student status.

KCACTF Scenic Design

Author BRINDLE BRUNDAGE

Mentor CATHERINE ZUBLIN

Poster 30, Session 1

Theatre

Experiencing the Kennedy Center American College Theatre Festival firsthand will provide me with opportunities to learn from some of the most talented and experienced minds in the country. A wide variety of workshops will help me learn new skills and hone existing ones, while the sheer size of the event guarantees that I will be afforded chances for networking that are absolutely vital for students of theatre. In attending the festival, I will be able to improve myself as an actress, director, and, most importantly of all, designer. The chance to hear feedback from some of the region's preeminent professionals, particularly their critiques of my work, will provide me with perspectives I had never considered before and assist me on the path to creating something uniquely magnificent. I hope to represent myself as a true ambassador of Weber State University, both as an individual and a designer, so that I can share with fellow students the creativity, enthusiasm, and professionalism that embody our school.

**Where Words Once
Were - Projection Design**

Author TIFFANY CAMPBELL

Mentors JESSICA GREENBERG
CATHERINE ZUBLIN

Poster 31, Session 1

Performing Arts

Tiffany Campbell is attending the Kennedy Center for the Arts College Theatre Festival to present her projection design for Where Words Once Were. She will be competing against other students with similar design projects to win grants and scholarships. While attending this festival Tiffany will be honing her presentation skills and making contacts for future work in the field.

**The Refiner's Fire: Removing
Barriers in Education for
Teachers and Marginalized
Community Members**

Author CHEYENNE ESPINOSA

Mentor GINA SHELLEY

Poster 32, Session 1

English

Few teacher education programs have created bridges between schools and criminal justice systems. Project LIFE was a revolutionary program that broke down stereotypes and raised hopes in the lives of marginalized community members. Each week as part of a service-learning program, university students volunteered to help the participants study for their GEDs or college placement exams. This adult education program reported huge benefits for both the participants and the university students who were their tutors.

Deluge

Author ROBERT FRENCH

Mentor JENNIFER KOKAI

Oral Presentation, Session 2

Performing Arts

In order to answer the question, “What are the most efficient and effective methods of production for a new theatrical work?” Associated Artists of the Theatre, in tandem with WSU’s USITT chapter fully produced a student written, directed and designed work within the Eccles theatre. Structured production meetings were held weekly by the entire artistic team, and communication ladders were established. This allowed for a flexible decision making process. Challenges ultimately arose with budgeting as unforeseen costs added financial strain to the project. The production ultimately had a successful four performance run with a response and talk back with members of the Kennedy Center American College Theatre Festival. This response was critical to areas of writing, directing, design, and acting in respect to the evaluation of our collaborative efforts.

Lighting Design Entry for We Foxes

Author DANIEL GARNER

Mentor JESSICA GREENBERG

Poster 33, Session 1

Performing Arts

I am a student of technical theater in the Department of Performing Arts here at Weber State University. I specialize in Lighting Design and Stage Management. I am presenting my lighting design of We Foxes at the Kennedy Center American College Theater Festival. I am so proud of this production and I would love to share what I experienced with my colleagues and peers. Among the many students in our department, I'm honored that I have this opportunity for many reasons. First, the work I have done and will be presenting will allow me the chance to receive feedback from industry professionals who do this kind of work every day for a living. Second, I will be able to learn from others who are also presenting at this festival and receive inspiration for future projects. Third, I will be able to build brand new professional networks I can use in my career. Finally, this is an incredible experience that is very rare among undergraduates. I know that this trip to KCACTF will only help to increase my skills and make work even harder during my college stay here at Weber.

Business Perceptions of Veterans and PTSD

Author MELANIE JACKSON

Mentor MICHAEL AULT

Poster 37, Session 1

Communication

Veterans often retire from military service only to begin a second career in the civilian world. The disparity in the two workplaces, civilian and military, can cause great anxiety for the veteran, and misconceptions about veterans can do the same for hiring officials. Despite special veteran hiring protections and programs implemented by the Obama Administration, some veterans claim many hiring officials are hesitant to hire them due to misconceptions about Post Traumatic Stress Disorder (PTSD). I am conducting a research project to determine the extent to which ideas about PTSD affect hiring and management practices in the workplace. The project is a mainly qualitative study in which interviews and surveys will be conducted with veterans, vocational rehabilitation and employment representatives, and managerial officials. The collective information will be compiled in a thesis and presented at the symposium.

Perceptions on Education in the Tongan Community

Author AULOLA MOLI

Mentor MICHAEL AULT

Oral Presentation, Session 2

Communication

This study utilizes Constant Comparative Analysis (Grounded Theory) to analyze the interviews of members in the Tongan community to find the barriers that impede Tongans from obtaining a bachelor's degree. 30 participants with varying levels of education were interviewed to obtain more understanding about the perceptions of education in the Tongan community. In comparison with the national average (24.4%), only 13.8% of Pacific Islanders (also known as Polynesians) had a bachelor's degree in the United States (UCLA Asian American Studies Center, 2007). Of that 13.8%, Tongan citizens are amongst those who are the least likely to attain higher education (UCLA Asian American Studies Center, 2007). With the majority of American citizens unaware of this existing population, the educational crisis in Polynesian communities will continue to persist. Preliminary findings of this study have revealed that potential barriers may be the inability to assimilate amongst other cultures, the lack of parental support, being unaware of resources on campus, misunderstandings of the role of education in individual development, and making education a lower priority than family support and athletics. The findings from this study will be used to educate both the Polynesian community and other similar cultural groups, and institutions of higher education, with the goal of improving educational attainment within these groups.

**Perceptions of Mental
Training to Athletic
Performance**

Author TAWNIE MOORE

Mentor MICHAEL OLPIN

Poster 35, Session 1

Communication

Mental training has been said to be 90% of the sports game. Most often this aspect of training is neglected, costing athletes performance letdowns. The purpose of this study is to find out how college athletes feel about mental training and the extent that they feel mental training affects their athletic performance. The survey contains questions about mental training, the amount of time athletes dedicate to focusing on the mental game, the perceived influence of mental training on athletic success, and whether or not current Big Sky Conference Coaches utilize mental training. These responses will help us understand the prevalence of mental training in the Big Sky Conference. The results will be used to promote mental training and potentially develop training programs for athletes. In the poster presentation, I will show the results of my survey both for Weber State University athletes and athletes within the Big Sky Conference. I plan to show the extent that athletes are participating in mental training. I will show the relationship between the amount of participation in mental training and the degree that athletes feel mental training is helpful. My hypothesis is that mental training is underutilized among elite college athletes. Based on my survey results, I plan to show if that is the case, in this poster presentation.

Technical Direction For Deluge

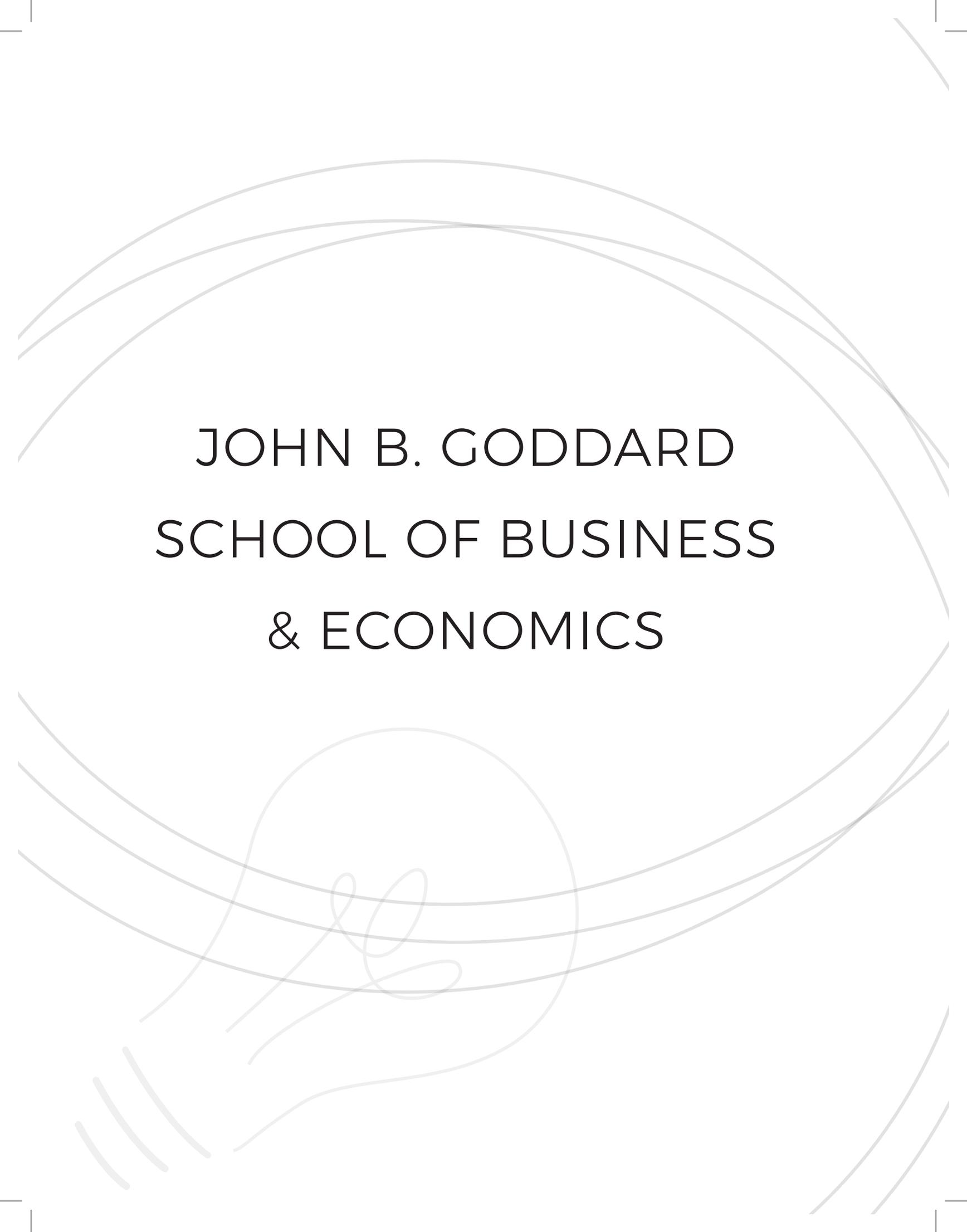
Author BENJAMIN READING

Mentor CATHERINE ZUBLIN

Poster 36, Session 1

Performing Arts

Technical Direction For “Deluge” For every artistic endeavor, there prevails the “nuts and bolts” of transmuting concept into construct. In the industry of live theatrical production, the specialist charged with facilitating and coordinating, the realization of artistic concepts into tangible works upon an open stage, is referred to as the “Technical Director”. For this project I have an opportunity for a unique experience, particularly as an undergraduate. I have been selected by my peers and mentoring faculty to be the Technical Director of a completely student produced, student written, new work. This is not an opportunity normally available to undergraduate students in almost any theatre arts program across the United States. I will be working with a production team of my peers to meet the needs of the script (written by Riley French). It is my task to physically produce a full sized production of a new play, by leading other students, on a professional level, and to do it safely. I will be expanding, and testing my body of knowledge, through practical experience, non-theoretical research, and real-world problem solving, using the skills and practices I have learned over the last 3 years of my college career.



JOHN B. GODDARD
SCHOOL OF BUSINESS
& ECONOMICS

Undergraduate Research at Weber State University: A 15-Year Analysis

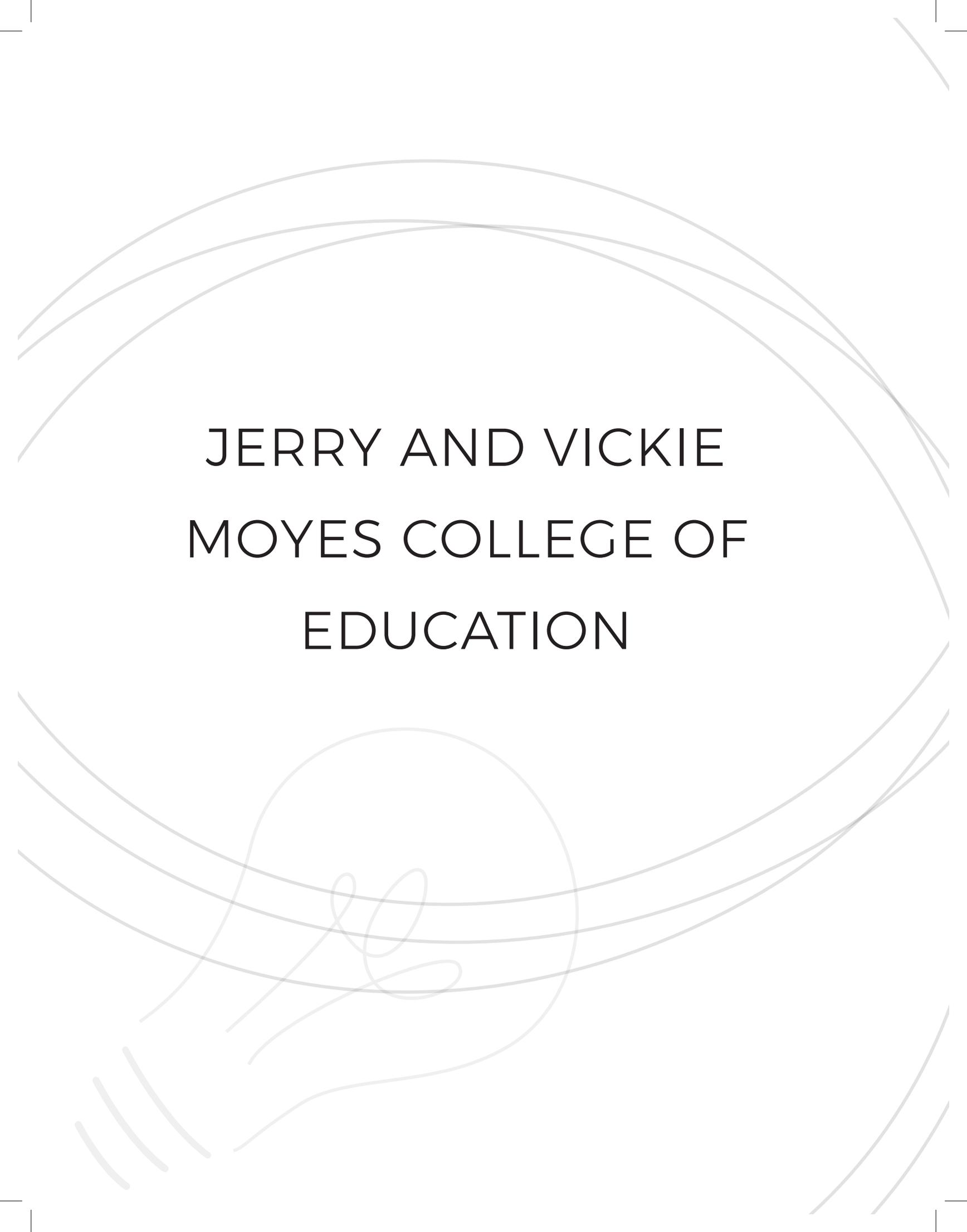
Author TARA REYNOLDS

Mentors SHANE SCHVANEVELDT
JOHN CAVITT

Poster 29, Session 1

Business Administration

The primary objective of this research project is to provide a retrospective analysis of the past 15 years of undergraduate research at Weber State University based on student participation in the annual undergraduate research symposiums from 2004 to 2018. A literature review of leading journals in the field of higher education and undergraduate research showed that there is a prominent lack of published literature that analyzes the historical experience of an undergraduate research program at the university level. To examine WSU as a case study, data was compiled from past undergraduate research symposium programs, related records, and interviews with selected administrators, faculty and staff associated with WSU's undergraduate research program. Variables examined include student participation by year, college and department; student class standing; presentation mode selected; occurrence of projects with multiple student researchers and/or multiple faculty mentors; as well as the occurrence of repeat participation in projects by students within a year or year-to-year. The results have the potential to provide programs, administrators and faculty mentors with information for evaluating participation levels, identifying trends and changes over time, and ultimately generating insights for program planning and improvement.

The background features several light gray, curved lines that sweep across the page, creating a sense of movement and depth. In the lower-left quadrant, there is a more complex, scribbled line pattern. The overall aesthetic is clean and modern.

JERRY AND VICKIE
MOYES COLLEGE OF
EDUCATION

**Engaging Students in Family
Life Education Throughout
Undergraduate Programs
(On Campus Engagement)**

Authors GRACE BINGHAM
HALEY BALLOU
MICHAEL MCCOLLEY
AMBER JOHNSON
JARED BROOKS

Mentors PAMELA PAYNE
TERI HENKE

Poster 23, Session 1

Child and Family Studies

Child and Family Studies Student Association (CFSSA) at Weber State University uses active involvement methods (e.g., play doh, prize wheels) to engage prospective & current students in events and departmental activities. Events hosted immerse students in Family Life Education (FLE). Professional development focused events include Pathway events (e.g., work, graduate school, networking) and employment socials. Additional events promote the program and collaboration between students and faculty through breakfast bars, service opportunities, field experiences and teaching opportunities. This presentation discusses various events that increase engagement and visibility of both the Family Science program and our student affiliate.

Favorites & Rebels

Authors DAWNELLE CALL
ARIANNE LOVELL
AALYAH HENRY
MEGANNE ADAMS

Mentor DANIEL HUBLER

Poster 24, Session 1

Child and Family Studies

The study examines results of 374 respondents who provided information on the effects of perceived parental favoritism on stress, self-esteem, and the need to belong in adulthood. What was found is that there is a significant correlation between perceived favoritism and levels of stress and self-esteem but no correlation with the need to belong. Those who perceived themselves to be the favorite had lower levels of stress and higher levels of self-esteem than those who did not perceive themselves as the favorite.

Contemporary Theory of EAMC and New Supplement Developed on this Theory

Author NOAH JOHN ERB

Mentor CONRAD GABLER

Poster 25, Session 1

Athletic Training and Nutrition

Background: Previously, EAMC was theorized to be caused by water and electrolyte loss that affected the excitability of motor nerve terminals. Evidence has begun to demonstrate that this is unlikely, and a new theory is evolving based on muscle fatigue and heat affecting an individual's neuromuscular control. Purpose: To explore the mechanisms behind the neuromuscular theory of cramping and review the latest research on new anti-cramping supplement (HOTSHOT) based on this theory. Methods: Ebscohost, Pubmed, and Google Scholar databases were searched to find peer-reviewed journal articles related to this area of research. These articles were reviewed and their results compared. Results: HOTSHOT is believed to effectively treat EAMC by stimulating transient receptor potential (TRP) channels in the oral passageway. Stimulation of these channels elicits the brain to send signals to the spinal cord and suppress hyperactive motor neurons by activating spinal inhibitory neurons. Early research has shown that ingesting HOTSHOT has the ability to reduce both the duration and incidence of EAMC in individuals. Conclusion: HOTSHOT is an emerging supplement that been shown to prevent and treat EAMCs by activating TRP channels in the mouth, which suppress hyperactive motor neurons. More research is needed to explore the connection between taste receptors and the neuromuscular system.

What It Means to Truly Listen

Authors BRYAN HENRIE
SAVANNAH SHAPIRO
BREEANN SONODA

Mentor DANIEL HUBLER

Poster 26, Session 1

Child and Family Studies

Healthy communication between romantic partners predicts relationship satisfaction. This study explored the context and meaning of listening to partners within romantic relationships, using a qualitative analysis. We investigated a data-set of 27 couples (NPartners=54), with a mean age of 33.35 years (SD=10.59). Respondents were asked about when they felt “MOST” and “LEAST listened to” and how they felt during those times. Results showed that partners felt “most listened to” when venting about personal challenges, especially with challenges at work and with feelings of stress. Partners feeling “most listened to” described their experiences with words such as, “I felt valued and loved.” On the other hand, partners feeling “least listened to” reported on discussions about finances or sharing personal opinions. When some of the partners did not listen, the other partners often reported feeling “invalidated and frustrated.” Interestingly, on a dyadic level, there were a few couples (n=4) who had mutual feelings about when they felt “most and/or least listened to.” Family educators and therapists using this information can help couples recognize recurring patterns that both strengthen and hinder partners’ abilities to effectively validate one another. As listening skills are taught, couples are more equipped to strengthen their relationship satisfaction.

Influence of Meal Caloric Distribution in Metabolic Syndrome Parameters Among College Students

Authors ASHLEY PETITTA
ALEXIS ELINKOWSKI

Mentor DAVID AGUILAR-ALVAREZ

Poster 27, Session 1

Athletic Training and Nutrition

Purpose/hypothesis We investigated the influence of meal calorie distribution on metabolic syndrome parameters in Weber State students. We hypothesize that variance in the percentage of calories eaten at each meal will affect MetS parameters. **Methodology** We assessed MetS parameters in 168 Weber State University student participants. Diet records for each participant were collected and analyzed. Participants were separated by gender (Male:53; Female:115) and by meal calorie distribution. Groups included high, medium and low percentage of calories in breakfast, lunch, dinner, and snacks. Mean differences in MetS parameters were analyzed. **Results** Women in the high calorie breakfast distribution group presented lower systolic blood pressure than their counterparts ($\mu= 107.3$ mm/Hg, $\mu= 113.3$ mm/Hg, $\mu= 115.01$ mm/Hg, $p = 0.05$). Men in the high snack consumer group presented higher HDL-C ($\mu= 41.3$ mg/dL, $\mu= 35.1$ mg/dL, $\mu= 32.3$ mg/dL, $p = 0.01$) and higher blood glucose ($\mu= 97.8$ mg/dL, $\mu= 92.1$ mg/dL, $\mu= 91.5$ mg/dL, $p = 0.05$) than the other groups. **Conclusion** Previous studies show that different meal calorie distribution patterns are associated with increased consumption of specific foods. These may account for the differences observed in MetS parameters among calorie distribution groups in this study.

Evaluating the Effectiveness of Comprehensive versus Risk-Avoidance Sexual Education Curriculums in

Authors ALYSON RASMUSSEN
TINA PASTRANA

Mentor PAMELA PAYNE

Oral Presentation, Session 2

Family Studies

In the United States, there are two approaches to sexual education in public schools: risk-avoidant curriculums; often referred to as “abstinence-only”, and comprehensive sex education (Alford, 2001). Currently, Utah educators must follow a state-mandated curriculum and without special permission, it is illegal for health teachers to deviate from the state-mandated sexual education curriculum (Steadman, Crookston, Randy, & Hall, 2014). As outlined by the state of Utah, educators are only allowed to discuss contraception with written parental permission. In addition, any discussion that appears to advocate, promote, or teach the logistics of contraception is forbidden and punishable by law (Steadman, et al., 2014). The Institute of Medicine found that abstinence-only programs do not reduce high-risk behavior that puts youth at risk for HIV and other STI infections. However, comprehensive sex education was found to be effective and does not have an impact on teen’s first intercourse, frequency, or number of partners (Starkman, 2002). For the purpose of this study, parental attitudes towards the two sexual education curriculums will be evaluated to determine if there is a discrepancy between what is currently being taught in public schools regarding sexual education; and what parents would prefer to be taught to their children. Working in conjunction with a small urban city Health Department, a cross-sectional social survey will be disseminated to the parents with children under 17 in two counties in Northern Utah. Utilizing a social survey to gather qualitative data, parental preferences towards sexual education curriculums will be assessed to determine what Utahans want to be taught in public schools. The findings will be utilized to advocate for policy changes that will improve sexual health education in Utah and other states.

Gendered Household Roles and their Impact on Relationship Outcomes

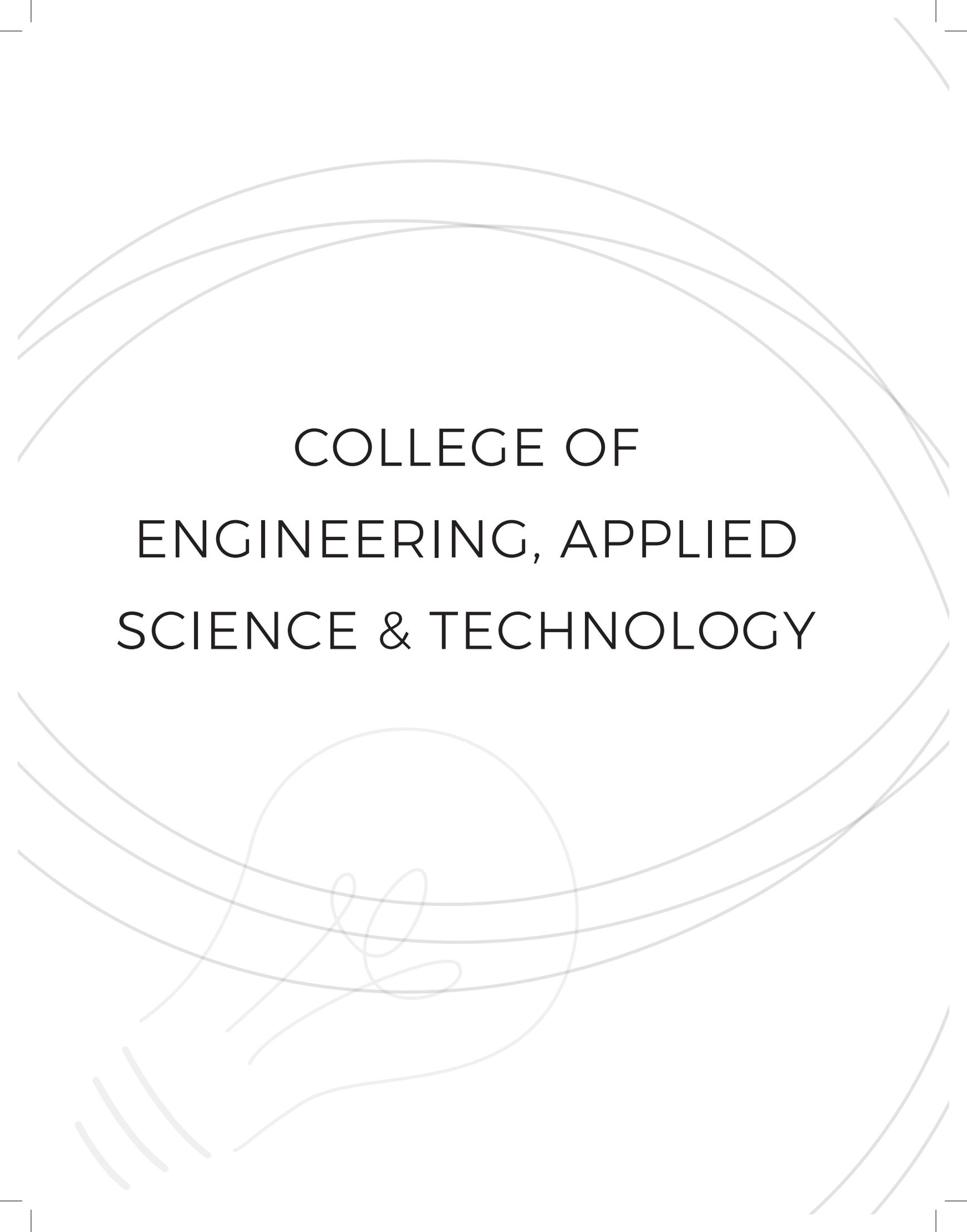
Authors ASHLEY VANDENBERG
MATTHEW LEFTHAND
MARK ADAMS

Mentors DANIEL HUBLER
CHARLES RYAN DUNN

Poster 28, Session 1

Child and Family Studies

Previous research shows that gender roles can exert a large influence on many different aspects of an individual's life. The current dyadic study observes the impact of gender role ideologies on relationship outcomes with a specific focus on traditional and egalitarian roles. Additionally, the relationship between gender roles and life satisfaction, relationship satisfaction, and social support is also explored. Participants were 145 heterosexual romantic couples who reported being married or in long-term relationships. Respondents were invited through various online invitations and announcements. Results revealed a significant and positive relationship between flexible/egalitarian gender roles and life satisfaction, relationship satisfaction, and partner support levels. The results of this study point to the importance of gender role ideologies within romantic relationships and their impact on satisfaction levels and perceived support.



COLLEGE OF
ENGINEERING, APPLIED
SCIENCE & TECHNOLOGY

Microprocessor programming for scientific atmospheric data acquisition

Authors RACHEL L. BERGHOUT
JOHN R. WARENS

Mentors HUGO VALLE
JOHN E. SOHL

Poster 1, Session 1

Computer Science

This abstract outlines the process of developing a microprocessor-based instrument for eventual commercial development and sale. The instrument is a custom-made microcontroller designed for monitoring and recording air quality. The AtmoSniffer is written in C language on a 16-bit Microchip PIC based system. The system contains multiple custom printed circuit boards (PCBs), each with an onboard microcontroller. These PCBs require a reliable and fault tolerant inter-system and inter-chip information delivery system. Communication takes place over I2C, SPI, UART, Bluetooth, or wireless xBee. The AtmoSniffer also includes a basic three push-button interface with a two-line LCD providing direct device interaction. Data capture and instrumentation status reports are wirelessly transmitted and recorded on a microSD card to guard against data loss. The system also contains a gas board designed to detect and measure an array of gases including ozone, carbon dioxide, carbon monoxide, nitrogen dioxide, sulfur dioxide, nitric oxide, and ammonia. It also measures temperature, relative humidity, pressure, and three different sizes of particulates. These sensors report using a mix of analog and digital signals that are collected and processed into a single data sample. While capturing signals, it has been necessary to correct for any microprocessor mathematical limitations in precision.

Wireless Power Transfer

Authors CHAD GARDNER
BRAD BECKMAN

Mentor SUKETU NAIK

Poster 2, Session 1

Electrical and Computer Engineering

Abstract Wireless power transfer is a technology which enables the transfer of electrical power without a physical connection between the charging device and the receiving device. Many of the current technologies available for wireless power transfer exhibit non-ideal behaviors. Meaning that wireless chargers are not user friendly and work only with near perfect alignment at short distances. The aim of this project is to develop a charging pad with better design functionality, and that charges easier than current devices. The core of this technology is making use of the magnetic resonance concept for transmitting power wirelessly for charging devices at short distances. Electrical power is transferred at a frequency around 100 kHz to charge the device at a respectable efficiency while attaining a more user friendly device for the consumer. An impedance compensating network is used to better match the transmitter and receiver to achieve maximum power transfer. Research within this project also includes coil design, among which larger receiving coils are considered for more flexibility when placing a device on the charging pad. Research into better components on the receiver circuitry is also performed to maximize efficiency of the electrical power transferred. Keywords Wireless power transfer technology (WPTT), magnetic resonance, wireless charging pad, electrical power transfer.

Tactile Display

Authors SUNY LY
ORLANDO SALAS
JACOLBY GRIFFIN

Mentors DHANYA NAIR
SUKETU NAIK

Poster 3, Session 1

Electrical and Computer Engineering

Modern advances in technology has revolutionized the braille reading system. Today, people can buy and read off electronic devices that display a refreshing braille display. Electronic braille devices update letters and characters as the user reads. Unfortunately, the price of such devices can be too costly for some potential readers. Our tactile display aims to minimize cost by reducing the number of braille cells and offer an open-source solution, so anyone can learn how to build one. For our project, we will research modern braille devices and learn how we can build a more efficient and affordable device. Our final design aims to be a smaller and smarter device that does not require the user to slide their finger across multiple braille cells, instead it will simulate the user scrolling through text.

Mobile ad hoc Network for Search and Rescue Operations

Authors JOSHUA MARCHANT
CHRISTOPHER MONDACA

Mentor JUSTIN JACKSON

Poster 4, Session 1

Engineering

Utah search and rescue teams lose radio communication because for the most part, they use small short wave handheld HAM radios. The loss of communication delays their efforts significantly because in order to reestablish communication, rescuers must find a more favorable spot such as on top of a hill. This whole process can take up to an hour. We designed a mobile ad hoc network that may one day replace their current radio communication devices. This poster describes first the chosen standardized interfaces and layering for encoding/decoding text messages and creating a reliable binary channel from a structured digital communications viewpoint. Then a brief description of the architecture for a user mobile device and mapping software will be given.

Wireless Protocol Analysis using Software-Defined Radios

Author EZEKIEL NEWREN

Mentor KYLE FEUZ

Poster 5, Session 1

Computer Science

Ezekiel Newren Department of Computer Science
Weber State University Wireless Protocol Analysis
using Software-Defined Radios ABSTRACT Wireless
protocols are complex and often require dedicated
hardware to interpret and analyze them. Software
defined radios (SDR) move the signal analysis from
hardware to software, making it possible to analyze
many different wireless protocols with a single general
purpose hardware device. This project utilized bladeRF
and RTL2832U SDRs and the software tools GNU Radio
and gqrx to shed light on the inner workings of wireless
protocols and many of the related fields surrounding
them. With these tools we were able to identify protocols
such as fm radio, car keyfobs, garage door openers,
cellular frequencies, wifi, ZigBee, pagers, etc. Using
bladeRF we successfully transmitted morse code and
played wav files through an fm modulator. From these
previous successful wireless protocol trials, we then
chose to study the quadrature phase-shift keying (qpsk)
modulation. With GNU Radio we successfully simulated
transmitting and receiving arbitrary binary information
via qpsk modulation.



DR. EZEKIEL R. DUMKE
COLLEGE OF
HEALTH PROFESSIONS

Yoga as an Intervention for Musculoskeletal Disorders

Authors AUBREY CLARK
ADRIANNE GUYMON
ASHLYN WINMILL
HALEY PEARCE

Mentor FRANCES MCCONAUGHY

Poster 37, Session 2

Dental Hygiene

Yoga as an Intervention for Musculoskeletal Disorders
Adrienne Guymon, Ashlyn Winmill, Aubrey Clark, Haley Pearce
Frances McConaughy, MS, RDH
Dental hygienists have long been affected by musculoskeletal disorders (MSDs) as an occupational health hazard. Complementary alternative medicine approaches (CAM), including yoga, have been suggested as a beneficial tool for reducing musculoskeletal pain. While there have been studies that have evaluated pain among dental hygiene students, few studies show yoga as an intervention for MSDs among undergraduate students. Therefore, the purpose of this study is to examine the implementation of yoga as a prevention strategy with one senior dental hygiene class. A survey research design is used in this study of senior dental hygiene students to examine their severity and location of existing pain; pre-post multiple yoga sessions. We hypothesize students, who currently experience musculoskeletal pain, will perceive a decrease in pain after participating in the study.

Periodontal Disease Risk Assessment: Case Study

Authors EMMA DEGRANGE
ANN DOLLING
NATASHA PRUHS
RYAN ALLEN

Mentor FRANCES MCCONAUGHY

Poster 38, Session 2

Dental Hygiene

Periodontal disease is caused by specific pathogenic bacteria that activate an inflammatory response. Clinicians have traditionally used subjective risk assessments to determine the presence of periodontal disease. A case study design involving one patient with a pre/post salivary test was used to determine periodontal pathogens present in the oral cavity. The purpose of this case study is to examine the benefits and incorporation of salivary testing (for periodontal pathogens) for one patient as well as to determine the ease of salivary testing in an educational setting. The salivary test identifies periodontal pathogens of the patients and can provide useful pre/post therapy information. Awareness of these causative pathogens contributes to more effective risk assessment of periodontal disease as well as identifying therapeutic interventions for the patient (Bader, 2013).

The Effects of Vitamin C, Hydrocortisone, and Thiamine on the Production of Tnf-Alpha in Human PBMCs

Authors KALEB EPPICH
COLTER CEDERLOF
SKYLER CHILD

Mentor KENDAL BEAZER

Oral Presentation, Session 2

Medical Laboratory Sciences

Bacterial sepsis kills about 250,000 Americans annually. Septic shock, resulting from sepsis, is the body's response to infection that causes inflammation systemically. Tumor necrosis factor (TNF) has been shown to be the primary mediator of the inflammatory response in sepsis. The combination of vitamin C, hydrocortisone, and thiamine given intravenously has been shown to improve the outcome for patients with sepsis. The research goal will be to test the effects of these drugs on immune cell production of TNF-alpha in vitro. There is minimal research into how these drugs treat sepsis. Human peripheral blood mononuclear cell (PBMC) cultures will be isolated from the researchers' blood. These cultures will be exposed to lipopolysaccharide (LPS) of Gram negative bacteria to stimulate responses similar to in vivo septicemia. Cultures will be incubated with hydrocortisone, vitamin C, and thiamine after LPS stimulation. The three drugs will be added both individually and in combination of all three. The supernatant of the cultures will be extracted, and TNF-alpha will be measured via enzyme-linked immunosorbent assay (ELISA) to determine effects on immune cell response to LPS. The treatment should show reduced TNF-alpha production in the cell cultures. This would provide insight into how the therapy treats sepsis.

Photography & Self-Assessment of Ergonomics in Dental Hygiene Students

Authors HANNAH HOFFMAN

ALICIA FLYNN

ERIKA MAGANA

KATIE PRICE

Mentor FRANCES MCCONAUGHY

Poster 39, Session 2

Dental Hygiene

Research suggests that dental hygienists are prone to musculoskeletal disorders (MSDs), but that this may begin during their undergraduate careers. Dental hygiene students are taught a number of self-assessment skills and one strategy to improve their ergonomic awareness may be through the use of photography. The purpose of this study is to explore the use of photography and self-assessment with a cadre of dental hygiene students. Students will be photographed during instrumentation procedures, and while using magnification loupes, with a clinical patient. A posture assessment rubric (Appendix A) will be used by students and faculty to assess whether their positioning is 'acceptable, compromised or harmful'. Further, a pain assessment (location & severity) survey (Appendix B) will be completed by the students prior to the photograph. It is expected that students will report neck and shoulder pain and that results from the ergonomic self-assessments will show students use 'acceptable, compromised, or harmful' positioning at least 50% of the time.

Electronic cigarettes and the Risk of Rheumatoid Arthritis

Authors JACOB HUTCHINS
CADEN KENDELL
MACEAN KNOWLTON

Mentor MATTHEW NICHOLAOU

Oral Presentation, Session 2

Medical Laboratory Sciences

Electronic cigarettes have become increasingly popular in the past decade. Little research has been done on health risks associated with their use. Smoking traditional cigarettes in conjunction with genetic polymorphisms results in significantly higher risk for developing seropositive rheumatoid arthritis (RA). RA is classified into two subsets, seropositive and seronegative, with seropositive patients being defined based on the production of autoantibodies. The purpose of this study is to investigate the potential health risks for developing seropositive rheumatoid arthritis in electronic cigarette users. EDTA blood samples will be obtained from traditional smokers, electronic cigarette users, and nonsmokers. DNA will be extracted from EDTA tubes and used to genotype for the presence of certain risk alleles (genetic polymorphisms) using TaqMan SNP Genotyping Assay. In addition, autoantibodies seen commonly in RA (ie. antibodies to citrullinated proteins and Rheumatoid factor) will be measured in all samples using an Enzyme Linked Immunosorbent Assay (ELISA) or an agglutination test, respectively. It is expected that, similar to traditional cigarettes, electronic cigarettes will modulate the disease mechanism of seropositive RA. These results would educate electronic cigarette users of potential health risk factors of seropositive RA associated with this form of smoking.

Hand-held X-Ray Device Safety

Authors MORGAN HUTCHINS

AMANDA LEE

MCKALL PLATT

ASHLEY CASTELLANOS

Mentor FRANCES MCCONAUGHY

Poster 40, Session 2

Dental Hygiene

While radiographic imaging is important and beneficial to provide appropriate treatment by diagnosing pathologies and bone levels of patients, the changes in imaging technologies have resulted in an increase in both medical and dental exposure delivered to the patient. This exposure may also affect the clinician exposing the x-ray, which makes it very important that health care workers are aware of the radiation risks associated with these exposures; especially when using a non-traditional, hand-held x-ray device. The portable x-ray device has several positive features, but it also presents particular challenges when it comes to exposing images safely. Some researchers argue that safety is compromised due to inadequate education with the device. The purpose of this project is to examine imaging technique and exposure using a portable device with a group of students. Following educational sessions, students will use a portable x-ray device to take pre-selected images on a mannequin. A rubric will be used to evaluate students' technique and diagnostic images that are produced. It is expected that students will produce diagnostic images at least fifty percent of the time.

Systematic Inflammation in Electronic Cigarettes versus Traditional Cigarettes

Authors SEBASTIAN LAWSON
DALLAS CLARK

Mentor MATTHEW NICHOLAOU

Oral Presentation, Session 2

Medical Laboratory Sciences

The use of Electronic Cigarettes (e-cigs) has had an increase in popularity over the past several years. This can be attributed to multiple factors such as, people thinking it is less harmful than traditional cigarette use, a method to cut back on the amount of nicotine intake, and as a cessation to smoking. Cigarettes cause inflammation both in the lung and systemically; this study tested differences in pro-inflammatory cytokines between those that use e-cigs, traditional cigarettes users, and control (non-smokers). To evaluate this, blood samples were collected from participants. Groups were selected from a suburban geographical area, mainly a university campus. Samples were centrifuged to isolate serum for testing using an Enzyme-linked Immunosorbent Assay (ELISA). 96 micro-well ELISA plates were used to test for specific pro-inflammatory cytokines: IL-1 beta, IL-8 and TNF-alpha. In conjunction C-reactive Protein (CRP) was ran via standard chemistry analyzer. The mean cytokine levels were compared between groups using ANOVA and two sample t-Test. The researchers expect e-cigs to stimulate less pro-inflammatory cytokines than traditional cigarettes, but more than the control groups. The results from this study clarified part of the assumption that e-cigs are healthier or better to use as an alternative to conventional cigarettes.

Elimination of Antibiotic Resistance in *Klebsiella pneumoniae* using CRISPR-Cas9 System

Authors ERIN MAY
NOAH FOWLER

Mentor MATTHEW NICHOLAOU

Oral Presentation, Session 2

Medical Laboratory Sciences

Antimicrobial resistance has become a growing threat worldwide. Using CRISPR-Cas9 (clustered regularly interspaced short palindromic repeats) gene editing technology, it may be possible to eliminate these resistant microorganisms with precision. The goal of this study is to kill an ESBL (extended-spectrum beta-lactamase) ATCC 700603 control strain of *K. pneumoniae* using CRISPR-Cas9 technology. A housekeeping gene, *dnaB*, needed for survival and a *bla*(SHV) gene coding for beta-lactame resistance will be targeted. *Klebsiella pneumoniae* will be transfected with the CRISPR-Cas9 plasmid through electroporation. The CRISPR-Cas9 plasmid, if effective in targeting these genes, will cause double-stranded DNA breakage resulting in cell death (as demonstrated in other model systems). A mock plasmid transfected into *K. pneumoniae* will act as a control. Two plasmids targeting *dnaB* and *bla*(SHV) respectively, will be transfected into *K. pneumoniae* to observe the targeted genes effect on colony count. As proof of concept, a mutated plasmid with these sites will be unable to bind, showing specificity of the non-mutated plasmids. PCR (polymerase chain reaction) will determine if the targeted genes are successfully removed from transfected cells. Successful transfection of the CRISPR-Cas9 plasmids will lead to decreased colony count of *K. pneumoniae* when plated on antibiotic selective media.

Incorporating Dental Loupes in Dental Hygiene Programs

Authors HAILEY PRESTWOOD
KRISTEN BENEDICT
KATIE ENRIGHT
ROSY PENA
ANGIE DAVENPORT

Mentor FRANCES MCCONAUGHY

Poster 41, Session 2

Dental Hygiene

Dental hygienists are exposed to a variety of physical stresses, including repetitive body positioning and muscle strain during instrumentation. This puts them at moderate to high risk for musculoskeletal disorders. Studies have shown that the use of magnification loupes during patient treatment may alleviate the strain in the neck and back regions. Further, the inclusion of loupes in dental hygiene curricula may enhance students' abilities to assess the periodontium and oral tissues of patients. Recent research has found that despite faculty awareness of the benefits of magnification loupes, the vast majority may not require loupes for themselves or students. Because little is known about the requirements of loupe usage or ergonomic instruction provided in dental hygiene (DH) programs in Utah, the purpose of this study was to investigate the policies and practices regarding magnification loupes among these programs. A survey research design was used to collect data on an internet website. It is expected that less than half of the DH programs require students to use magnification loupes and that it is rarely included in the curriculum.

Implant Maintenance Practices of Dental Hygienists

Authors BRITTANY SMITH
TESS MURRAY
CAESIE EGBERT
JORDON FELTER

Mentor FRANCES MCCONAUGHY

Poster 42, Session 2

Dental Hygiene

Dental implants are progressively becoming the “gold standard” for replacing missing teeth and long-term maintenance is critical for a successful implant. Implant related diseases, such as peri-implantitis, can occur and directly affect the longevity and health of an implant. Implants accumulate plaque and calculus and require meticulous homecare efforts as well as debridement by dental hygienists. Initially, few homecare devices and professional instruments were available that effectively cleaned the implant surface. Further, the literature has offered minimal and contradictory information for hygienists on the use of metal and unfilled resin instruments to care for implants as well as devices to use for patient homecare. The purpose of this project is to ascertain current practices on implant care from dental hygienists. This study uses a survey research design to collect data online from practicing hygienists. It is expected that the results will provide important information about the debridement practices of dental hygienists and their homecare recommendations for patients with implants.

Childhood Caries Risk Assessment Practices and Fluoride Varnish Use Among Dental Hygienist

Authors NATALIE WOOD
SHELLY WOOD
MADISON SMITH
AMY BARRETT
JACI RANDALL

Mentor FRANCES MCCONAUGHY

Poster 43, Session 2

Dental Hygiene

Dental caries is the most communicable and preventable disease process in children. The unfavorable statistics for early childhood caries (ECC) should encourage dental professionals to improve efforts in caries prevention. A caries risk assessment (CRA) can be an instrumental tool for the dental team. For example, the CAMBRA assessment can identify key factors that can predict a patient's risk for caries. In spite of these available assessment, limited information was found in the literature regarding the actual frequency of ECC assessments conducted in private dental offices. The purpose of this project was to examine ECC caries risk assessment practices of dental hygienists and to obtain information on the follow up practices of varnish placement, resulting from the caries risk assessments. This study used a survey research design to collect data online from dental hygienists in the United States. It is expected that dental hygienists will report using an informal (vs formal) caries risk assessment for children and that fluoride varnish is provided regardless of placement in low, moderate, or high risk caries categories.



COLLEGE
OF
SCIENCE

Alternative Synthetic Strategies for Zirconium Metal Organic Frameworks

Author JEHAD ABOURAHMA

Mentor BRANDON BURNETT

Oral Presentation, Session 1

Chemistry

Zirconium Metal Organic Frameworks have shown promising application in drug delivery, gas storage, catalysis, and surface chemistry. The objective of this research was to increase the control of the crystallization process in MOFs by synthesizing organometallic clusters, templating the clusters into a single crystal, and finally connecting the organic ligands together through a [2+2] photodimerization process, creating a three-dimensional MOF material. 4-stilbenecarboxylic acid was the source for the organic linker and was the source for the metal node. Infrared spectroscopy (IR) provided strong evidence showing that the coordination of the 4-stilbenecarboxylic acid to the zinc metal node was successful in the formation of the organometallic cluster. XRD provides evidence that this alternative crystallization method is possible.

Potential Pain Receptors in Nemertea

Authors ARUSA ASHFAQ
AUGUSTUS MALAN
RACHEL DUBOSE

Mentor BRIAN CHUNG

Poster 1, Session 2

Zoology

By tracing the evolutionary origins of physiological and biochemical mechanisms, one can determine the original reason for their existence and the interesting variations as life evolved. One interesting evolutionary question is the origin of pain. In vertebrates, pain is sensed by the neurotransmission of a chemical called Substance Pain, released by damaged cells, and sensed by specialized Substance Pain receptors on pain sensing neurons. These pain receptors fall into a large family of receptors that are called tachykinin-like receptors (TKR). All of these receptors share similar genetic sequences, hence their similarity. Throughout the body, TKRs not only convey pain, but also control various other body functions such as regulation of blood pressure and intestinal peristalsis. Despite a large volume of knowledge of TKR in vertebrates, there is very little knowledge of this receptor family in lower order invertebrates. We intend to use nucleotide alignment published TKR genetic sequences in order to determine if the invertebrate *Paranemertes peregrina* contains a TKR within its genome, and what this TKR is utilize for. As an invertebrate, this animal represents a significant evolutionary distance from vertebrates which presents an important milestone in the evolution of the TKR family.

Effect of Triclosan on C. Elegans

Authors MADISON BALLIF

Mentors BRIAN CHUNG
MOHAMMAD SONDOSSI

Poster 2, Session 2

Zoology

Triclosan is a compound used for its antimicrobial properties that has been in use in consumer products for decades. However, the FDA recently banned its use in commercial soaps, partly due to its similarity to the compound bisphenol-A (BPA). Because of its excessive consumer use, this compound can still be found accumulating in the environment. In this experiment, *C.elegans*, a model nematode, were harvested and their eggs were distributed to growth plates containing increasing concentrations of Triclosan. *C.elegans* hatching and subsequent maturation were then observed. When using autoclaved *E. coli* as a foodsource, no *C.elegans* hatchlings were ever observed on plates containing high concentrations of Triclosan. When utilizing live *E. coli*, *C.elegans* larvae were observed but delayed in their hatching and maturation compared to control groups, or plates containing lower Triclosan concentrations. These preliminary results indicate that Triclosan has an inhibitory effect on *C.elegans* growth and maturation, but that these effects can be less pronounced when sufficient nutrition is available.

**Processing of Lead Iodide
Perovskite Thin Films for
Solar Cell Application**

Authors HEATHER BARTON
ANDREW SANDOVAL
PARKER BURROWS

Mentors BRANDON BURNETT
KRISTIN RABOSKY

Poster 3, Session 2

Chemistry

We present two process methods for the construction of high purity, polycrystalline lead iodide perovskite films - dip method and chemical vapor deposition method. Furthermore, we compare the merits of both types of thin film processes including product purity, process cost, environmental impacts, and time commitment.

Modeling of fluxes of Nitrogen, Phosphorus, and Carbon triggered by wild fires

Authors TERI CISNEY
MICHAEL FOWLES
NICHOLAS SHAW
MEG BAKER

Mentors MAREK MATYJASIK
MICHAEL HERNANDEZ

Poster 4, Session 2

Geoscience

River runoff is one of the controlling processes in the terrestrial cycles of nitrogen, carbon, and phosphorus. One of the factors that has not been studied and modeled in detail are fluxes of these elements produced from forest wild fires. All three elements released by weathering is quickly absorbed in soils. Forest wild fires expose barren soils to intensive erosion, thus releasing relatively large fluxes of nutrients. Measurements from four control burn sites were used to correlate erosion of these fluxes. These results were used to model nutrient fluxes from burned watersheds during a five year long period after fires occurred. Erosion in our model is simulated using a combination of two models: the WEPP (USDA Water Erosion Prediction Project) and the GeoWEPP (GIS-based Water Erosion Prediction Project). Erosion produced from forest disturbances is predicted for any watershed using hydrologic, soil, and meteorological data unique to the individual watersheds or individual slopes. The erosion results are modified for different textural soil classes and slope angles to model fluxes of nitrogen, carbon, and phosphorus. The results will help the United States Forest Service manage phosphorus fluxes in national forests.

The role of urease in carbonate precipitation in the Great Salt Lake

Authors RYAN CLAY
DEZMOND SWAIN

Mentor CARIE FRANTZ

Poster 5, Session 2

Geosciences

Microbialites are sedimentary structures that are formed through the binding and trapping of grains or precipitation of minerals by members of the microbial communities associated with the microbialite. Expansive microbialite deposits composed mostly of carbonate minerals exist in the Great Salt Lake (GSL), but the exact mechanism of their formation is not known. We hypothesize that one mechanism could be microbial urease activity. The enzyme urease breaks down urea into ammonia and carbonate (CO_3^{2-}), which in turn can react to form carbonate minerals. Bacteria cultured from the microbialite and lakewater were found to be positive for urease activity using a urease broth test. We are isolating urease-positive organisms to determine if they are representative of the microbialite microbial community as a whole by comparing isolates' 16S gene sequences to microbialite metagenomes. Finally, we will perform precipitation tests by spiking cultures with excess Ca^{2+} and watching for carbonate precipitation. Precipitation will be measured quantitatively via atomic absorption spectroscopy and analyzed for structure using a scanning electron microscope. The results will allow us to assess whether GSL microbialites formed as a result of microbial urease activity.

Determining the Kinetics for the APH/ACY Enzymatic Pathway

Authors CARSON COLE
DAVID COFFMAN

Mentor TRACY COVEY

Poster 6, Session 2

Chemistry

Metabolism is critical for proper the growth and function of cells. Cells contain numerous metabolic pathways all with unique functions. Malfunctioning metabolic pathways have been implicated in numerous disease processes. This study examines one such metabolic pathway. The APEH/ACY pathway, named for the two enzymes involved, is part of cellular catabolism. It functions to break down small proteins into their constituent amino acids. These building blocks can then be used to make an extensive array of protein products that are necessary to the proper growth and function of the cell. The mechanism of this process is well understood and has been extensively studied, however, much less is known about its overall kinetics. Through using gas chromatography and mass spectroscopy it is possible to examine the flux of these two enzymes. This process was able to show different rates in strains of HELA and A549 cancer cells, as well as in normal erythrocytes.

Solar Water Heating Project

Author COREY COLLATZ

Mentor KRISTIN RABOSKY

Oral Presentation, Session 2

Physics

The aim of this research is to develop a thin film material that receives solar radiation without heat loss to the atmosphere to generate steam for performing work on other systems. Each thin film made is a combination of silicon dioxide and molybdenum, either stacked in layers or in an amorphous structure, that has the intent of having a high solar absorbance and a low thermal emittance. The water heating process is done with the aid of minimal optical concentration and the use of other cost-effective materials. The process of developing these thin film selective solar absorbers is done by a technique known as sputtering. This presentation will include the results of various forms of material characterization performed on samples created thus far. Characterization data has been obtained through scanning electron microscope imaging, electron backscatter diffraction, ultra violet-visible light spectroscopy, thermal emissivity readings, and overall performance data for generating steam. A summary of the data will be presented contrasting results between different sputtering techniques as well as modifications made to each respective technique. The intertidal zone is defined as the area of land that is above water at low tide and below water at high tide.

Tissue analysis of osmotic stress on nemertean

Authors RACHEL DUBOSE
AUGUSTUS MALAN
ARUSA ASHFAQ

Mentors BRIAN CHUNG
ROBERT OKAZAKI

Poster 7, Session 2

Zoology

This intertidal zone is a particularly hostile habitat because of the cyclic changes in osmolarity. As the tide recedes, the volume of water surrounding an intertidal organism decreases significantly in contrast to times of high tide. While some life forms burrow into the intertidal mud to minimize their exposure to these vast changes in osmolarity, others can tolerate this and thrive on the surface of the intertidal zone. The carnivorous ribbon worm *Paranemertes peregrina* (*P.peregrina*) is a particularly interesting invertebrate who is somehow able to tolerate these large changes in osmotic pressure and hunt for prey on the surface during low tides, yet continue this behavior during high tide as well. During the summer of 2017, a number of these animals were collected from the intertidal mud flats of the University of California-Davis, Bodega Marine Laboratory and preserved for microscopic analysis. Paraffin-embedded sections of *P.peregrina* will be stained to determine mucin chemistry following osmotic stress to test our hypothesis that protects itself from osmotic stress by selectively secreting different types of mucus into its surface epithelium.

Bacteriophage as an Alternative Treatment for Antibiotic Resistant Bacteria

Authors DARIANN GALLEGOS
JOSHUA JORGENSEN

Mentor MATTHEW DOMEK

Poster 8, Session 2

Microbiology

Antibiotic resistant in disease causing bacteria is a large health problem worldwide. However, there are alternatives to treat illness caused by these bacteria, specifically bacteriophage. Bacteria were isolated from the Great Salt Lake using selective media. Preliminary identification showed Vibrio and Enterococcus like-bacteria. Some species in both of these groups of bacteria may cause disease in humans. Initial testing also showed some antibiotic resistance. Genetic identification using 16S rRNA sequencing will determine what bacteria were isolated from the lake water. The bacteria that showed resistance to antibiotics will be tested for bacteriophage susceptibility. The bacteriophage will also be isolated from the lake water. The outcome of this project is to show that antibiotic resistant bacteria can be controlled with a simpler and safer method. Bacteriophage have the potential to be a safe treatment for disease-causing antibiotic resistant bacteria.

Assessing the biogenicity of Great Salt Lake microbialites using geochemical measurements

Authors JESS GANN
KRISTEN MAYFIELD

Mentor CARIE FRANTZ

Poster 9, Session 2

Microbiology

Microbialites are defined as structures built by microbial communities through trapping and binding, or precipitation. However, the interplay between biotic and abiotic formation mechanisms is not well understood. Microbialites are key to understanding early Earth biology and surface environments due to the rich record of microbialites in periods dating back as far as 3.5 billion years. Calcium carbonate in the form of calcite, aragonite, or dolomite is the core molecule in many of these formations including those in the Great Salt Lake. We hypothesized that the microbialites in the Great Salt Lake formed at an intersection of brine lake water and fresh spring water without microbiological involvement. To test this hypothesis, measurements were taken on site to provide a snapshot of the aqueous chemistry surrounding the microbialite structures. Through the use of the analytical tool Geochemist Workbench, we uncovered strong evidence suggesting abiotic precipitation of carbonates is not possible using the conditions currently existing in The Great Salt Lake. This means the presence of microbialite structures is either due to microbial involvement in the past or present, or the chemical environment has changed from the point when abiotic precipitation was possible.

**An Investigation of the
Lysogenic Phage that
infects Halomonas Isolated
from the Great Salt Lake**

Authors JESS GANN
CARSON DAVIS

Mentor MATTHEW DOMEK

Poster 10, Session 2

Microbiology

A phage or bacteriophage is a virus which depends on bacteria for replication. There are two types of phage, lytic or lysogenic. A lysogenic phage will integrate its genome into the host's (bacteria) chromosome, unlike a lytic phage which will take over the host cell machinery to replicate itself until the cell dies (lysis). Categorizing and sequencing phage is important in understanding the lysogenic replication cycle. A Halomonas bacteria was previously isolated from The Great Salt Lake, following this a phage was also isolated and named LJ17 which displayed lysogenic characteristics. We hypothesize the phage genome from LJ17 can be found within the Halomonas bacterial chromosome. To test this the host and phage genome will be sent to an off site laboratory for genetic sequencing. By looking for the phage genetic code in the host genome it will be determined if the phage is lysogenic. To further test this hypothesis other standard microbiological experiments will be conducted as confirmatory tests.

Synthesis of Anticancer Titanium Compounds and their Efficacy

Authors ATHERTON GREEN
TANNER GROVER

Mentor TIMOTHY HERZOG

Poster 11, Session 2

Chemistry

Organometallic chemotherapy drugs have been shown to be extremely effective. Cisplatin is the progenitor of this field, but due to its size, is easily removed from the cell. To solve this synthesis of a half-sandwich titanocene ether compound was attempted. The first synthesis employed a styrene catalysis. After this was unsuccessful, the synthetic pathway was changed to a more direct synthesis. A half-sandwich titanocene ether coordination compound was then synthesized as well as a double ether compound. The compounds were then characterized by ¹HNMR and it was determined that they were not synthesized. The synthesized materials were then tested on cancer cells with low efficacy.

Suppression of Lactobacillus wasatchensis Growth by Organic Acids

Author IRELAND GREEN

Mentors CRAIG OBERG
MATTHEW DOMEK

Poster 12, Session 2

Microbiology

Lactobacillus wasatchensis is a slow growing, non-starter lactic acid bacterium (NSLAB) causing late gas defect in aging cheese. Organic acids are used as food preservatives, can occur naturally in foods, and generally don't affect flavor or product quality. Five organic acids (lactic, formic, propionic, citric, and acetic) produced by many NSLAB organisms were tested for their ability to inhibit Lb. wasatchensis. They were added at their minimum, median, and maximum concentrations, as found naturally in aged Cheddar cheese, to individual wells of a 48 well plate containing MRS+R broth inoculated with Lb. wasatchensis WDC04. Growth rates were determined on a Tecan spectrophotometer over 40 hours. Initially, tests were done at pH 7.0 with several organic acids exhibiting slight inhibition. Tests were then run at pH 5.0 to determine if they were more effective at a pH of aged cheese. Formic acid was the most inhibitory with the maximum concentration (100 mM) showing the greatest inhibition of Lb. wasatchensis. Citric acid at the minimum (12 mM) and median (13.5 mM) concentrations also produced inhibition. Use of selected organic acids at concentrations normally found in Cheddar cheese could be a potential antimicrobial measure to prevent or reduce late gas defect in aging cheese.

Invertebrate Diversity in Great Salt Lake Ecosystem Revealed by DNA Barcoding

Author SABRINA HANEY

Mentor JONATHAN CLARK

Poster 13, Session 2

Zoology

Great Salt Lake (GSL) is a fascinating example of an extreme environment, with salinities in some regions exceeding 20%. Invertebrates, including brine flies and brine shrimp, are important for supporting a population of birds estimated at over 7 million individuals. This study uses mitochondrial cytochrome c oxidase I DNA barcodes to examine the diversity of other invertebrates associated with the GSL ecosystem. DNA barcoding is the international standard for species identification based on genetic comparisons and provides an estimate of species diversity and distribution. Invertebrates were collected from the shoreline and adjacent vegetation, were sorted based on gross morphology, and DNA barcodes were determined by polymerase chain reaction and sequencing. The sampling revealed arachnids, insects, and crustaceans, and within each group, individuals were identified to the genus and species level using phylogenetic analysis. Although known brine fly species were represented, a large number of the barcoded insects have not been previously described from the GSL ecosystem. Sequence comparisons were used to examine the degree of genetic differentiation among individuals from the same species. These results represent one of the few assessments of invertebrate biological diversity from an extreme environment.

Rhinostasis Chemically Treated Nasal Tampon for Epistaxis Management

Authors JACOB HESS
KORTNEY JAMES
DALTON FACER
BARBARA TRASK

Mentors TRACY COVEY
SCOTT MOORE

Poster 14, Session 2

Chemistry

To provide a more effective, convenient options for patients to use at home, our team is patenting a chemically treated nasal-tampon device that safely aids in clot production and helps stop bleeding. Tranexamic Acid is currently available on the market as a generic drug that has few side effects to help patients suffering from trauma, heavy menstruation, dental procedures, and nosebleeds – medical conditions that mostly affect those on blood thinners. Clinical research indicates that Tranexamic Acid is safe and effective in its use as an antifibrinolytic for bleeding in mucosae such as in the nose, mouth, and vagina. To design our device will be to determine the efficacy and cost-effective concentrations of tranexamic acid using a coagulation analyzer in the Health Science building. Next, we will need to find an effective way to apply the chemical, so it is packable and practical for the market. This will require the use of a lyophilizer, a freeze dryer, which Weber State owns. The research will also require a low-heat oven, which Weber State also owns. Lastly, we will utilize CE or UV spectrophotometry to determine the concentration of the impregnated material.

Rapid Method for Measuring the Effect of Prebiotics on Probiotic Bacteria Growth

Author DANA HOFFMAN

Mentor CRAIG OBERG
MATTHEW DOMEK

Poster 15, Session 2

Microbiology

Prebiotics are used to stimulate probiotic bacterial growth in the gut to optimize their health benefits. A rapid method was developed to evaluate potential growth enhancement by prebiotics on probiotic bacteria using a programmable spectrophotometer, standard microtiter plates, and commercial media, with growth enhancement results ready in 12 hours. Lactobacillus strains were grown in MRS broth while Bifidobacterium strains were grown in MRS broth with L-cysteine. Each culture was back diluted to an OD₆₀₀ of 0.1 with the appropriate MRS broth then inoculated into wells (48 well plate) containing individual prebiotics. Plates were placed in a Tecan Infinite M200 spectrophotometer and incubated at 37°C with A₆₀₀ readings taken for 12 h. Growth curves were done in triplicate with results compared to controls to determine extent of prebiotic growth enhancement. To optimize the method MRS concentrations of 20%, 35%, 50% and 100% were tested at selected pHs (7.0, 5.5, 5.0, 4.5, and 4.0) using 5 probiotic cultures. Addition of the bio-catalytic oxygen-reducing reagent oxyrase to test wells just prior to testing significantly enhanced growth of Bifidobacterium species and some lactobacilli such as Lb. acidophilus. Results indicated a 25% MRS broth at pH 5.0 with 2% oxyrase addition optimized prebiotic growth enhancement. Using this method, the stimulatory effect of added prebiotics (2% v/v) FOS, GOS, and XOS was determined for Bifidobacterium infantis M-63, Bifidobacterium longum BB536, and Bifidobacterium lactis BL-04, Lactobacillus rhamnosus LR-32 and Lactobacillus acidophilus NCFM. All three significantly improved growth of M-63, but only FOS increased growth of BL-04. For BB536, just GOS enhanced growth. GOS and FOS slightly improved growth of NCFM but no oligosaccharides enhanced growth of LR-32. The method allows rapid testing of various inoculum levels, prebiotic concentrations, media pHs and prebiotic combinations for any probiotic strain including Bifidobacterium.

Assemblage Composition Differences Between Two Creeks in Ogden, UT

Authors DANIEL HUNNEL
AMBER BELL
COLTON MOONEY

Mentor CHRISTOPHER
HOAGSTROM

Poster 16, Session 2

Zoology

Burch Creek and Strong's Creek are located close to Weber State University, in Ogden, UT. These two creeks are fed by runoff from the Wasatch Mountains and eventually empty into the Weber River. Being that these two creeks are runoff and have pristine water conditions, they house an environment for a variety of species. There are also a wide variety of habitat types within each creek that allow for the diversification of species that occupy the area. We sampled macroinvertebrates to measure the EPT richness index which is often used to assess water quality. EPT stands for Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) which are aquatic insect orders that are used as biological indicators. In both creeks, differences were found despite them being less than five km apart. Our goal was to find if habitat diversity was the cause for the differences seen in the presence of macroinvertebrate families between the two creeks.

Modeled Effect of Industrial Waste in Promontory Point Landfill Near the Great Salt Lake

Authors ANGELA JEX
HYRUM BRISCOE
JESSICA CLARK
AARON PHIPPS
PHILIP SANDGREN
DANIELLE SAXER
TYLER TRUSSELL

Mentor CARIE FRANTZ

Poster 17, Session 2

Geosciences

The Promontory Point landfill, operated by Promontory Point Resources, LLC, is a 2,000 acre site located near the northern shore of the Great Salt Lake and has been permitted to accept 385 million tons of municipal waste from Utah. Promontory Point Resources has applied for a Class V permit that would allow the site to accept out-of-state industrial waste, raising concerns about toxin contamination in the lake and the region. Our research explores the possibility and impacts of groundwater, lakewater, and air contamination given different scenarios of waste deposition, taking into account the existing and planned environmental protection measures at the site. Anticipated levels of toxic materials leaching from the landfill into the lake and/or soil and groundwater will be calculated based on existing studies of contaminant transportation and toxic metal content at similar waste collection sites. The model will consider various modes of input of toxic material into the lake including microbial breakdown, sediment transport, rainfall, groundwater, and air transport. The results of our model should allow us to estimate the concentrations of each toxic element that could likely be leached, which will provide bounds on the effect of toxins on the Great Salt Lake, the organisms in the GSL, and the general population.

Experimental Demonstration of Indium Tin Oxide for Optimization of Thermophotovoltaics

Author ALEX JOHNSON

Mentor SPENCER PETERSEN

Poster 18, Session 2

Mathematics

The efficiency of a thermophotovoltaic cell is adversely affected by absorption of photons that are not spectrally aligned with the bandgap of the TPV. Indium tin oxide (ITO) is a metallic oxide that has the potential to exhibit spectral emissivity that more closely aligns with a thermophotovoltaic bandgap. Properties of ITO are dependent upon the fabrication parameters thereof. Sputtering provides a controlled environment in which ITO fabrication parameters can be controlled on the molecular level affording increased control of the characteristics of ITO. The objective of this research is to more closely inspect the effect of fabrication parameters on the spectral emissivity of ITO. To attain this objective, deposition rate, thickness, and spectral reflection and transmission will be characterized for sputtered layers of ITO. Several iterations are expected in the span of the research to achieve the more desirable attributes of ITO near the bandgap of a thermophotovoltaic cell. To date, one layer has been completed and characterized.

The Degradative Effects of Horseradish Peroxidase on Microbial Biofilms

Author SAMUEL KALIS

Mentor WILLIAM LOROWITZ

Oral Presentation, Session 1

Microbiology

Bacteria in nature grow attached to surfaces, often forming biofilms. These biofilms are typically matrices of polysaccharides, proteins, and lipids hosting a consortium of bacteria living together in a community for mutual support and safety. Biofilms not only grow in nature but also where their presence is undesirable e.g. intravenous catheters, endoscopes, hulls of ships, and oil pipelines. In this investigation the enzyme horseradish peroxidase was tested as a method of degrading biofilms formed by *Staphylococcus aureus* and *Pseudomonas aeruginosa*, medically-important species. Cultures of *S. aureus* and *P. aeruginosa* were allowed to form biofilms in microwell plates, were removed, and the biofilms were treated with solutions of horseradish peroxidase and hydrogen peroxide. The biofilms were stained with crystal violet, washed, and the crystal violet bound to biofilm was dissolved in ethanol. Absorbance of the freed crystal violet was read in a plate reader. Variables tested include: time, concentrations of enzyme and hydrogen peroxide, and reusability of the treatment solution. Currently, no conditions tested generated results suggestive of clearance of biofilms superior to the positive control solution. As of now, the results from this investigation suggest that under the conditions examined horseradish peroxidase was not effective for degrading microbial biofilms.

Impact of Hobbyist Beekeeping on Flora Along the Wasatch Front

Author EVELYN LINFORD

Mentor SUE HARLEY

Poster 19, Session 2

Botany

The purpose of this project was to explore the effects of backyard beekeeping on plant reproduction by observing pollen collection rates of *Apis mellifera*, the European honey bee. Pollen samples were collected from four beehives at various locations over a period of five months. Collections yielded between 20 and 800 samples weekly. To date fifteen species have been identified with a compound light microscope. Identified species included several agricultural and common garden species such as *Zea mays*, *Curcubita*, and *Rubus*. Three species of Rosaceae and native species such as *Castilleja* and *Taraxacum lyratum* were identified. The invasive species *Verbascum thapsus* and *Isatis tinctoria* were also found in collections. Pollen collections reflect the plants flowering in that area at that time. While there is a benefit to agricultural, garden, and native plants, data suggests backyard beekeeping is reproductively benefitting invasive species. This is important for understanding the impact of *Apis mellifera* as a pollinator both in an agricultural role and wild role. Bee populations are declining, with many native species becoming extinct or endangered due to human activity. *Apis mellifera* could fill in the pollination gaps left by these insects.

Distribution of Spider webs

Authors GIDEON LOMIIKO
TYLER ANDERSON
HAYLEY QUAY
SAVANNAH STOKES

Mentor CHRISTOPHER
HOAGSTROM

Poster 20, Session 2

Zoology

In this study, we investigated the distribution of spider webs along stream habitats. We hypothesized that spiders build their webs away from their competitors (fish) and closer to the stream habitat due to the larger numbers of macroinvertebrates supported there. To study this, we counted the number of spider webs along two 20 m sections of two local creeks, Burch and Strong's Creeks. We categorized sections of the stream based on depth, turbulence and water velocity and counted the number of spider webs within 2 m of the shoreline of each habitat type. Finally, we conducted backpack electrofishing to get the distribution of fish in the sections of each creek. We found lesser numbers of spider webs in areas inhabited by fish therefore supporting our first hypothesis that spiders build their webs away from their competitors. Also, we found a decrease in the number of spider webs as we moved away from the stream therefore supporting our second hypothesis that spiders build the webs closer to the stream due to the higher availability of food.

The Effects of Osmotic Stress on Hsp Concentration

Authors AUGUSTUS MALAN
ARUSA ASHFAQ
RACHEL DUBOSE

Mentors BRIAN CHUNG
ROBERT OKAZAKI

Poster 21, Session 2

Zoology

The life of a cellular protein begins with the process of transcription or copying the DNA in the nucleus into a messenger RNA (mRNA) copy which is then taken from the nucleus whereupon ribosome organelles begin translating the genetic code into a protein that is then carefully folded by a group of enzymes called Heat Shock Proteins (Hsp). The amount of any protein that can be produced can therefore be influenced by altering the amount of transcribed mRNA, or the amount of translation of already present mRNA. Our lab has previously found that even the expression Hsp themselves varies on the stress that an organism endures. We are currently seeking to determine if this alteration in Hsp is due to transcription or translation. Our model utilizes the intertidal ribbon worm *Paranemertes peregrina* which alters Hsp protein levels in response to the type of environmental stress it faces. Following osmotic stress, all of the mRNA was extracted from these ribbon worms to determine if osmotic shock alters the transcription of Hsp mRNA. We hypothesize that the cyclic change in Hsp protein is the result of corresponding change to Hsp mRNA transcription, and will test this hypothesis using various molecular biological techniques

Isolation of a *Lactobacillus wasatchensis*-like isolate from an aged European cheddar cheese showing

Author ISAAC MARTINEAU

Mentors CRAIG OBERG
MICHELE CULUMBER

Poster 22, Session 2

Microbiology

Lactobacillus wasatchensis WDC04, a non-starter lactic acid bacterium, was isolated from aged Cheddar cheese that had late gas formation. Subsequent studies have demonstrated *Lb. wasatchensis* can produce gas in culture and in experimental cheeses. *Lactobacillus wasatchensis* has been identified in cheeses with late-gas defects from geographically dispersed locations within the United States. Recently, a sample of a Cheddar cheese with late-gas defects produced in Europe was examined. Several slow-growing isolates were obtained from this cheese on MRS+1% ribose agar media that morphologically resemble *Lb. wasatchensis*. Their 16S rRNA gene was sequenced with identical results. The 16S rRNA gene had 99% sequence identity to *Lb. hokkaidonensis* strain LOOC260, another slow growing *Lactobacillus* isolated from silage in Japan, and 97% sequence identity with *Lb. wasatchensis* WDC04. Growth of *Lb. hokkaidonensis* is reported to produce gas with glucose, and acid with ribose, but has not been found in cheese. Further genetic and physiologic characterization will help determine if gas production in the European cheese is caused by this organism and will provide more evidence for the geographical distribution and phylogenetic diversity of organisms that cause gas defects in aged cheeses.

Anatomy and histochemistry of the Hairy Woodpecker tail apparatus

Author ALEXIS MATHEWS

Mentor RON MEYERS

Poster 23, Session 2

Zoology

Muscles contain different proportions of slow and fast fibers. Slow muscle fibers are found at higher concentrations in muscles performing enduring actions. In contrast, fast fibers are found in muscles executing dynamic movements. Avian species differ in behavioral traits and anatomical modifications involving the tail apparatus. Woodpeckers use the depressor caudae muscle of the tail apparatus to hold the tail against the tree trunk as a prop when climbing and foraging. Our lab previously established that Northern Flickers (*Colaptes auratus*) have a higher percentage of slow fibers in *M. depressor caudae* than other species who don't use their tail as a prop while climbing. Hairy Woodpeckers (*Dendrocopus villosus*) spend more time climbing with the tail apparatus continually depressed; therefore, I hypothesized depressor caudae of Hairy Woodpeckers will contain more slow fibers compared to Northern Flickers. We used gross dissection and immunohistochemistry to evaluate five tail muscles from four Hairy Woodpeckers. The depressor caudae had approximately 16.33 percent slow fibers, in contrast to Flickers that possessed about 7.4 percent. Findings show a correlation of slow muscle fibers in the depressor caudae and the functional behavior of Hairy Woodpeckers maintaining a depressed tail in climbing.

Isolation and Characterization of Bacteria to Degrade Art Waste Solvents

Author GABRIEL MCKAY

Mentors CRAIG OBERG
MICHELE CULUMBER

Poster 24, Session 2

Microbiology

Paint and solvents used in acrylic and oil painting generate waste resistant to breakdown, requiring expensive disposal fees, and posing a health hazard during storage. Bacteria were initially isolated from paint waste storage containers. Microbial degradation of solvents linseed oil, bestine, and turpenoid by these bacterial isolates was investigated. In addition, bacteria previously isolated from jet fuel-contaminated soil were also tested. All isolates were propagated in M9 minimal broth containing each solvent, with the majority forming biofilms at the solvent/broth interface after three weeks of incubation at 22°C. Ten isolates were identified by 16S rRNA sequencing. Isolates from paint waste containers include *Pseudomonas zhaodongensis*, *Planococcus citreus*, and *Planococcus riflettoensis*. Gas chromatography mass spectrometry (GC/MS) was used to measure microbial degradation of two solvents. GC/MS results indicate six isolates degrade both bestine and oleic acid, a selected component of turpenoid, as new peaks (breakdown products) were detected while initial solvent peak areas decreased over time. Results show bacterial isolates from paint waste and jet fuel-contaminated soil can degrade individual paint waste solvents. Optimizing growth studies (pH, oxygen, and temperature) indicate modifications in container handling can maximize solvent biodegradation to breakdown paint waste, reducing disposal fees and health risks.

**Characterization of
4-Hydroxyisoleucine in
Complex Mixtures by
UHPLC-MS**

Authors SAVANNAH NELSON
JARED THOMPSON

Mentor TODD JOHNSON

Poster 25, Session 2

Chemistry

Various studies using rat models have demonstrated that a naturally occurring amino acid, 4-hydroxyisoleucine (4-OH-Ile), can stimulate insulin secretion and lower blood glucose levels. However, identification of this amino acid and its metabolites in biological samples are still unknown. Ultrahigh-performance liquid chromatography and tandem mass spectrometry was used to detect the 148.152 Dalton amino acid's fragmentation, forming three main product peak ranges: 74.22-74.33, 102.22-102.33, and 130.22-130.33. It was found that increasing the collision energy and Argon CID gas of the instrument resulted in an overall increased percentage of the 102m/z peaks, making it significant in identifying 4-OH-Ile in complex mixtures. Samples of water and plasma that underwent methanol extraction were spiked with the amino acid and analyzed. The total ion count (TIC) and mass spectrometry data of spiked samples detected peaks corresponding to 102m/z, within a retention time of 1.25-1.5 minutes. Detection and identification of the fragmentation of 4-OH-Ile can now be applied to other biological samples.

Trout and Spider Distributions Along Creek Sides

Authors JEN O'LEARY

Mentor CHRISTOPHER
HOAGSTROM

Poster 26, Session 2

Zoology

Trout can change the flux of emerging insects from aquatic habitats to riparian zones, which is an important ecosystem function that supports riparian consumers, such as spiders (Benjamin et al. In a study of trout, Dineen (1951), found that spiders only accounted for 0.3% of the fish's diet. This would mean that spiders are not absent purely because of a predator/ prey relationship, instead a different selection pressure must be coming into play.

Bacteriocin Production By Bio-Productive Lab Cultures that Inhibit *Lactobacillus Wasatchensis*

Author SOPHIE OVERBECK

Mentors CRAIG OBERG
MICHELE CULUMBER

Poster 27, Session 2

Microbiology

Lactobacillus wasatchensis, a novel non-starter lactic acid bacteria (NSLAB), has recently been identified as an important cause of late gas defect in aging cheese. Controlling growth of this undesirable NSLAB may be possible by incorporation of bio-protective LAB cultures (BP-LAB) into the cheese during manufacture, inhibiting its growth during cheese aging. Previous research has shown that several BP-LAB cultures inhibit *Lb. wasatchensis* to varying degrees but the exact extent and mode of inhibition has not been determined. Quantification of inhibition between BP-LAB cultures and *Lb. wasatchensis* was done using the spot test with the agar-flip method then measuring inhibition zones in comparison to time incubated. The four most inhibitory BP-LAB cultures were *Lactobacillus paracasei* P-210, *Lactobacillus brevis* 13648, *Lactobacillus casei* F19, and *Lactobacillus paracasei* Lila. In addition, potential synergistic quantification of inhibition by co-BP-LAB strains was tested. Pairs of BP-LAB strains were grown together, and then tested following the previous described protocol. Four different co-cultures were tested with no significant increases in the inhibition zones observed when BP-LAB cultures were paired versus individual strains. Results confirmed that selected BP-LAB strains can significantly inhibit growth of *Lb. wasatchensis*. Currently, we are trying to isolate any bacteriocins produced by these BP-LAB.

Cormorant's: Where Are They During and After Fish Stocking in Suburban Ponds in Northern Utah

Authors NICHOLAS PADILLA
JANTZ ARBON
GARRETT EVANS
CARL CATALAN
JOHN KENDRICK

Mentor CHRISTOPHER
HOAGSTROM

Poster 28, Session 2

Zoology

Double-crested Cormorant (*Phalacrocorax auritus*) foraging on fish populations has increasingly become a concern in North America. The Cormorant is a piscivorous bird which populates a wide variety of aquatic habitats. Our research focused on the locations of the birds and their foraging activities in relation to the fish stocking dates in small suburban ponds in northern Utah. Based on a prior study, we hypothesized that the number of cormorants at each pond would increase around the stocking dates. Every morning during May 2017, we censused cormorants for 30 minutes at nine ponds. We also measured turbidity and water temperature. In general, cormorant numbers increased following rainbow trout (*Oncorhynchus mykiss*) stocking. In one case, a higher number of trout stocked was associated with the highest abundance of cormorants. In contrast, stocking of channel catfish (*Ictalurus punctatus*) was not associated with an increase in cormorants. The most turbid pond also had no fish stocking and fewest cormorant observations. This suggests the possibility that stocking lower numbers of trout more frequently could reduce attraction of cormorants.

Is Soil Grain Size a Reliable Indicator of Soil Liquefaction Potential?

Author THOMAS RUFFING

Mentor RICHARD FORD

Poster 29, Session 2

Geosciences

The goal of this study is to determine if soil grain size is a reliable indicator of the potential for soils to undergo liquefaction during an earthquake. Using published Geographic Information System (GIS) liquefaction hazard data points from the Utah Geological Survey (UGS) and four adjoining 7.5-minute geologic maps of Davis and Weber Counties in Utah, five locations were randomly selected for sampling of the surface material, based on five different overlain hazard potential classifications. Once collected, the samples were prepared and sieved using standard grain-size-analysis techniques and classified according to the Unified Soil Classification System. The sieve data reveal five closely matched soils in terms of their grain-size distribution. Though taken from five geologically unique depositional environments, there appears to be no significant relationship between a soil's grain-size distribution and its liquefaction potential as mapped by the UGS. These results indicate the need for a broader inquiry into liquefaction potential to examine other factors that contribute to this hazard. Specifically, future work should test for a relationship between the depth to shallow groundwater, as measured in local water wells, and liquefaction potential.

Metallation and Mechanochemical Synthesis of Tetraphenylporphyrin

Authors BRENON SEVERE
HAYDEN SHARP

Mentor BRANDON BURNETT

Poster 30, Session 2

Chemistry

Tetraphenylporphyrin (TPP) has been a compound of interest due to its use in dyes, renewable energy, biological enzymes and plant photosynthesis. Traditional synthesis requires harsh conditions and the use of toxic solvents that require special disposal. More recently, a mechanochemical approach has been applied needing less time with no solvent, however producing a lower yield of TPP. By altering the oxidizing agents as well as adding different metals during synthesis, we look to increase the yield of TPP while keeping the amount of toxic solvents used and reaction time a minimum, providing a method to replicate this process in larger quantities.

“Living Rock” Great Salt Lake Microbialite Display

Author DEZMOND SWAIN

Mentor CARIE FRANTZ

Poster 31, Session 2

Microbiology

A microbialite is a sedimentary rock formed by the activities of microorganisms. These structures appear in the rock record for billions of years, and represent some of the earliest signs of life on this planet. However, there is still a lot of uncertainty about how exactly these structures are formed. The Great Salt Lake (GSL) is home to extensive shoreline microbialites, making it a great place to study and do research. This project is centered around the design and construction of an educational and research “live” microbialite display here at Weber State University. The microbialite, which hosts a rich and active microbial community, will sit in a scientifically monitored aquarium similar to conditions of the GSL. State of the art equipment and instruments will be used to read and record changes in water chemistry (due, for example, to microbial activity or active carbonate precipitation), which will include changes in pH, temperature, oxygen, and also light conditions. These readings will be available to view in real-time on a computer monitor to the observer. There will also be a webcam and submerged endoscope that will provide a close-up live-feed of the microbialite, allowing the observer to view the biological and physical changes the structure may go through. The display will be used for courses, tours, and more importantly provide a place where research can be conducted to further our knowledge about microbialites.

Fiber Type Distribution in Golden-collared Manakins (*Manacus vitellinus*)

Author KARMA THOMAS

Mentor RON MEYERS

Poster 32, Session 2

Zoology

Manakins are neotropical birds that display an unusual mating behavior requiring intense muscle speeds. The Golden-collared Manakin (*Manacus vitellinus*) is an extreme performer of this behavior and beats its wings together behind its back at such a high speed (60 Hz) that it produces sounds known as “wingsnaps”. It is speculated that these wingsnaps come from specialized “superfast” muscle fibers within one of the main wing muscles, the scapulohumeralis caudalis. By cutting dissected muscle tissue into 10 μm serial sections we analyzed scapulohumeralis caudalis and pectoralis muscles from three Manakin species (Golden-collared, Red-capped, and Blue-crowned) and two closely-related control species (Dusky Antbirds and House Wrens) to determine if these fibers are present. We concluded none of the species possessed superfast muscle fibers, showing us Golden-collared Manakins are able to produce their wingsnaps without the use of specialized fibers. We then assayed the muscle for levels of aerobic activity to determine if this helped produce wing speed. In every species, most pectoralis muscles had a greater percentage of highly aerobic fibers, whereas most scapulohumeralis caudalis muscles featured a lower percentage of highly aerobic fibers. We are currently unsure what physiological characteristics allow for this wingsnapping behavior.

Feasibility of Biocementing in Great Salt Lake and Uintah Basin

Author KUYLER THOMPSON

Mentor CARIE FRANTZ

Poster 33, Session 2

Geoscience

This project aims to contribute to the understanding of how microbialites may form in the Great Salt Lake, and to help understand the role of microorganisms in the creation of microbialite rocks found in the rock record. This can provide more understanding of the history of the earth and the evolution of life. To help the understanding of how microbialites form in the Great Salt Lake, we test whether or not micro-organisms have the ability to consolidate and lithify loose sediments via the process of microbially induced carbonate precipitation. The key indicator that we use to measure the effectiveness of the microbes' ability to bind sediments is the change in permeability of the sediment from before the treatment to after treatment. The treatment aims to allow the microbes to successfully induce calcite precipitation that will act as a cement to bind the sediments. We hypothesize that the microbes will significantly reduce the permeability of the sediments when compared to control groups which do not contain any microbes.

Inhibition of Pathogens by Probiotic Strains of Lactobacilli

Authors SHERIE THORNTON
AMMON SMART
AMBER SMITH

Mentors KAREN NAKAOKA
MICHELE CULUMBER

Oral Presentation, Session 1

Microbiology

Many studies have characterized lactic acid bacteria (LABs), noting their potential health promoting features and encouraging their use as probiotics. This study's purpose was to identify by DNA analysis seven strains of LABs isolated from probiotics and to test their ability to inhibit bacterial pathogens. LAB strains were identified by 16S rRNA gene analysis that indicated five are *Lactobacillus rhamnosus* and two are *Lactobacillus plantarum*. Each LAB strain was inoculated onto the center of a sheep blood agar plate and incubated for 3 days at 30 degrees Celsius. Then, the agar in each plate was aseptically flipped over into the lid of the plate exposing the uninoculated side. One of five pathogens was swabbed onto the newly exposed side of the agar, to test if the lactobacilli metabolites inhibit the pathogens. All five pathogens were tested against each LAB strain. After the plates were incubated for 48 hours, *Escherichia coli*, *Salmonella Typhimurium*, *Shigella sonnei* and *Enterococcus faecalis* grew without interference. However, three of the seven strains of lactobacilli slightly inhibited methicillin-resistant *Staphylococcus aureus*, an important pathogen that infects wounds. Inversely, *E. faecalis* slightly decreased the LABs' hemolytic activity. Further studies are underway to characterize the interplay of pathogens and lactobacilli.

**Use of Gambel Oak
Acorns as Nesting Sites by
Temnothorax Ants**

Author BROCK VANCE

Mentor JOHN MULL

Poster 34, Session 2

Zoology

Most ant species in North America nest in the ground. Ants in the genus *Temnothorax* are known to form colonies in hollowed-out acorns and twigs. This nesting behavior has been observed in other regions of the U.S., but it has not been well documented that *Temnothorax* ants nest in acorns in northern Utah. During the summer of 2017, we collected acorns that had fallen from Gambel oaks (*Quercus gambelii*) and examined them for signs of use by ants. Samples were collected beneath the canopy of trees east of the Weber State University campus. We collected all acorns found inside a 0.25 m² quadrat. A total of 13 quadrats were sampled. In the lab, we measured acorn dimensions and counted any ant life stage found within them. Of the 318 acorns collected, 6.6 % were occupied by ants. The total number of ants per acorn was positively related to acorn size ($y = 0.1868x + 5.0623$; $r^2 = 0.28$; $p = 0.05$). Occupied acorns were most likely those that had been hollowed out by acorn weevils or other insects the previous year. The distribution and number of ant life stages found in individual acorns suggest that a single colony is dispersed among multiple acorns at any one time.

Preservice Teachers' Learning of Fraction Multiplication and Division

Authors BOSTON WORKMAN
MARLISE WEYBURN

Mentor SHAWN BRODERICK

Oral Presentation, Session 1

Microbiology

In this session, we will explore how prospective elementary teachers (PSTs) deepen their knowledge of fraction multiplication and division in an arithmetic for elementary teachers course. Historically, PSTs have had difficulties recalling and learning how to explain these topics and misconceptions still persist today. With regard to fraction multiplication, PSTs tend to believe the idea that multiplication always makes things bigger, misapply other procedures like multiplying the reciprocal, and complicate the process by finding a common denominator. Dividing fractions, whether procedurally or conceptually, has also been a challenge for PSTs. Much of the challenge is likely due to the way in which typical textbooks treat division of fractions. They simply state that dividing by a fraction is the same as multiplying by its reciprocal. There is little or no attention given to the meaning of fraction division and no connections are made between division with fractions and division with whole numbers. We will discuss the results of a study in which we used manipulatives, pictures, and real-life examples to fortify PSTs' knowledge of and confidence in multiplying and dividing fractions and how to apply them to real life.

Characterization of the Hemolytic Activity of Probiotic Lactobacilli

Authors JAYSON WORKMAN
JESSE KUPFER

Mentor KAREN NAKAOKA

Poster 35, Session 2

Microbiology

Lactobacilli are valued for their health promoting aspects and their use as probiotics. However, we observed in our lab that seven probiotic lactobacilli (PLBs) lysed sheep blood agar (SBA), a characteristic of pathogens. This study's goal was to characterize this hemolysis. Initially, PLBs were inoculated onto SBA, incubated at 25, 30 and 37 °C, aerobically and anaerobically. All seven PLBs lysed SBA after 2-4 days of incubation under all conditions. PLBs were then grown in broth for 2 and 6 days to obtain culture supernatants (CSs). CSs of the seven PLBs were filter sterilized and pipetted onto SBA plates. After 24 hours of incubation, the SBA was lysed by all CSs with day 6 CSs causing larger zones of hemolysis than day 2 CSs. The pH of CSs and non-cultured broth was adjusted to pH 6. These were tested along with the original CSs (pH 3.4-3.5) on SBA. All pH 3.4-3.5 CSs lysed SBA but none of pH 6 CSs lysed the SBA. Importantly, non-cultured broth did not lyse SBA at either pH indicating that metabolites in the CSs were responsible for hemolysis. Studies are underway to characterize the chemical nature of the hemolytic activity of cultured PLBs.

To Frack, or Not to Frack?: A Video Debate

Author KATHERINE QUIGLEY

Mentor RICK FORD

Oral Presentation, Session 2

Geoscience

As suggested in the title, this project debates whether or not fracking should become a common practice. It does so by examining the arguments surrounding fracking, with a creative twist. Fracking is the process of fracturing the rock deep in Earth's crust in order to extract oil and gas that is trapped in the rock. In order to make this video, a literature review was conducted about both sides of the argument, using material from the Honors class titled "To Frack, or Not to Frack?," as well as additional sources. It was concluded that fracking is a good backup resource for which technology exists, but that it remains just that - a backup resource. For the film, a script was written based on the "To be or not to be" soliloquy from Shakespeare's Hamlet. Cast members for the film were the father, brother, and sister of the author. Footage was filmed at two locations: the oil refineries in Woods Cross and Gailey's Park in Fruit Heights. This project has increased the author's understanding of fracking and about the positive and negative economic and environmental impacts of fracking.

Mutation Analysis of Enteroviruses

Authors SERENA YOUNG
COURTNEY THOMAS
CONNOR KENDRICK

Mentor DANIEL CLARK

Poster 36, Session 2

Microbiology

Enterovirus A71 and Coxsackievirus A16 both cause Hand, Foot & Mouth disease (HFMD), but Enterovirus A71 can also cause a neuroinvasive disease which is sometimes fatal. In an effort to discover what part of the enterovirus genome is most likely to mutate and cause disease, we mapped conservation across the genome of Enterovirus A71, Coxsackie virus, and the related Poliovirus. We used all available GenBank records and performed an alignment and conservation analysis to generate a map of viral mutants. This map was superimposed on viral proteins, including models of secondary protein structure. Our results showed that several conserved regions aligned with specific viral proteins, and aligned with protein structures. Considering this and other studies, several mutant hot-spots associated with disease were found. This study helps explain how a population of mutants can evolve within a human host.



COLLEGE OF
SOCIAL & BEHAVIORAL
SCIENCES

Fact vs Fiction: The Influence of Learning Styles and the Testing Effect on Predictions of Memory P

Authors HUNTER ANDERSON
SABRINA BADALI
JOANNA REEDER
GIUSEPPE PAUCARPURA

Mentors SHANNON MCGILLIVRAY
SARAH HERRMANN

Poster 7, Session 1

Psychology

The belief in learning styles is a widespread myth, however, when people are presented with information in the teaching style that matches their learning style, their performance does not improve (Kratzig & Aruthnott, 2006). Conversely, the testing effect refers to the benefits of active retrieval practice (i.e., practicing testing oneself), and this phenomenon shows a clear link to improved memory performance (Roediger & Karpicke, 2006). The current study examined the effect of learning styles and the testing effect. Four topics were chosen and for each topic, four versions of the presentation were created – visual with practice questions, visual without practice questions, verbal with practice questions, and verbal without practice questions. Participants' learning styles were assessed and they were informed of the results. Participants made global JOLs (i.e., what percentage of the questions will you get correct?) as well as a prediction of ease judgement before receiving each type of lesson. After each lesson, participants completed a multiple choice test on the material. It is predicted that participants' JOLs and judgments of ease will overestimate the benefits of learning styles, but will underestimate the benefits of testing effect, relative to its impact on actual memory performance.

**Proving people wrong:
Effects of perspective and
presentation modality on
overcoming misconceptions**

Author SABRINA BADALI

Mentor SHANNON MCGILLIVRAY

Poster 8, Session 1

Psychology

Misconceptions about psychology are prevalent among the public, and while taking a psychology course is associated with a significant decrease in overall misconception endorsement, some misconceptions appear to be resistant to change (Bensley et al., 2015). However, if asked to think from a more scientific perspective, endorsement rate of some misconceptions may decrease (Amsel et al., 2009). Additionally, it has been found that teaching methods that activate a student's misconception before providing the correct alternative, known as refutational teaching methods, are more effective in dispelling misconceptions than standard teaching methods (Kowalski & Taylor, 2009). The current study investigated the effectiveness of refutational videos versus refutational text, and perspective taking on overcoming misconceptions in psychology. Four misconceptions were chosen, and for each misconception, a refutational video and a text-based presentation was created. At pretest, participants completed questionnaires assessing endorsement of the misconceptions, as well as surveys assessing the real life implications of belief in these misconceptions. Participants were then presented with the refutational teaching materials and were given the appropriate perspective-taking instructions. Two weeks later, students completed the misconception questionnaire again. It was hypothesized that the professor perspective condition and video format would be associated with the lowest misconception endorsement rates.

Honey, Did You Remember the Milk? Metacognitive Insight and Accuracy in Couples

Authors SABRINA BADALI
TIFFANY PAGE
TESS KENDALL
MONIKA SAHLEEN
GIUSEPPE PAUCARPURA

Mentor SHANNON MCGILLIVRAY

Poster 9, Session 1

Psychology

Couples often divide and conquer when it comes to what information each person remembers. For example, maybe one person is good at remembering directions, so the other does not need to. Despite how common this behavior is among couples, an important question is, do we really know what our partner will remember? The current study recruited romantic couples who had been cohabiting at least 6 months. Each person in the couple was given eight memory tasks meant to reflect real-life scenarios that one would likely encounter, such as remembering directions or a grocery list. For each set of materials, individuals gave a prediction (i.e., a global judgment of learning) regarding how many items they thought they and their partner would recall. These predictions were compared to actual performance and the data revealed that participants were roughly as accurate at predicting their own performance as they were their partners' performance.

Justice and the Memorialization of the Rwandan Genocide

Author MICHAEL BALLIF

Mentor STEPHANIE WOLFE

Oral Presentation, Session 1

History

For 100 days in 1994, the East African state of Rwanda was torn apart by the Genocide against the Tutsis. Since that time, both the government and the citizens of Rwanda have sought to memorialize the victims. This study examined the relationship between this memorialization and justice, through oral interviews with survivors, documentation of memorial sites, and traditional research methods. What was discovered in this study was the strong correlation between memorialization and three forms of justice in particular—countering denialist narratives, promoting the idea of "never again", and by raising awareness of the material needs of the survivors. This demonstrated a more active form of memorialization than the usual perception of memorial activities.

Relationships Between Trait Hostility, Adaptive Functioning Threats, and Narrative Meaning Making

Author JULIA BLUMENSTEIN

Mentor CADE MANSFIELD

Poster 10, Session 1

Psychology

Negative life events are a certainty, yet how we experience those events and whether or not we grow from them is tied to how we make-meaning of those events (Mansfield, Pasupathi, & Mclean, 2015). Trait hostility, which is partially defined by the belief that other people are sources of frustration likely matters for negative event meaning-making (e.g. Smith, 1992), the extent to which people feel threatened by negative life events, and whether or not they grow from those events. However, there has not been research done on how hostility matters for meaning-making. We assessed individual differences in trait hostility and tested the extent to which those differences were associated with growth-related meaning-making and perception of threat from negative life events. Undergraduates ($n = 125$; female = 84; Mage = 22.46; SD = 4.10) recalled two negative relationship events (perpetration and victimization of harm) for two minutes, then reported on adaptive functioning (such as sense of empathy, feelings of loneliness, perceived likeability, self-alienation). Finally, participants wrote narratives of the negative events. Narratives are being reliably coded for self-blame, other-blame, quantity and characteristics of emotion and cognitive words, and insight-based meaning making (our analog of growth, e.g. McLean & Pratt, 2006).

Personality and Birth Order

Authors KAILLEE BROWN
LAURA PASTRANA

Mentor HEATHER CHAPMAN

Poster 11, Session 1

Psychology

The purpose of this study is to evaluate if there is a relationship between birth order and personality in our sample that is collected. Understanding your unique personality traits can be helpful in improving yourself. Knowing your strongest personality traits can influence what type of career choices you make, relationships you form, who you choose to create relationships with, and how you react to different situations. These are just a few examples of how knowing and understanding your personality traits can be beneficial for your personal development throughout your life. Our study's focus is to determine if there is a correlation between birth order and specific personality traits. Thus, knowing the typical personality traits depending on your birth order can be helpful. Our hypothesis is that there is a relationship between birth order and personality. A factorial ANOVA will be used for these analyses.

Effects of Xeriscaping on Surface Temperatures

Authors HAILEY BURTON
HEATHER COUTURIER
KYIA HILL
EMILY KAEMMER

Mentor DAN BEDFORD

Poster 12, Session 1

Geography

The arid and semi-arid climates of the western United States require constant attention to water conservation. Institutions of higher education have a special obligation to environmental sustainability writ large, of which water conservation is a part. One obvious approach to reducing a university's water consumption is through xeriscaping. However, xeriscape has the potential to exacerbate existing urban heat island effects as wet surfaces are replaced by dry ones, partitioning less energy into latent heat and more into sensible heat. This study examines localized surface temperatures of several currently utilized landscaping materials at Weber State University in Ogden, Utah. These landscaping materials included grass, blacktop asphalt, light-coloured river rock, and dark wood chips. Weather station measurements of incoming solar radiation were combined with albedo and infrared thermometer measurements of the various ground surfaces. These data were used to identify rates of heat absorption and sensible and latent heat partitioning for the different surfaces. The surface emitting the greatest amount of infrared heat was a dark coloured wood chip landscaping material. These findings were communicated to members of the university's Facilities Management team, and will be included in future decision making regarding landscaping materials. The ultimate objective is to ensure that water conservation measures are successfully implemented, without unduly raising temperatures across campus.

Internal and External Influences on Rwandan Genocide Memory

Author TAYLOR COVEY

Mentor STEPHANIE WOLFE

Oral Presentation, Session 1

Political Science

My presentation examines the influence of national and international politics on the various memorials honoring the victims of the 1994 Rwandan Genocide, once a war-torn country which has now dedicated itself to "Never Again." It is evident that each memorial created within the country highlights different events, actors, and victims, and utilizes a diverse way of portraying this information, from honorable burial sites in quiet churchyards to remnants of victims' belongings alongside their remains or pictures. In my thesis, I specifically explore the effects of international politics on memory, including the contributions and representation of foreign states, international organizations, and so forth. For example, while it was a colony of Belgium, Belgian nationals created a class system in Rwanda based on racial and ethnic traits, ultimately creating the divide and resentment between the Hutu and Tutsi peoples. Not only is it important for Rwanda to memorialize this event and recognize responsibility so its people can heal, but others whose involvement, or lack thereof, resulted in the massacre must do the same. I attempt to study these levels of interaction in my analysis, which is based on secondary research sources including book excerpts and a collection of articles. I am planning to continue my research by visiting Rwanda and conducting interviews this upcoming June. The new information I will gain while in the country will contribute to a greater understanding of the current relationship dynamics between the international community and internally-conflicted countries, as well as the interpretation and protection of human rights. As we have learned from the Holocaust, memorialization of such catastrophic events has a major impact worldwide, generating awareness of and compassion for the human race.

**Qawinaq: How International
Attention Changed the
Course of Maya Indigenous
Resistance During the
Guatemalan Civil War**

Author ANDREW CROOKSTON

Mentors JEFFREY RICHEY
KATHRYN MACKAY

Oral Presentation, Session 1

History

My central research question is: What was the social climate of discrimination in Guatemala in the years leading up to the climax of the Civil War (1982) and what were the Maya and ladino responses to this social climate? Spanish colonialism in Guatemala created economic demands that led to a rigid societal hierarchy, feudal patterns of land ownership, and ruthless exploitation of Maya communities. Within the societal hierarchy of Guatemala, Maya people maintained a low socioeconomic status and their languages, cultures, and religious practices were rejected by non-indigenous people, known within Guatemala as ladinos. My research question is composed of two parts. The first will be establishing the outward forms of discrimination against indigenous people that existed in the 1970s. I will explore how indigenous people represented their own identity in the public sphere under the discrimination of the time. The next section will explain the Maya responses to discrimination and racism, especially those decisions to take up arms against the military dictatorships. During the Symposium at Weber State, I would like to present this information in the form of an oral presentation.

Stress Levels and Sleep Quality in Caregivers

Authors VALORIE DODART
KASIE ANDERSON

Mentor HEATHER CHAPMAN

Poster 13, Session 1

Psychology

The purpose of this study is to explore the stress level of caregivers and the impact of this stress on sleep quality. Through the gathering of this important data, we hope to find evidence that stress affects sleep quality and can lead to a greater ability to identify when social supports are most needed to mitigate the stress effects on the body.

**Mormon Missionary Efforts
in South Africa**

Author TANNER FLINDERS

Mentor SUSAN MATT

Oral Presentation, Session 1

History

This presentation will take a brief look at the history of Christianity in South Africa, the development of the Mormon priesthood ban, and the efforts of the first Mormon missionaries to proselytize in South Africa during the 1850's. It will focus on research into whether or not the priesthood ban impeded the efforts of the three original missionaries in spreading Mormonism.

The Effects of Racially Charged Terms on Culpability in a Police Shooting

Authors BENJAMIN GABBERT
MARGARITA RODRIGUEZ

Mentors TODD BAIRD
JOE HORVAT

Poster 14, Session 1

Psychology

Using an experimental design, this study examined the effects of racially-charged terms in determining both suspect culpability and justification for the officers use of force. Participants were exposed to either a control condition or one of four racially charged terms (Black, Negro, Hispanic, Mexican). It was hypothesized that the variation of racial terms, participant race, prior participant discrimination, and negative experiences with police would alter participants determination of culpability/justification. Results indicated that only the participant's race resulted in any statistically significant variance.

**The Collaborative Process:
How law enforcement
agencies and universities
research together**

Authors STEINER HOUSTON
CARRIE STONE

Mentor MONICA WILLIAMS

Oral Presentation, Session 2

Sociology

The current project is a collaboration between an official at a local law enforcement agency (LEA) and undergraduate students and faculty at a regional university. Although the main focus of the study is on disproportionate minority contact, this presentation will focus on the collaborative efforts of those involved in collecting and analyzing the data. In an effort to receive available grants and other funding, many LEAs have sought out partnerships with local institutes of higher education to conduct research on various topics. The willingness of LEAs to seek out such research shows a desire to look inside their organizations and proactively address any issues that may be discovered. As part of the current collaboration, the undergraduate students have maintained constant contact with the law enforcement official and have been given the opportunity to discuss the study with various record keeping and information technology personnel. Because previous research has rarely provided an in depth look at the collaborative process, this study will be a great resource for future researchers and community partners who wish to enter into a collaborative process to study sociolegal topics such as law enforcement's relationships with the communities they serve.

Paper Color and Testing Ability

Authors MICHAEL JOHNSON
MARYANN MARYANN

Mentor HEATHER CHAPMAN

Poster 15, Session 1

Psychology

This research looks at the work of MaryAnn Moss and Michael Johnson, student researchers at Weber State University, and Heather Chapman, primary investigator. We will obtain data from a random sample of Psychology 1010 students at Weber State University. The purpose of this study is to identify if there are any relationships between the color of paper on which a test is given, the gender of the tester, and the outcome of the test scores. The colors of paper to be used are white, light blue, and pink. The genders to be tested are male and female. We made a math test comprised of 60 simple math questions that will be given to participants. They will have 5 minutes to complete the math test to the best of their abilities. When the time expires, we will collect the tests to gather our data. We will use an ANOVA test to compare all of the results between our groups in the study.

**Adjunct faculty:
The theory behind inclusion**

Author LESA LANDRITH

Mentor KERRY KENNEDY

Oral Presentation, Session 2

Social Work

Adjunct faculty are a large part of University life. Research about adjunct faculty is lacking whereas research about students, tenured faculty, and faculty on track for tenure is much more prolific. How can adjunct faculty be framed to be better understood? This research explores temporary worker satisfaction and part-time worker satisfaction in an effort to better understand adjunct faculty and their unique role in the University system. Using this framework and building on previous research from Weber State, results from a 25- question survey given to adjunct faculty will be presented within the frame of temporary workers in order to provide a deeper perspective to better understand this unique group.

Fall of the House of Pinkerton

Author GABRIEL LISONBEE

Mentor SUSAN MATT

Oral Presentation, Session 1

History

The Homestead Strike of 1892 is typically viewed as a loss for labor forces. While I do not dispute this overall claim, I argue that an important consequence of the Homestead Strike has been largely ignored: the impact that the strike had on the Pinkerton Detective Agency. Prior to the Homestead Strike, the Pinkerton Detective Agency served as a nation-wide private policing force. They were hired by state officials and private industrialist alike to provide investigative and protective services. However, this changed following the Homestead Strike. The Pinkerton Detective Agency lost its national prestige after the Battle at Homestead where eight strikers died, prompting public backlash against the Pinkertons, governmental investigations into their practices, and legislation restricting the employment of Pinkerton Detectives. These restrictions and the public backlash to the Pinkertons created a power vacuum in law enforcement. This vacuum created the need for a public law enforcement system that was national in scope. This shift would ultimately aid the workers of labor disputes since law enforcement would be more publically accountable than private detective agencies, and because it would open the door for more governmental intervention in labor disputes.

How Does Scent Affect Attitude Towards School?

Authors CRYSTAL MARKER
KASS MADSEN

Mentor HEATHER CHAPMAN

Poster 16, Session 1

Psychology

The purpose of this study is to ask college students about their attitude towards school. In the United States, there has been an increase in the need for a college education, because the highest paying jobs require it. Many factors affect achievement in college, one of which is attitude towards school. Having a positive attitude is something that could potentially aid a student to graduate with their bachelor's degree or higher so employment can be obtained and sustained. There is a need to study different environmental factors that can aid toward a better attitude concerning school achievement. It may be said that people with a positive outlook have a higher purpose, and those with a negative outlook may not achieve their goal of graduation, and have lower paying jobs. Having a positive attitude is something that could potentially cause an increase in overall achievement in the educational system, and the main purpose of our study is to evaluate university level students exposed to essential oil scent, and to see if there is a correlation with their attitude towards school in a positive or a negative manner. If essential oils can influence student attitude, then it could benefit students with overall achievement in school and successful future employment.

Exercise and Test Anxiety

Authors YAVET MURILLO

KAITLIN OSBORNE

REGINA WARD

Mentor HEATHER CHAPMAN

Poster 17, Session 1

Psychology

There are several types of anxiety disorders described in the DSM-V. The anxiety disorder that most people are familiar with is generalized anxiety disorder and according to the Anxiety and Depression Association of America (ADAA), it affects over 6.8 million adult Americans. Emerging research has shown that exercise may be a possible form of treatment for anxiety. Some psychologists and therapists have begun to assign exercise as homework to help improve and boost moods with those struggling with depression, low self-esteem, and anxiety (Stonerock, 2015). Studies have shown that individuals who exercise regularly are less likely to develop any anxiety disorders in contrast to individuals who do not participate in regular exercise. Therefore, we intend to explore the relationship between exercise and test anxiety.

Understanding Parental Attitudes toward Abstinence Based and Comprehensive based Sexual Health Topic

Authors LAURA PASTRANA
ALYSON RASMUSSEN

Mentor PAMELA PAYNE

Oral Presentation, Session 2

Psychology

There are only two types of sexual education programs that are taught in the United States, comprehensive sexual education and abstinence-only until marriage programs (Steadman, Crookston, Randy, & Hall, 2014). These are state mandated programs and without special consent it is illegal for health teachers to teach anything other than the state mandated curriculum (Steadman, et al., 2014). Utah state law only allows a discussion of contraception use with parental approval and is up to the local school board if that can even be offered (Steadman, et al., 2014). If condoms and contraception are discussed amongst students, teachers are not allowed to explain how to use and or promote condoms or contraception even among students who engage in sexual behaviors in the state of Utah. The current study is looking at the possible discrepancy between what is currently being taught in public schools regarding sexual education and what parents would prefer to be taught. We are working with a small urban city Health Department to administer a cross-sectional social survey to the parents in two counties of Northern Utah. The survey will assist in gaining a better understanding of the knowledge, opinions, and attitudes of current practices but also parental opinions of different evidence based opt-in options as well. We anticipate that the survey results will express parents wanting a more comprehensive form of sexual education for their children rather than an abstinence based program. The finding from this project will be used to influence policy changes and improve sexual health education in Utah and other states as well.

The Psychological and Biological Effects of ENDS During Baseline and Withdrawal Conditions

Author MAKENZIE PETERSON

Mentor TODD HILLHOUSE

Poster 18, Session 1

Psychology

Electronic nicotine delivery systems (ENDS) and electronic cigarettes (E-cigs) are marketed as a safer alternative to cigarettes; however, the research community is still investigating the short- and long-term effects of ENDS. Minimal research has evaluated the biological and psychological effects of ENDS on first time daily ENDS users (previously nicotine native). The present sought to evaluate several psychological (e.g. cravings, withdrawal, and dependence) and biological (heartrate, blood pressure, carbon monoxide concentration) measures under normal and withdrawal conditions. The study was composed of two experimental sessions with participants smoking their ENDS ad lib for the first session (baseline session) and abstaining from nicotine for 12 hours in the second session (withdrawal session). ENDS users has significantly higher craving scores on all measures of the tobacco cravings questionnaire short form during baseline and withdrawal session as compared to nonsmokers. During baseline and withdrawal sessions, ENDS users had a mean score of 7.32 (emotionality), 15.26 (expectancy), 5.49 (compulsivity), and 9.86 (purposefulness) - (nonsmokers had a score of 3.5 on all scales). ENDS were classified with moderate dependence based on the Fagerstrom Dependence Scale with a mean score of 2.67 and 3 on baseline and withdrawal sessions, respectively. The mean CO reading for nonsmokers was 2.18 ± 0.44 (baseline) and 3.25 ± 0.44 (withdrawal), while the ENDS users had CO readings of 3.34 ± 1.02 (baseline) and 2.5 ± 0.56 (withdrawal), which suggests that ENDS are safer in terms of combustible activity. Interestingly, this study found that ENDS users have significant craving score even when they are able to smoke, which may suggest that they are not receiving adequate nicotine with this time of delivery system.

Essential oils effect in memory recall

Authors TADIANA RICHTER
LISA BUSBY

Mentor HEATHER CHAPMAN

Poster 19, Session 1

Psychology

Low levels of stress and anxiety are part of most college students lives. Anxiety is a feeling of worry, nervousness or unease. Usually regarding an upcoming event or relating to something with an uncertain outcome. Test taking causes anxiety and is a problem for many students. We know men and women are different in the subjects they do well in. We also know that there are some test taking strategies available and that some work better than others. One strategy is that essential oils can help with improved focus and reduce anxiety. Rosemary is believed to be the herb of memory. Ancient Greek and Roman cultures thought the leaves were supposed to quicken the mind and prevent forgetfulness. Lavender is traditionally believed to be relaxing. In many cultures lavender is used to enrich sleep and promote calmness. Therefore, the purpose of this study is to determine if Rosemary and Lavender improve memory recall and reduce anxiety. We want to know if the simple and cost effective use of essential oils is an effective treatment option for college students who experience test related memory recall failure due to anxiety. We will determine this by showing current psychology 1010 students a series of photos. Some students will experience the rosemary fragrance in the room, some students will experience the lavender fragrance and still others will have no fragrance at all. We want to see if the use of essential oils for memory recall and promoting calmness is improved between men and women. We will compare the results to determine if it helped and determine if there was a difference between men and women. If it improves the outcome for both teachers could spray an essential oil in their classroom to reduce test taking anxiety and improve recall for all students. The implications would be a changed to the classroom environment.

**Challenging information,
religiosity, superstition
and beliefs about
psychology as a science**

Authors MONIKA SAHLEEN
RAQUEL LEMOS
TAMARA CARDON

Mentors SHANNON MCGILLIVRAY
SARAH HERRMANN

Poster 20, Session 1

Psychology

There is an occasional conflict between scientific and religious beliefs that can cause tension (Dagher & Boujaoude, 1997), and lead people to feel they have to choose one belief over the other. Additionally, beliefs in popular paranormal phenomena have been shown to become even stronger when confronted with scientific evidence that challenges those beliefs (Ridolfo, Baxter, & Lucas, 2010). The current study investigated the relationship between religiosity, superstitious beliefs, and one's trust in psychology as a science. In addition, the study examined the effect of presentation of psychological findings that negatively portray those who endorse religious or superstitious beliefs on one's endorsement of psychology as a science. Participants in this study completed a survey that assessed their religiosity and belief in the paranormal. Following this, participants read several findings that negatively portrayed those who hold either religious or superstitious beliefs (or, as a control, neutral findings). Finally, participants completed a survey to evaluate their belief in psychology as a science. It was predicted that for those who indicated they were superstitious or religious, being presented with information that negatively portrayed those who hold such beliefs would be less likely to endorse psychology as a science, compared to a control condition.

Disproportionate Minority Contact in Policing: Where does the bias lie?

Authors CARRIE STONE
STEINER HOUSTON

Mentor MONICA WILLIAMS

Oral Presentation, Session 2

Criminal Justice

The current project involves a collaboration between a local police department and undergraduate students and faculty at a regional university to examine a heretofore underexplored explanation for disproportionate minority contact (DMC). Previous researchers have explained DMC by utilizing two hypotheses. The first, differential treatment, is the theory that variations exist in policing whereby officers disproportionately focus on minority groups. The second, differential offense, is the theory that variations exist in patterns of offending whereby minority groups disproportionately place themselves within police focus. Utilizing reports provided by a local police department, we analyze a third hypothesis that we call differential civilian response. Differential civilian response is the theory that civilians disproportionately place minorities within police focus. After controlling for offense rates, we will examine the extent to which biases within police departments and among civilians contribute to DMC between officers and community members. By examining an underexplored explanation for DMC rates, findings from this study have the potential to enhance community education efforts, influence police training practices, and aid future researchers in understanding how civilian bias impacts rates of DMC within communities.

Music and Memory Recall

Authors EMILY TANNER
EMILY HOFF

Mentor HEATHER CHAPMAN

Poster 21, Session 1

Psychology

Music is an important part of life and culture. It can be understood and felt by people of all ages. Children as young as two months old have been documented to turn towards pleasant sounds. Music can have a variety of effects on an individual. These effects typically are changing (either enhancing or reducing) a current state of emotion, such as love, hate, anger, or depression. Music has been known to motivate an individual in a wide array of activities such as cleaning, running, working out, sleeping, and even studying. While it isn't uncommon to see people working out with music playing, more attention has been given to students listening to music while they study. Studying with music playing in the background has become a popular trend among most students ranging from elementary age to graduate students. Because music is something we can't escape, the researchers of this project would like to determine music's effect on students. Is music really helping students with their academic success or is it hindering full potential of their best work and memory recall? Generally put, if music enhances our emotions and emotions are tied to memories, then does music affect memory recall?

**That Face Looks Bitter:
The Impact of Taste
on Judgments of
Emotional Expression**

Authors SAMANTHA TIBBETS
ROSEMARY SAGE
JULIA BLUMENSTEIN
JESUS SAAVEDRA
JOHN SIMMONS

Mentors SHANNON MCGILLIVRAY
SARAH HERRMANN

Poster 22, Session 1

Psychology

Previous research in embodied cognition has examined the ways that the perceptual system influences other cognitive processes. Recently, there has been growing interest in investigating how tastes impact cognition and behavior. For example, it has been found that bitter taste increases hostility (Saglioglou & Greitemeyer, 2014) and harsh moral judgments (Eskine et al., 2010), compared to participants who tasted something sweet or control groups. Although several conceptual frameworks have been proposed to explain the dynamics of how bitter taste affects judgment, little research has examined the impact of sour tastes on cognition or behavior. The present research compares the effect of sour, bitter, sweet, and no taste on social judgment of emotional expression. The study will examine the extent to which the taste experienced by participants influences the ability to detect specific positive and negative emotions in faces displaying neutral, subtle, and apparent emotional expressions. For example, the degree to which bitterness or sourness influences the detection of disgust in faces, compared to sweetness or no taste. The current study will also examine the effect of taste on participants' rating of the intensity of the emotion expression, as well as the likability of the target faces.



BACHELOR OF
INTEGRATED STUDIES

Personality and Family Structure

Author KENDRA SPOMER

Mentor HEATHER CHAPMAN

Poster 6, Session 1

Psychology

Understanding your unique personality traits can be useful for self-improvement. Knowledge of what your strongest personality traits are can influence how you respond to certain situations, your career path, and even personal relationships. The focus of this study is to determine if there is a correlation between family structure and an individual's prominent personality traits. The hypothesis for this study is that there is a significant relationship between family structure and personality.

STUDENT INDEX

A

Jehad **Abourahma** 8, 55

Meganne **Adams** 5, 30

Mark **Adams** 5, 35

Ryan **Allen** 7, 44

Hunter **Anderson** 4, 99

Tyler **Anderson** 6, 77

Kasie **Anderson** 4, 108

Jantz **Arbon** 7, 85

Arusa **Ashfaq** 6, 56, 63

B

Sabrina **Badali** 4, 99, 100, 101

Meg **Baker** 6, 59

Madison **Ballif** 6, 57

Michael **Ballif** 9, 102

Haley **Ballou** 5, 29

Amy **Barrett** 7, 53

Heather **Barton** 6, 58

Brad **Beckman** 4, 38

Amber **Bell** 6, 72

Kristen **Benedict** 7, 51

Rachel L. **Berghout** 4, 37

Grace **Bingham** 5, 29

Julia **Blumenstein** 4, 103, 123

Hyrum **Briscoe** 6, 73

Jared **Brooks** 5, 29

Kailee **Brown** 4, 105

Brindle **Brundage** 5, 16

Parker **Burrows** 6, 58

Hailey **Burton** 4, 105

Lisa **Busby** 4, 119

C

Dawnelle **Call** 5, 30

Tiffany **Campbell** 5, 17

Tamara **Cardon** 4, 120

Ashley **Castellanos** 7, 48

Carl **Catalan** 7, 85

Colter **Cederlof** 12, 45

Skyler **Child** 12, 45

Teri **Cisney** 6, 59

Aubrey **Clark** 7, 43

Dallas **Clark** 12, 49

Jessica **Clark** 6, 73

Ryan **Clay** 6, 60

David **Coffman** 6, 61

Carson **Cole** 6, 61

Corey **Collatz** 11, 62

Heather **Couturier** 4, 105

Taylor **Covey** 9, 106

Andrew **Crookston** 9, 107

D

Angie **Davenport** 7, 51

Carson **Davis** 6, 66

Emma **DeGrange** 7, 44

Valorie **Dodart** 4, 108

Ann **Dolling** 7, 44

Rachel **Dubose** 6, 56, 63, 78

E

Caesie **Egbert** 7, 52

Alexis **Elinkowski** 5, 33

Katie **Enright** 7, 51

Kaleb **Eppich** 12, 45

Noah John **Erb** 5, 31

Cheyenne **Espinosa** 5, 18

Garrett **Evans** 7, 85

F

Dalton **Facer** 6, 70

Jordon **Felter** 7, 52

Tanner **Flinders** 9, 109

Alicia **Flynn** 7, 46

Noah **Fowler** 12, 50

Michael **Fowles** 6, 59

Robert **French** 10, 19

G

Benjamin **Gabbert** 4, 110

Dariann **Gallegos** 6, 64

Jess **Gann** 6, 65, 66

Chad **Gardner** 4, 38

Daniel **Garner** 5, 20

Atherton **Green** 6, 67

Ireland **Green** 6, 68

Jacolby **Griffin** 4, 39

Tanner **Grover** 6, 67

Adrienne **Guymon** 7, 43

H

Sabrina **Haney** 6, 69

Bryan **Henrie** 5, 32

Aalyah **Henry** 5, 30

Jacob **Hess** 6, 70

Kyia **Hill** 4, 103

Emily **Hoff** 4, 124

Dana **Hoffman** 6, 71

Hannah **Hoffman** 7, 46

H

Steiner **Houston** 11, 111, 121

Daniel **Hunnell** 12, 47

Jacob **Hutchins** 12, 47

Morgan **Hutchins** 7, 48

J

Melanie **Jackson** 5, 21

Kortney **James** 6, 70

Angela **Jex** 6, 73

Alex **Johnson** 6, 74

Michael **Johnson** 4, 112

Amber **Johnson** 5, 29

Joshua **Jorgensen** 6, 64

K

Emily **Kaemmer** 4, 105

Samuel **Kalis** 8, 75

Tess **Kendall** 4, 101

Caden **Kendell** 12, 47

Connor **Kendrick** 7, 95

John **Kendrick** 7, 85

Macean **Knowlton** 12, 47

Jesse **Kupfer** 7, 94

STUDENT INDEX

L

Lesa **Landrith** 10, 113

Sebastian **Lawson** 12, 49

Amanda **Lee** 7, 48

Matthew **Lefthand** 5, 35

Raquel **Lemos** 4, 121

Evelyn **Linford** 6, 76

Gabriel **Lisonbee** 9, 115

Gideon **Lomiiko** 6, 77

Paula Andrea **Lopez Alvarado**
5, 15

Arianne **Lovell** 5, 30

Suny **Ly** 4, 39

M

Kass **Madsen** 4, 115

Erika **Magana** 7, 46

Joshua **Marchant** 4, 40

Crystal **Marker** 4, 115

Isaac **Martineau** 7, 79

Alexis **Mathews** 7, 80

Kristen **Mayfield** 6, 65

Michael **McColley** 5, 29

Gabriel **McKay** 7, 81

Aulola **Moli** 10, 22

Christopher **Mondaca** 4, 40

Colton **Mooney** 6, 72

Tawnie **Moore** 5, 23

Yavet **Murillo** 4, 116

Tess **Murray** 7, 52

N

Savannah **Nelson** 7, 82

Ezekiel **Newren** 4, 41

O

Jen **O'Leary** 7, 83

Kaitlin **Osborne** 4, 116

Sophie **Overbeck** 7, 84

P

Nicholas **Padilla** 7, 85

Tiffany **Page** 4, 99

Tina **Pastrana** 10, 34

Laura **Pastrana** 4, 10, 105, 117

Giuseppe **Paucarpura** 4, 99, 101

Haley **Pearce** 7, 43

Rosy **Pena** 7, 51

Spencer **Petersen** 74

Makenzie **Peterson** 4, 118

Ashley **Petitta** 5, 33

Mckall **Platt** 7, 48

Hailey **Prestwood** 7, 51

Katie **Price** 7, 46

Natasha **Pruhs** 7, 44

Q

Hayley **Quay** 6, 77

Katherine **Quigley** 11, 95

R

Jaci **Randall** 7, 53

Alyson **Rasmussen**
10, 34, 117

Benjamin **Reading** 5, 24

Joanna **Reeder** 4, 99

Tara **Reynolds** 5, 27

Tadiana **Richter** 4, 119

Margarita **Rodriguez** 4, 110

Thomas **Ruffing** 7, 86

S

Jesus **Saavedra** 4, 123

Rosemary **Sage** 4, 123

Monika **Sahleen** 4, 101, 120

Orlando **Salas** 4, 39

Philip **Sandgren** 6, 73

Andrew **Sandoval** 6, 58

Danielle **Saxer** 6, 73

Francesco **Sechi** 7

Brenon **Severe** 7, 87

Savannah **Shapiro** 5, 32

Hayden **Sharp** 7, 87

Nicholas **Shaw** 6, 59

John **Simmons** 4, 123

Ammon **Smart** 8, 91

Brittany **Smith** 7, 52

Madison **Smith** 7, 53

Amber **Smith** 8, 91

BreeAnn **Sonoda** 5, 32

Kendra **Spomer** 4, 125

Emily **States** 6

Savannah **Stokes** 6, 77

Carrie **Stone** 11, 111, 121

Dezmond **Swai** 6, 7, 60, 88

T

Emily **Tanner** 4, 122

Karma **Thomas** 7, 89

Courtney **Thomas** 7, 95

Kuyler **Thompson** 7, 90

Jared **Thompson** 7, 82

Sherie **Thornton** 8, 91

Samantha **Tibbets** 4, 123

Barbara **Trask** 6, 70

V

Hugo **Valle** 37

Brock **Vance** 7, 92

Ashley **Vandenberg** 5, 35

W

Regina **Ward** 4, 116

John R. **Warens** 4, 37

Marlise **Weyburn** 8, 93

Ashlyn **Winmill** 7, 43

Natalie **Wood** 7, 53

Shelly **Wood** 7, 53

Boston **Workman** 8, 93

Jayson **Workman** 7, 94

Y

Serena **Young** 7, 96

MENTOR INDEX

A

David **Aguilar-Alvarez** 33

Michael **Ault** 21, 22

B

Todd **Baird** 110

Kendal **Beazer** 45

Dan **Bedford** 105

Shawn **Broderick** 93

Brandon **Burnett** 55, 58, 87

C

John **Cavitt** 27

Heather **Chapman** 104, 108, 112,
115, 116, 119, 122, 125

Brian **Chung** 56, 57, 63, 78

Jonathan **Clark** 69

Michele **Culumber** 79, 81, 84, 91

D

Matthew **Domek** 64, 66

Charles Ryan **Dunn** 35

F

Kyle **Feuz** 41

Richard **Ford** 86

Carie **Frantz** 60, 65, 73, 88, 90

G

Conrad **Gabler** 31

Hailey **Gillen Hoke** 15

Jessica **Greenberg** 17

H

Sue **Harley** 76

Teri **Henke** 29

Michael **Hernandez** 59

Sarah **Herrmann** 99, 120, 122

Timothy **Herzog** 67

Todd **Hillhouse** 118

Christopher **Hoagstrom**
72, 77, 83, 85

Joe **Horvat** 110

Daniel **Hubler** 30, 32, 35

J

Justin **Jackson** 40

Todd **Johnson** 82

K

Kerry **Kennedy** 111

Jennifer **Kokai** 19

L

William **Lorowitz** 75

M

Kathryn **MacKay** 107

Cade **Mansfield** 103

Susan **Matt** 109, 113

Marek **Matyjasik** 59

Erin **May** 12, 50

Frances **McConaughy**
43, 44, 46, 48, 51, 52, 53

Shannon **McGillivray**
99, 100, 101, 120, 123

Ron **Meyers** 80, 89

Scott **Moore** 70

MaryAnn **Moss** 112

John **Mull** 92

N

Suketu **Naik** 38, 39

Dhanya **Nair** 39

Karen **Nakaoka** 91, 94

Matthew **Nicholaou** 47, 49, 50

O

Craig **Oberg** 68, 71, 79, 81

Michael **Olpin** 23

Robert **Okazaki** 63, 78

P

Pamela **Payne** 29, 34, 117

R

Kristin **Rabosky** 62

Jeffrey **Richey** 107

S

Shane **Schvaneveldt** 27

Gina **Shelley** 18

John E. **Sohl** 37

Mohammad **Sondossi** 57

W

Monica **Williams** 111, 121

Stephanie **Wolfe** 102, 106

Z

Catherine **Zublin** 16, 17, 24