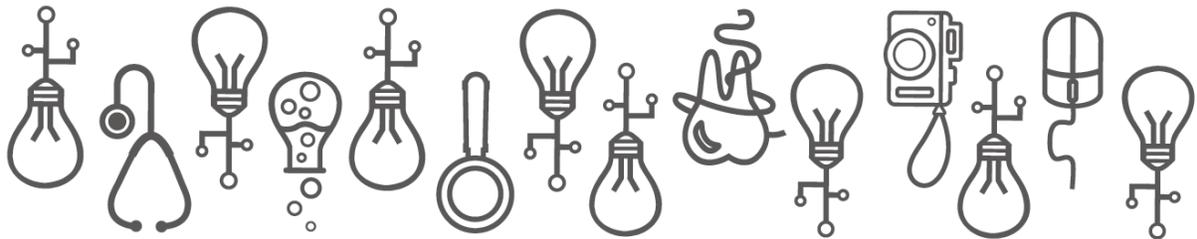


12TH ANNUAL UNDERGRADUATE RESEARCH SYMPOSIUM & CELEBRATION



Welcome

On behalf of the Office of Undergraduate Research, welcome to Weber State University's **12th 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



WEBER STATE UNIVERSITY

Office of Undergraduate Research

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

Charles w. & Joan J. Odd

Corene & Calvin Lasson

Dawn T. Newey

Gloria z. Wurst

Jodi L. Smith

Karla Jensen

Matthew S. & Heather C. Jensen

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Richard F., II & Karen W. Fairbanks

Stephen & Susan Denkers Family Foundation Trust

Yaeko K. Bryner in memory of Dale W. Bryner

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9:00 AM - 11:00 AM | Registration

Check-in and registration for Symposium participants.

Shepherd Union Building, Ballrooms

10:00 AM - 11:30 AM | Oral Session 1

Shepherd Union Building, Third Floor

11:00 AM - 12:00 PM | Poster Session 1

Light Refreshments will be served.

Shepherd Union Building, Atrium

12:00 PM - 1:00 PM | Student & Mentor Luncheon

Presentations:

Outstanding Mentor Award

Outstanding Student Researcher Award

Faculty & Student Sustainability Research Award

Shepherd Union Building, Ballroom A

1:15 PM - 2:15 PM | Performing Arts

Shepherd Union Building, Ballroom C

1:15 PM - 2:30 PM | Oral Session 2

Shepherd Union Building, Third Floor

3:00 PM - 4:00 PM | Poster Session 2

Light refreshments will be served.

Shepherd Union Building, Atrium

Poster Display Listing

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Hair and Makeup Designer for Arcadia

1 Gary Duran

Restrict Sex Offenders, but not Too Much: Restrictions on Symbolic Sex Offender Laws in Nebraska

2 Shanalyn Wheeler

Early Intervention Effectiveness in Promoting Long Term Educational Success of Children from Rural Utah Families

3 Jamie Stokes

The Compulsory Cure? Competing Values in the Attempt to Raise Voter Turnout

4 Zachery Venstra

Do the "Nones" Matter

5 Blake Tubbs

Perceptions of Bullying: Connecting Elementary Students, Teachers, and Administrators

6 Emma Mark

Introverts and Extraverts' Physiological and Behavioral Responses to Aggression

7 Parker Hughes

Self-Compassion and its Effects on Stress Response

8 Cassity Haverkamp

Actual and Perceived Effectiveness of Mnemonics among Traditional and Non-Traditional Students

9 Sandralee Dansie

Who Knows What Little Red Riding Hood Believes and Feels?

10 Eryberto Martinez

Genetic Differences in the Serotonin Transporter Gene and Oxytocin Receptor Gene and Their Association with Emotional Sensitivity

11 Chase Brower

Physiological Measures and Genetic Predictors of Empathy

12 Andrea Lauritzen

Exploring Factors Linked to Dating Expectations and Satisfaction

13 Cassie Decker

Exploring Parental Antecedents of Bullying and Victimization

14 Courtney Call

Understanding the Impact of Effective Communication on Family Cohesion

15 Alyson Bradbury

Parent-child Relationship and the Impact on Juvenile Delinquency

16 Sydney Bowman

Exploring Parenting Influences on Adult Child Outcome: A Self-Reflection Study

17 Kristen Stone

Memories of Bullying: A Qualitative Exploration of Reflections by Adults

18 Jennifer Ghan

Similarity and Difference in Individual Perception of Spiritual and Religious Beliefs: A Qualitative Pilot Study

19 Amy Summers

Changing Perspectives of Preservice Educators Through Service Learning: Juvenile Detention Center

20 Brigitte Hunter

Super Hero Social Skills

21 Ming Ge

Does Legalized Same-sex Marriage Improve Marital Stability?

22 Michael Rodgers

Sexual Orientation Based Wage Discrimination in the Utah Labor Market

23 Kurt Kunzler

The Effect of Financial Literacy and Payday Loan Usage

24 Casey Stratton

Organizational Culture and the Effect it has on Employee Satisfaction and Customer Care

25 Alex Thedell

Smokey Joe's Cafe: Projection Design

26 Jazmine Thompson

Exploring the Evolution of the "N" word: Is its Degradation Deceasing?

27 Abigail Payne

"The Mountains are Calling and I Must Go": Weber State University Professor's Experiences in Nature

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Almost, Maine Sound Design

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Arcadia

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Oral Presentation & Performance Schedule

Session 1

Room 312

Room 316

Ballroom C

10:00 AM

Landon Foulger

Effects of Various Chalcone's on Cancer Cells

Chandler Copenhaver

Developing the Warrior Within

10:15 AM

Beck Nelson

Effectiveness of Vacuum Cleaners on Removing Microorganisms from Household Surfaces

Jennifer Murphy

Changing Attitudes about Harm Reduction

10:30 AM

Brent Nelson

Classification of Bacteriophage Isolated from the Great Salt Lake using Electron Microscopy

Mathew Walker

Transforming Utah: Focusing on How Transgender Persons Negotiate Their Identities

Daniel Hayward

Analysis Of Urinary Biomarkers in the Diagnosis of Depression

10:45 AM

Kyle Spainhower

Fiber Type Distribution and Tail Muscle Function in Birds

Skyler Pyle

The Mineral Spring Tourism Boom in North America

Claudemir Lima

Role of Type 3 Deiodinase in Idiopathic Epileptic Patients

11:00 AM

Deseret Liu

Examining Nitrosamines in the Potable Water of Ketchikan, Alaska

Hailey Hanson

Developing a Methodology for the Use of Lighter-Than-Air Platforms

Brody Barney

F508 Deletion Mutation in Patients Diagnosed With IBS and Asthma

11:15 AM

Drew Hodge

Perceptions of Public Land Management in Utah

Maikie Sengdeng

Intrinsic Factor Inhibition Due to the Use of Isotretinoin

Oral Presentation & Performance Schedule

Session 2

Room 312

Ballroom C

1:15 PM

Daniel Weller

A Patriotic Duty: John Sherman's Efforts to Preserve the Union

Ling-Yu Lee

Music Teacher National Association Young Artist Piano Competition- Southwest Division

1:30 PM

Christina Summers

UFOs in Post War America: An Alien Viewpoint of Utah

1:45 PM

Skyler Pyle

The Commodification of Water and Leisure at North America's Mineral Springs

Seth Foster

Irene Ryan

2:00 PM

Brian Whitney

Mormonism and the Progressive Era: Urban Housekeeping, 1918-1930

2:15 PM

David Sleight

A Walk in Someone Else's Shoes: Empathy through Embodiment

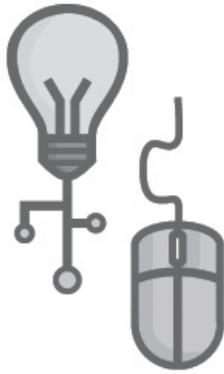
Shi Pong Lee

Young Artist String Competition Southwest Division

2:30 PM

Candace Horne

Can Love Make Your Worries Disappear?



College of Engineering, Applied Science & Technology

Project topics in this section include: Electrical Engineering, and Engineering Technology.

Solar Tracker

Authors Kirk Carter
Steffan Voet

Mentor Chris Trampel

Poster Display 42
Electrical Engineering

Solar tracking is a project whose purpose is to design a system that optimizes the amount of power absorbed from solar panels by rotating them to be perpendicular to the sun. Having the panels be perpendicular to the sun will increase the amount of surface area that will have direct sunlight hitting it and therefore increase the amount of power absorbed. The goals that will be accomplished are the design of the for-mentioned system to track the sun using photo sensors, a micro controller and DC motors. We have implemented our solution by using a feedback controls approach, by creating a digital PID controller.

Remote Operating Sensor System (EVAN)

Authors Ross Frazier
Evan Chief

Mentor Justin Jackson

Poster Display 41
Electrical Engineering

In today's world, technology is becoming wireless. Companies have been providing this technology to homes. These technologies usually allow lighting and temperature to be monitored and controlled wirelessly. However, they have failed to create an all in one device that can simultaneously monitor and control these utilities. In addition, the sensors that are typically used do not communicate to one another to optimize power efficiency of the home. This project will utilize sensors, wireless communication, and computer programming to create an all in one device. The temperature, light, and motion sensors will collect data from the house and then transmit the data wirelessly to a person's phone to be monitored. From the phone, the user will then be able to adjust the utilities of their home using a single application. This application will be designed by using an objective=c language in xCode or enabling the webpage to be mobile friendly. xCode is a development tool to create applications. In addition to creating an all in one device, motion sensors will communicate with the lighting control to turn on and off lights as one moves throughout the house to optimize power efficiency. The poster presentation will include design layout, schematics, and a basic prototype of the remote operating sensor system.

Mobile Elemental Power Plant II (MEPPII)

Authors John Garrett
Brad Richey
Mentor Julie McCulley

Poster Display 44
Engineering Technology

The Mobile Elemental Power Plant II (MEPP II) is an on-going research project to obtain and analyze the generation and consumption of electrical power through portable power plants. This research will show how accessible electrical power can be used by obtaining and storing solar energy into portable power plants with deep-cycle batteries. MEPP II is being researched on how much electrical power is being generated and consumed on a daily basis. Research and observation will be conducted to ensure how much electrical power is being generated and consumed during the different seasons of the year. This will determine the maximum power MEPP II can provide for storage throughout the year. Hardware and software programs such as LabVIEW, will record the necessary power measurements needed to make a full analysis of the generation and consumption of electrical power. This analysis will be collected to help provide possibilities of using solar energy as good source of renewable energy for personal, economical, commercial, and natural disaster relief use. In addition, a Solar PV array mounting system will be designed, developed, and fabricated to make MEPP II more user-friendly. The mounting system will enable for a quick and precise set-up to gather more solar energy.

ASARDS

Authors Trinh Huynh
Bryan Duquette
Thao Huynh
Mentor Chris Trampel

Poster Display 45
Electrical Engineering

We are building, testing, and deploying Aquatic Sensors and Remote Data Stations (ASARDS) to study the water in the Ogden River. The ASARDS system will collect data in real time and extend the iUTAH sensor network. Our research is focused on the development of an open-source, low-cost, low-power underwater communication system (Figure 1). An in situ sensor is connected to a microcontroller that performs an analog-to-digital (A/D) conversion. The microcontroller converts the information from the sensor into a data packet that is converted to an analog signal and transmitted using a transducer. We plan to implement a Frequency Shift Keying (FSK) communication protocol. The receiving hydrophone is connected to a second microcontroller that reconstructs the transmitted data packet. The data is processed and finally transmitted to a smartphone using the Bluetooth wireless protocol. Our initial work will focus on the design and construction of an acoustic modulator-demodulator (MODEM) that uses sound waves in place of electromagnetic waves to communicate between the transmitter and receiver. The acoustic MODEM is necessary for long-distance communication as gigahertz (GHz) frequency electromagnetic energy is rapidly converted to heat underwater.

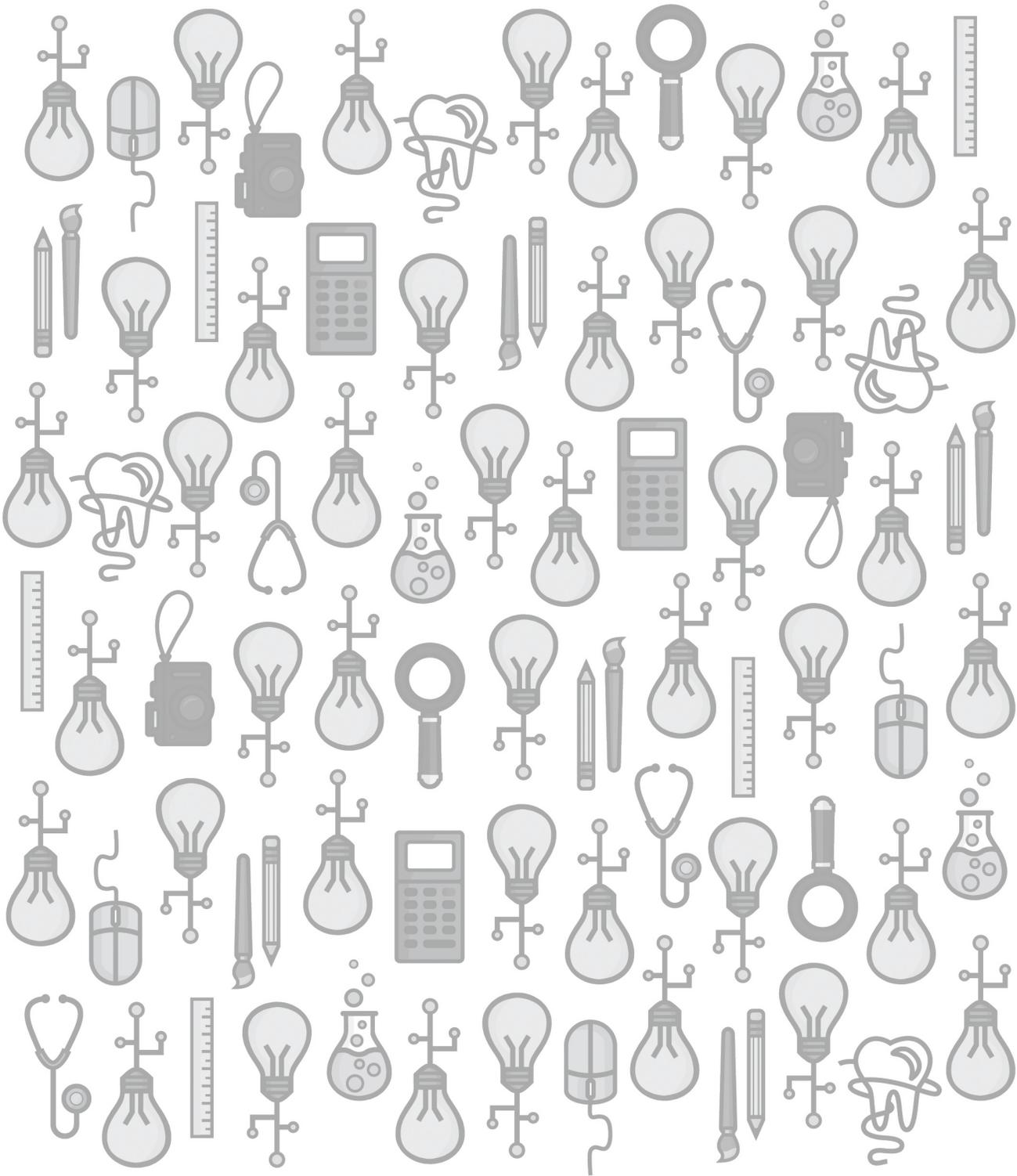
Robotic Welding Safety

Authors Nolan Sprosty
Keltson Cummings
Ashley Fern
Eric Hughes
Steven Perez
Tad Shepherd

Mentor Andrew Deceuster

Poster Display 43
Engineering Technology

Robotic welding is becoming more common in today's manufacturing environments. The United States Occupational Safety and Health Administration (OSHA) as well as the American Welding Society (AWS) have required safety devices on these robots to ensure the safety of employees working around the robots. The purpose of this project is to look at how quickly these safety devices can stop the robot as well as see how these can affect the productivity rate of the robot.





Telitha E. Lindquist College of Arts & Humanities

Project topics in this section include: Communications, English, Music, Performing Arts, and Theatre.

Irene Ryan

Author Seth Foster
Elizabeth Hernandez
Mentor Jennifer Kokai

Performance
Theatre

I have been selected as a nominee for the Irene Ryan Scholarship Competition for my performance as Gus/Augustus Coverly in Arcadia. This competition will aid immensely in my growth as an artist, as it will require me to work independently to select and prepare material to perform at the Kennedy Center American College Theatre Festival. I will exercise discipline and dedication so that I may best represent WSU. At the festival, I will perform for a variety of theatre artists, including undergraduate students and professionals. Watching other competitors will be a valuable experience, as it will help me discover what works well in an audition setting. Because the competition takes place in Hawaii, I requested, and received, funding for my airfare and festival registration.

Martin Luther and Charmed: Luther's Beliefs and the Sister Witches

Author Maria Georgiou
Mentor Scott Rogers

Oral Presentation
English

Martin Luther believed that "it is commonly the nature of women to be timid and to be afraid of everything. This is why they busy themselves so much with witchcraft and superstition" ("Luther on Women" 232). In Early Modern Europe, witchcraft was believed to be real. Luther believed that women were more likely to be tempted towards the devil, but their reasons as to why varied. Luther's misogynistic beliefs of women lured him towards believing that women were more susceptible towards witchcraft. His beliefs on women and their susceptibility helped create a profile for what constituted a witch in the 16th century. Luther incorporated his own views of women and the stereotypes of a witch found in the Malleus Maleficarum and other famous treatises of the time to construct what he believed to be the modern witch. Luther's opinion of women and witchcraft can still be seen today in the television show Charmed. Throughout Charmed, three sister witches, Prue (Later Paige), Piper, and Phoebe, are often emotional, even when they have full control of their powers. Their emotions get the best of them, tempting them into using their powers for personal gain, and even turning them into other mystical beings. In this paper I will indicate how Martin Luther's views on witchcraft can be seen in the '90's television show, Charmed. Luther's claims that women are more susceptible to witchcraft because they are overly emotional and weak and women can choose to become witches are all portrayed by the sisters.

Hair and Makeup Designer for Arcadia

Author Colton Hattabaugh

Mentor Catherine Zublin

Jean Louise England

Poster Display 0
Theatre Arts

I was the hair and make-up designer for Weber State University's production of "Arcadia" written by Tom Stoppard. My goal as a designer was to help create the world of the play envisioned by the playwright. The play took place in two distinct time periods: the early 1800s and the present day. As I worked closely with the costume designer I was able to accomplish my design project of bringing the characters to life through my artistic ideas and by providing historical research. The opportunity to design was offered to me after excelling in a stage make-up course at WSU where I learned techniques of make-up and hair. Designing for a main stage show was an exciting and educational experience in which I learned to collaborate with a production team and challenge my creative skills.

Stage Management for Smokey Joe's Cafe

Author Korey Lamb

Mentor Catherine Zublin

Poster Display 36
Theatre

While serving as stage manager for Smokey Joe's Café throughout the rehearsal process I work closely with the director. Together, provide everyone with the tools needed for rehearsals. I find that the most effective means for this is being an active participant in the scheduling and progression. I achieve my goals by having my prompt script in order, being aware of what the director wants to accomplish, arriving early, and providing the cast with sufficient scheduling and rehearsal schedules in advance. Even with planning, problems still arise that could not be anticipated. Being flexible, task oriented, and a problem solver are skills that I utilize to solve the problems as quickly and painlessly as possible. When a more difficult situation arises I approach the situation as levelheaded as possible. When our production reaches performance, I take over the reins of the project, giving care to remember that continued communication with the director and production staff is vital. As a stage manager, I affirm that positivity breeds productivity. Maintaining a positive attitude in spite of setbacks, or any troubles can significantly contribute to a successful theatre experience for all involved. I believe that the success and happiness of the company is dependent on the stage manager and their attitude, so if the stage manager cracks it can make the entire company suffer. My goal is to remain as positive as possible, while still maintaining control over the show and expecting professional behavior from my cast and crew. Dependability is important in all situations. I do what I say I'm going to do, and I am where I say I'm going to be, even if honoring these later becomes less convenient. I know that my cast, crew, directors, and design team have come to trust me when I say I will take care of something. My passion resides in stage management and I will do what is necessary to achieve my goals.

**Music Teacher National Association
Young Artist Piano Competition -
Southwest Division**

Author Ling-Yu Lee

Mentor Yu-Jane Yang

Performance
Performing Arts

My name is Ling-Yu Lee, a WSU senior majoring in piano performance. On November 7th, 2015 I participated in the Music Teacher National Association (MTNA) Steinway Young Artist State of Utah Collegiate Piano Competition and won the first place. As a winner of the MTNA State of Utah Piano competition, I have been asked to represent Utah and Weber State University to compete in the MTNA Southwest Division Competition, which will be held at Tempe, Arizona from January 8th to 11th of 2016. I will be performing a program of 40-minute repertoire including pieces written by composers from various time period including Bach, Beethoven, Chopin, and Balakirev. This proposal seeds fund for the soloist, me, Ling-Yu Lee to participate in the Southwest Division Competition of MTNA Young Artist Piano competition. It is my honor to represent Weber State University to compete in the division competition in Arizona.

**Young Artist String Competition
Southwest Division**

Author Shi Pong Lee

Mentor Shi-Hwa Wang

Performance
Music

First of all, I feel honored to represent Weber State University to compete with other state winners. This is a rare experience to listen to other winners and also gain knowledge from the opinion that the judges has given to me. I tried my best and got second place in the southwest division. I got full support from my school and teachers, who travelled with me to Arizona and gave me valuable comments to prepare for the competition. I feel glad and thankful about what the undergraduate research project has supported me during this trip. As the concertmaster in the Orchestra, I will teach my peers about the knowledge that I learnt from professionals.

Almost, Maine Sound Design**Author** Lydia Oliverson**Mentor** Catherine Zublin**Poster Display 28****Performing Arts**

One of the main priorities of my education is to take what I learn from my university classes and apply it as I build my career in the technical theatre field. By working with professors who themselves keep up with the industry standard, I can become a more marketable technician. Encouragement from professors and my own drive to continue learning as much as I can has motivated me to take courses so as to be well-rounded and knowledgeable as I begin to work in the professional field. Composing and sound designing for “Almost, Maine” was a great opportunity to take the specialized knowledge I had gained and produce a design with a collaborate team. The invitation to present at the Kennedy Center American College Theatre Festival is an incredible opportunity to represent Weber State University and the level of excellence expected from its students. It is also a way to network with others in the western United States – connections that will be vital as I move into the professional realm of theatre. This experience will help prime me for success and contribute to my education at Weber State University.

“The Mountains are Calling and I Must Go”: Weber State University Professor’s Experiences in Nature**Author** Abigail Payne**Mentors** Barrett Bonella

Cori Tadehara

Poster Display 27**Communications**

For centuries men and women have fled to the hills for solitude and reprieve from stress and worldly cares. With the growing trend towards urbanization, fewer and fewer people have the opportunity to walk through the woods, much less finding peace in them. However, for many faculty members at Weber State University, spending time in nature has many benefits. In this oral history project, faculty members explore benefits they’ve seen from during their time in nature. After interviews were taken from faculty members, interviews were analyzed using Altas.ti. Some of the major themes that emerged from that analysis include finding solace and healing in nature and the importance of conserving natural resources.

**Associated Actors and
Technicians Presents: 35MM:
A Musical Exhibition**

Authors William Peterson
Mandie Wood Harris
Janessa Richardson
Mentor Jennifer Kokai

Poster Display 31
Performing Arts

Weber State students, as part of a campus group called Associated Actors and Technicians (A.A.T.), produced a play called 35MM: A Musical Exhibition. It is a series of musical vignettes, each of which tell a unique story about life, love, pain, heartbreak, death, and more. The question, then, is how can our production of 35MM through the directing and design process demonstrate the common threads in the human experience that tie humankind together? This production was completed entirely by students along with mentoring from every professor in the Theater Department. Each production team member - director, music director, costume designer, lighting designer, stage manager, sound designer, projections designer, properties designer, and scenic designer - is responsible for his or her own research to complete the production and answer this question. As such, this production is entirely independent research and a creative production. In total, roughly twenty-six students were directly involved in the production side of this creative project, in addition to the hundreds of Weber State students that will attend and learn from this production.

**9 Circles: Lighting Design and the
American College Theatre Festival**

Author William Peterson
Mentor Catherine Zublin

Poster Display 32
Performing Arts

9 Circles, written by Bill Cain, is a play examining the metaphysical journey of one man – Daniel E. Reeves – who has been accused of committing horrendous war crimes during his tour of duty as a soldier in the U.S. Army in the present-day Iraq War conflict. The play examines issues of mental illness among soldiers as we learn of Reeves journey from honorable discharge, arrest, military trial, and subsequent execution. The question, then, is how can I as a lighting designer support the arc of Reeve’s journey from mental static to mental and emotional clarity and help the audience feel these changes? Through purposeful implementation of principles of lighting design – angle, color, intensity, and movement – in coordination with other members of the production team – set, sound, costumes, properties, etc – the audience should subconsciously feel and internalize the arc of Reeves journey and come to a better understanding of the complex nature of soldiers in war, and the issues they face, and the consequences of these actions, which are felt both here in America and abroad.

The Mineral Spring Tourism Boom in North America

Author Skyler Pyle

Mentor Susan Hafen

**Oral Presentation
Communications**

This paper demonstrates how nineteenth century accredited physicians' analyses of mineral spring water legitimized its curative powers, significantly influencing the mineral spring tourism boom in North America. Using primary sources, such as the Boston Globe, *An Analysis of Mineral Waters of Saratoga and Ballston* by John H. Steel (1831), Theodore Dwight's *The Northern Traveler* (1841), and *Poland Spring Centennial: A Souvenir*, an autobiography by Hiram Ricker and Sons (1895), founders of the Poland Spring Empire, the author explains how the mineral spring tourism boom turned rustic operations into burgeoning businesses and brought economic gains and infrastructure to small towns, turning them into thriving metropolises. Spa culture helped shape Americans' desire for leisure and further solidified a capitalistic value system.

Damn Yankees: Dramaturgy & the Kennedy Center American College Theatre Festival

Author Janessa Richardson

Mentor Catherine Zublin
Jennifer Kokai

**Poster Display 30
Performing Arts**

"Damn Yankees" is the story of Joe Boyd, an avid Senators fan who strikes a deal with the devil in order to lead his team in defeating the Yankees and winning the pennant. However, Joe begins to learn that the fame and success he has gained isn't worth losing the life that he left behind. As the dramaturg for the production of "Damn Yankees," it was my job to work with the production team to ensure that the world established by the playwright was accurately understood by the audience. After reading and analyzing the script and score, I did the necessary historical research on topics covered in the play. I then made packets for the production team as well as the actors to help them better understand the history of the time period. This project was a great learning experience for me, in which I had the opportunity to collaborate with a team to create a cohesive final project that could be enjoyed by the audience. I learned to condense and prioritize my research for each individual designer. As a team we were able to bring life to the script, and take the audience on a journey to the 1950's.

Costume Design for Damn Yankee**Author** Katie Rogel**Mentor** Catherine Zublin
Jennifer Kokai**Poster Display 33**
Performing Arts

What is the purpose of an education? My purpose for pursuing an education is to take what I learn and be capable to apply it in reality, to make a career out of gained knowledge. That's what I'm doing here at Weber State University, taking things taught or discussed in a class room and making use of it. After taking classes such as Costume Design and Costume Construction and developing my construction skills by working in the on campus costume studio for two years I had developed skills in Costume Design. Because I had taken the classes and expressed interested I was given the opportunity to try my skills out and go out and develop new skills on my own. Designing the costumes for a main stage show, Damn Yankees was an incredible opportunity to explore my skills and interests. I learned specialized skills, design skills and how to collaborate with a production team to create something to share with the community. I now I want to know how my work and skills I've gained stand up to other designers around the United States. I want to represent Weber State University as a place where students learn can reach their highest level of potential. By taking my work to the Kennedy Center American College Theatre Festival, I can fulfill those goals I've made. Throughout my design process I have learned design and construction skills that are valuable and marketable. In order to reach my full potential with this knowledge I need to be able to present my work. Attending the Kennedy Center American College Theatre Festival will only further my success and education I gain from Weber State University.

Icarus Mother: Kennedy Center for American College Theatre Festival Costume Design**Author** Geoff Rosenberg**Mentor** Catherine Zublin**Poster Display 29**
Performing Arts

"Icarus Mother" is a retelling of the Icarus myth through the eyes of the spectators. It follows five neighborhood friends attending a picnic that later becomes the crash site of a jet plane. During preliminary meetings, my director approached me with the idea of having the show take place in a post-apocalyptic setting. While studying the script, I noted that each character noted being from a different area and had unique attributes throughout the show. In collaborating with the director, we decided to have each character represent a different area from the world in its apocalyptic state. As a design team, we each took that central apocalyptic theme and created a visual environment for audience members to partake in through the actors performance. This project was a great way for me to learn about history as well as design work. It allowed me to explore a new area of creativity and be able to showcase my work In front of other students and employers. I will also have an opportunity to participate in workshops to continue my design understanding. I am excited to be representing Weber State University by presenting my designs at the Kennedy Center American College Theatre Festival. This grant will provide the funds needed for travel and to be a participant in the festival. This will present me with an opportunity to showcase my work with fellow designers from schools all around the western United States and not only learn from their creations as well as participate in workshops.

Organizational Culture and the Effect it has on Employee Satisfaction and Customer Care

Author Casey Stratton
Mentor Susan Hafen

Poster Display 24
Communications

At face value banks appear the same, acting as an intermediary for financial transactions and other services. Since banks are similar, these for-profit organizations depend on customer relationships and support to survive in a competitive economy. Clientele is generated by quality customer service, which in turn depends upon the bank's organizational culture to create and sustain communication practices that are the foundation of service. This study analyzes, contrasts, and compares how two banks' organizational cultures affect customer service and employee satisfaction. Understanding how an organizational culture creates good customer service is more than observing the average happiness quotient of employees. A few select organizational communication components are analyzed in this study. These perspectives include management control, emotionality, system components and networks and the visual environment and aura of the workplace. To this end, I am able to employ auto-ethnographic research for very different banks for which I have been an employee: A large national bank and a small-town, community bank. Along with personal observations are added extensive interviews with seven co-workers. This project details exactly how the organizational culture of the community bank has been able to produce more satisfied employees and customers.

Properties Design for "Smokey Joe's Café"

Author Jessica Sume
Mentor Catherine Zublin

Poster Display 37
Theatre

"Smokey Joe's Café" is a contemporary American musical, celebrating the music of iconic songwriters Jerry Leiber and Mike Stoller. The show is written in a musical revue style, in which the music, rather than a plot, takes the audience on a journey through America's songbook. The show invites older audience members to revisit fond memories associated with this music, while exposing a whole new generation to the music of Leiber and Stoller. As the properties designer, I was responsible for designing, purchasing, and building the objects used by the actors on stage to help move the story forward. This included objects such as suitcases, chairs, glassware, and musical instruments. Early on in the production process, director Jim Christian stated his desire to capture the time period of the late 1950's-early 1960's. He wanted the focus of the show to be the music, and the performers and musicians creating it. Because it moved so quickly from one song to the next, the show needed to have a sleek feel to it, while remaining true to the intended time period. My objective in design was to provide props that were true to the time period, while not pulling focus away from the performers. I did not want the audience to notice the props, rather, I wanted the props to draw the audience's attention to the performers and the music they were creating. I achieved this objective through use of line, color, texture, ornamentation, and style. I was inspired by the clean lines and curves of 1960's modernism. I worked with the costume designer to create a color palette for props that would complement, rather clash with, the actor's costumes and builds. I ultimately chose to use a color palette of muted jewel tones and black. I created contrast in texture through use of both gloss and weathering techniques, as well as minimalistic ornamentation.

Hidden in this Picture Costume Design

Author Tia Taylor

Mentor Catherine Zublin

Poster Display 35
Performing Arts

Furthering my education has always been important to me. Higher education is a way to explore new and wonderful knowledge and opportunities that will open up doors when pursuing interests and career possibilities. The classes I have taken have pushed me to become a better student as well as more prepared for what life will bring after. I have gained and developed a strong set of skills and knowledge that I can draw upon long after leaving Weber State. It was a wonderful opportunity to work as a costume designer for Hidden in this Picture. I was able to apply and strengthen skills in design, work as a part of a production team, to create something to share with the other Weber State students and the community. It was an invaluable opportunity that has assured me that I am capable of taking on an important task and seeing them through to the end. As well as the importance and problem solving and working with others. I will have the opportunity to share my hard work and dedication in being able to represent Weber State University among other designers at the Kennedy Center American College Theatre Festival.

Smokey Joe's Cafe: Projection Design

Author Alex Thedell

Mentors Catherine Zublin
Jessica Greenberg

Poster Display 25
Performing Arts

Smokey Joe's Cafe: Projection Design by Alex Thedell Smokey Joe's Cafe is a musical revue that reflects and transports the audience back to the world of the 1950's. It is a collage of moments or vignettes that are set to some of the most popular and memorable music of the 50's. The characters perform numbers in Act I with a more young and neighborhood feel, but as the show progresses to Act II, there is a more adult and city feel to it. As the projection designer for this production, I was asked to create a spectacle, information to the audience, and moments of beauty. The idea that propelled my design for Smokey Joe's Cafe is that the musical is like a photo album that the characters guide the audience through. With each page turn of the album, the audience finds themselves in a new themed memory of a character(s) past life. I accomplished this challenge by finding images of unknown individuals, mostly teenagers and young adults, during happy moments of their lives and projected these images during show numbers like "In the Neighborhood". However, sometimes storytellers will excite their audience with a little more flair to the story, and this is where I felt projection could reflect that idea. One example was during the number "Trouble", which was themed to fire and ice, I projected onto two screens video backgrounds of fire and ice to give the dance more heat and mystery. From complex green screen filming of video to simple images of post cards from a road trip I feel that this projection design tested my limits and challenged my skills in Multimedia and Theatre Arts.

Exploring the Evolution of the “N” Word: Is Its Degradation Deceasing?

Author Jazmine Thompson

Mentor Anne Bialowas

**Poster Display 26
Communications**

Understanding the contemptuous background it carries, it is safe to say the word nigger holds a dominant ideology as a negative and derogatory word pertaining to black people and culture, and should not be used by anyone, especially White-Americans. This ideology seems to be pretty mainstream; however, it is interesting to see how it affects society. People have different opinions and reactions deriving off of this same ideology. The nonexistence of the word nigger as a norm in American Society seems to be pretty clear, until you analyze the African-American culture. African-Americans have fought long and hard to do away with the association to the word nigger. They hold the rest of society to a standard of enough respect to uphold the dissociation of the word from their culture. Yet, what standard are they truly setting when they frequently use the word amongst themselves? The African-American culture has transformed the word nigger into a slang word known as nigga, giving this word a supposedly different meaning from the word it was derived from. It is often used in the African-American culture as another word for friend, or “homie.” It has become so accepted and common that many other races use it amongst themselves as well. Many years before, this would have been considered absurd and a huge disrespect to the culture, as no one would want to be associated to anything even remotely close to the n word. With this being stated, some people might construct a different ideology stating that as time has passed, the word nigger has evolved, gaining a different meaning, and that it can only demean you by the power and connotation one attaches with it. I plan to analyze these circulating ideologies in hopes to obtain a general culture standpoint in an effort to truly define where society stands on the connotation of the “n” word.

Arcadia

Author Hayden Wadsworth
Mentor Catherine Zublin

Poster Display 34
Performing Arts

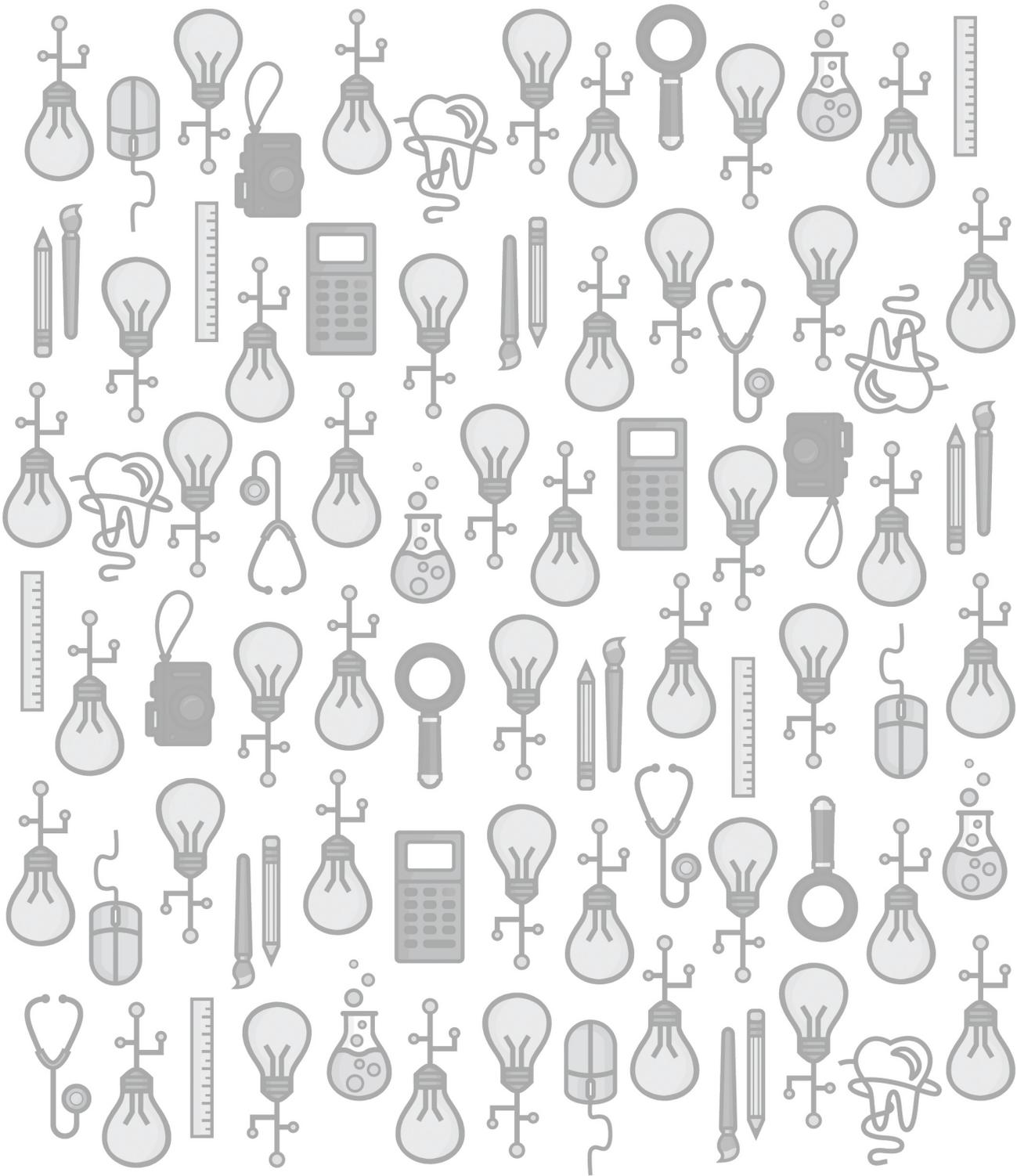
Researching, learning, and growing, these actions take time and patience to perfect. Arcadia is the story of historical researchers set in England studying an old country house in Derbyshire. This country house belongs to the Coverley family. The property has been passed down through generations. Thomasina Coverley a bright, young girl is introduced in the beginning of story at age 12. The time period is 1809. Fast forward to present time, the setting is the same house as in 1809. As we go further Thomasina grows older and the scholars make interesting discoveries. The objectives as a lighting designer for this production, were to create a passage of time for the audience to travel through. This was the primary goal using color to display this time shift. Second was to collaborate with projections at matching the time of day each scene was set. This was also used with color and less sharp shadow during the scenes in the nighttime. Lastly to create the in home environment of an 1800's house with no electricity. For warmth and light in 1809, fire was used. Emulating fire from an imaginary fireplace was the third and final objective. For my design intentions are for the stage to look like old photographic images contrasted with the look of Technicolor. The past being warmer color similar to sepia and the present existing as an opposite, a cool color that reflects the crisp cool look of technicolor. The furniture onstage being the same furniture in both time periods, lighting up the furniture with two lights, one a warm color, and one a cool color with transition from warm to cool, or cool to warm to display the transition from one time period to the next. Finally, at the ending of the story unifying both time periods during a dance for a time out of time sequence with lavender light. Lavender can display both properties of warm and cool. This color emulates the feeling of time out of time with both warm and cool coming together at the end.

Transforming Utah: Focusing on How Transgender Persons Negotiate Their Identities

Author Mathew Walker
Mentor Colleen Packer

Oral Presentation
Communications

Although positive views on transgender persons have increased, many transgender persons still must fight for acceptance. Through a thematic content analysis of three personal interviews, three published interviews, and two published narratives, this study examines the conversation of Utahans who have come out as transgender. Research suggests that a transgender person either feels the need to "pass" as male or female or identifies within a societal construct of gender outside the male/female dichotomy (Roen, 2001). This study uses Transgender Theory as a theoretical foundation to analyze the acceptance of transgender persons across different stages of transition – from those who have chosen not to transition to those who have completed the transition process. The major theme that emerged from the data was that transgender self-identification influences acceptance levels from other transgender and non-transgender people. Results suggest that transgender people who attempt to "pass" as male or female experience stronger acceptance from non-transgender persons than the transgender people who identify themselves outside of the male/female binary. This information can be important to transgender people as they strive for acceptance and negotiate their identities in a conservative Utah culture.





Bachelor of Integrated Studies

Project topics in this section include: Child & Family Studies, Health Promotion & Human Performance, Psychology, and Social Work.

A Picture is Worth a Thousand Words: Understanding Youth Experience of Nature Using Photovoice

Author Stacie Baker
Mentor Cass Morgan

Poster Display 38
Health Promotion & Human Performance

Research has shown that time spent in nature aids in short and long term physical, mental, cognitive, and socio-emotional health and development in youth (Mainella, Agate & Clark, 2011). Despite these benefits youth are increasingly disconnecting from the natural world (National Wildlife Federation, 2010). Summer camps, however, can serve as an important environment where youth can experience and 'connect' to nature (Dressner & Gill, 2010; Schmillen & Jacobs, 2011). Yet, little is known about how youth view and experience nature at camp and the specific aspects of the outdoor environment that affect a campers' experience in nature. Understanding the aspects of nature that campers may enjoy or find unpleasant is useful to create positive changes in camp programming that facilitate a connection rather than a disconnection to nature. This study used a photovoice method to better understand the aspects of the camp environment that contributed to the campers experience in nature. The campers identified specific natural camp features that contributed to their overall experience. They were able to express their positive and negative feelings, as well as express their desire to spend more time in structured and unstructured outdoor activities. Campers also indicated their awareness of the effects of technology in their everyday lives. The findings from this study illustrate how the natural environment of a camp setting can impact the camper's overall experience and can provide an important context in which campers can benefit from the positive outcomes of being in nature.

Developing the Warrior Within**Author** Chandler Copenhaver**Mentor** Mark Adams**Oral Presentation**
Child & Family Studies

The development of character is crucial for children and adolescents to be productive, competent and successful. The purpose of this study was to determine if an 8 week, after-school program focused on physical and character education exercises, employing a martial art theme, could result in improved areas of behavior and self-perception. Using a pre/post design, participants completed a survey before beginning the 8 week program, that covered multiple areas of self-perception in regards to many areas of their lives. The child sample found that the program did have significant improvement in children's perception of scholastic competence and meaningful improvements physical appearance. There was also significant parental reports of improved behaviour in their children and meaningful perception of this improvement from the children. The adolescent sample found significant improvements to job competence, with meaningful perceived improvements in Behavioral conduct. Lastly, outlined in this study are recommendations of how these findings can be duplicated to enhance the development of programs that are both appealing to children and adolescents, as well as effective in helping them in more comprehensive development.

**Changing Attitudes about
Harm Reduction****Author** Jennifer Murphy**Mentors** Heather Chapman
Aaron Ashley**Oral Presentation**
Psychology, Social Work & Ethnic Studies

Among the array of harms evident in society are the negative consequences associated with drug use, both for drug users and for society as a whole. Despite good intentions backing methods to regulate drug use, it is apparent that current U.S. drug policies are arguably ineffective at decreasing drug use. On the contrary, data shows that illicit drug use is actually increasing. In order to alleviate the damage caused by drug use, harm reduction practices should be considered. Harm reduction is growing from the need for a conscious and deliberate response to substance use other than criminal law enforcement and incarceration. Largely, in the United States, harm reduction practices have been rejected. Much of this rejection stems from a misunderstanding of what harm reduction is and the ways in which it can be, and has been, successfully implemented. In an effort to raise awareness about the benefits of harm reduction, I am creating a website designed to inform and prompt positive conversation about harm reduction, specifically among members politically and socially conservative communities. Embracing harm reduction practices in treatment and prevention is a more compassionate and beneficial model for the drug user, and thereby, for society as well.



John B. Goddard School of Business & Economics

Project topics in this section include: Economics.

Does Legalized Same-sex Marriage Improve Marital Stability?

Author Ming Ge
Mentor Doris Geide-Stevenson

Poster Display 21
Economics

This paper examines whether states that legalized same-sex marriage observe reduced divorce rates and improved marital stability. While several studies have discussed the effects of legalized same-sex marriage, few of them have explored how allowing homosexuals to marry influences marital stability. In this study, the cross-sectional state-level data is collected from 2010 to 2012. A simple hypothesis test for a difference in means suggests that divorce rates are significantly lower in the states allowing same-sex marriage than in the states not allowing it. Then, we control for other determinants of the divorce rate and test for the impact of legalized same-sex marriage by combining these data with year dummies in an OLS regression model. The results reveal that there is no significant correlation between legal recognition of same-sex marriage and divorce rates.

The Effect of Financial Literacy and Payday Loan Usage

Author Kurt Kunzler
Mentor Therese Grijalva

Poster Display 23
Economics

The purpose of this study is to examine the relationship between financial literacy and the use of payday lending services. This question is important because many people throughout the world are becoming victim of these “predatory” loan programs. Typical loans charge an upward of 400% APR for their services and the already financially strapped single mothers taking out these loans (highest demographic) are propelled into an endless debt cycle leading to bankruptcy. An intercept survey method was used to acquire individual data on payday lending use, financial literacy, and other economic and demographic indicators. The survey was conducted outside a discount food market, located within one block of Check City, a popular payday lender. Preliminary results show that payday lending use is inversely related to financial literacy. Further sampling and regression analysis is currently being conducted. This suggests the importance for public offerings of financial literacy courses at community centers or public libraries. If nothing else, the preliminary results confirm the efforts made by the State of Utah for a financial literacy course to be taught in all high schools.

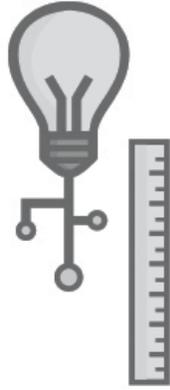
**Sexual Orientation Based
Wage Discrimination in the
Utah Labor Market**

Author Michael Rodgers

Mentor Therese Grijalva

**Poster Display 22
Economics**

Utah has seen a recent rise of support for the LGBT community and much of it stems from Utah business leaders. This makes for an interesting time to study sexual orientation based wage discrimination to see if this support translated into equal wages. Using survey data collected from current students and alumni of Weber State University, this study examines potential wage discrimination caused by sexual orientation in Utah. The discrimination was measured using OLS regression and Oaxaca-Blinder Decomposition. Gay and lesbian students were directly accounted for through self-identification and oversampled due to their small population. The results show that there is no wage discrimination in Utah based upon sexual orientation.



Jerry & Vickie Moyes College of Education

Project topics in this section include: Athletic Therapy, Athletic Training, Child & Family Studies, Nutrition, Special Education, and Teacher Education.

Exploring Parenting Influences on Adult Child Outcome: A Self-Reflection Study

Authors Sydney Bowman
Alyson Bradbury
Mentor Daniel Hubler

Poster Display 16
Child & Family Studies

The relationship shared between a parent and child has a profound effect on the outcomes of the child. This study is a qualitative exploration of 75 respondents who were asked to describe their relationship with their parents along with how their childhood experiences influences who they were as adults. The first question resulted in the general themes of having positive relationship with parents, support relationships, nonexistent relationships, and contentious relationships. For example, the following is a quote supporting the nonexistent theme: "My father was absent much of the time while I was in school but saw him more after they separated." The second question resulted in an overall theme of childhood positively influencing adulthood, parents being healthy examples, emotional issues spilling over, growing up too fast, or not having an impact at all. For example, the following is a quote supporting the positive influence theme: "My childhood experiences greatly influenced who I am today." This is a report of the thematic analyses, describing childhood experiences' influence on adult outcomes, and how relationships with parents become salient to adult experiences. What is remembered about families of origin may have real consequences on adulthood.

Parent-child Relationship and the Impact on Juvenile Delinquency

Authors Alyson Bradbury
Michelle Briseno
Heather Cabrey
Sydney Bowman
Mentor Daniel Hubler

Poster Display 15
Child & Family Studies

Parent-child relationships and child behaviors predict outcomes that range from a healthy adult life, indicated by pro-social behaviors and positive adult relationships, to unhealthy outcomes like alcohol abuse and delinquent behavior. Often these risky behaviors begin during the adolescent years before continuing into adulthood. The following research explored factors that related to risky behaviors during adolescence. In this study 304 participants reported about their relationship with their parents and their behavior during their high school years by asking them to reflect on the childhood. We also asked them to look back on their high school years and describe their delinquent behaviors, alcohol use, drug use, and if they bullied or were bullied themselves. Results indicated a significant and positive association between father's overprotection and respondent's likelihood of bullying ($r(182) = .21, p < .01$). We also found a significant and positive association between levels of bullying and the respondents' levels of antisocial behavior ($r(181) = .37, p < .01$), and binge drinking ($r(182) = .28, p < .01$). These findings provide evidence that there may be a link between mothers caring and overprotection and the children's behavior.

Understanding the Impact of Effective Communication on Family Cohesion

Authors Courtney Call
Nicole Kraemer
Mentor Daniel Hubler

Poster Display 14
Child & Family Studies

The relationships and communication levels that are defined by one's family of origin can be linked to life-satisfaction during the years of adulthood; specifically, communication patterns found in families have an association with family cohesion. It is hypothesized that as effective parent-parent and parent-child communication increases in a family, family cohesion will also increase. This current study surveyed 164 individuals to explore the levels of communication in their family of origin. Participants reflected back on the parent-parent communication, parent-child communication, and the overall family cohesion to see how these experiences impacted their relationship satisfaction. We discovered that both parent-parent and parent-child communication is positively and significantly related to family cohesion in respondents' families of origin. The data also showed that there was a significant, positive correlation between parent-parent communication and parent-child communication. Finally, it was found that cohesion is linked to expressiveness and conflict within the family. The results show the importance of effective communication in the relationships of a family of origin and family cohesion in individuals' life satisfaction.

Correlation of Blood Type to Achilles Tendon Cross Sectional Area Measured via Imaging Ultrasound

Author Desirae Cruse
Mentors Justin Rigby

Poster Display 68
Athletic Training

The purpose of this study was to determine if there is a correlation between the Achilles cross sectional area thickness and blood type. This was a longitudinal study. Participants included division I NCAA cross country athletes (mass= 61.3 ± 20.2 kg, height= 168.9 ± 17.2 , gender= 9 males, 16 females, years of running experience= 6.5 ± 5.5 years, years run collegiately= 2.5 ± 1.5 years). The dependent variable was the Achilles tendon cross sectional area measured by musculoskeletal imaging ultrasound. Repeated measures ANOVA was used to test differences between blood type and the Achilles tendon area changes over a cross country season. There was no difference between blood type and cross sectional area of the Achilles tendon thickness over the course of the cross country season ($P=745$).

Exploring Parental Antecedents of Bullying and Victimization

Author Cassie Decker
Mentor Daniel Hubler

Poster Display 13
Child & Family Studies

For the first research question, we examined the link between parenting dimensions and respondents' bullying activities and victimization experiences. Bivariate correlations indicated that levels of AG were positively and significantly related to levels of bullying activities ($r = .23$, $p < .001$) and levels of victimization experiences ($r = .31$, $p < .001$). Also, high levels of PI were related to lower levels of victimization experiences ($r = -.31$, $p < .001$). Multiple regressions were next computed examining incremental effects of PI and AG on bullying activities and victimization experiences when controlling for age and gender. As indicated in Table 1, both AG and PI were significantly and additively related to victimization, when also controlling for gender and age. Also, AG was significantly related to bullying, when also controlling for gender and age. Finally, gender (0=Male, and 1=Female) was found to be a significant and negative predictor of bullying, showing that females were less likely to become bullies (see Table 1). For the second research question, we tested for differences in bullying or victimization, based on gender. An independent samples t-test indicated no differences in bullying ($t = 1.67$, ns) or victimization ($t = -.35$, ns) based on gender. For the final research question, we ran a bivariate correlation test to identify any potential relationship between respondents' bullying activities and their victimization experiences, and a significant and positive relationship was found between the two factors ($r = .17$, $p < .05$). The results from the study provide support for the idea that parents play an active role in influencing a child's risk for bullying activities and victimization experiences. It also provides further evidence that those who are victims are more likely to become bullies.

A Physiological Comparison of Pickleball and Walking

Authors Tyler Farr
Josh Sonderegger
Mentor Matt Denning

Poster Display 40
Athletic Training & Nutrition

Purpose: To compare the movement requirements between pickleball and walking while using different technologies. **Methods:** 8 novice to intermediate level pickleball players (4 males, 4 females; age = 37 ± 16.5 years, mass = 69.1 ± 14.6 kg; height = 1.73 ± 0.12 m), participated in two data collection sessions (pickleball doubles and walking at a self-selected speed) while steps taken during each activity were measured by three different devices (Hexoskin™, Fitbit HR at dominant ankle, and Fitbit HR at dominant wrist). Each session lasted 30 minutes. An ANOVA was used to determine step differences between sessions and the different devices. **Results:** Steps taken during walking (2649.1 ± 517.0) was significantly greater than steps taken during pickleball (1808.7 ± 622.3 ; $p = 0.004$). Steps reported by the Fitbit HR worn at the ankle (2419.2 ± 563.6) was significantly greater than the steps reported by the Fitbit HR worn at the wrist (2122.4 ± 787.7 ; $p = 0.024$). **Conclusions:** Based on our results, movement requirements are different between walking and playing pickleball doubles. Further, the placement of the Fitbit HR device can influence movement parameters. More research is needed to determine location differences for other physiological and biomechanical variables.

**Similarity and Difference in
Individual Perception of
Spiritual and Religious Beliefs: A
Qualitative Pilot Study**

Author Jennifer Ghan
Mentor Pamela Payne

Poster Display 18
Family Studies

Personal aspects of religion may look similar to the broader notion of spiritual beliefs, but are often informed by doctrine from an organized religious group. By viewing spirituality in a way that encompasses both organized and personalized religious and spiritual beliefs, individuals are allowed to express the ways in which their beliefs exist. The goal of the current study acknowledges the complexity of spiritual beliefs for individuals and couples by allowing participants to define how they see themselves in terms of religion and spirituality.

Super Hero Social Skills

Author Brigitte Hunter
Mentors Shirley Dawson
Patrick Leytham

Poster Display 20
Teacher Education

The Superheroes Social Skills Program is one evidence-based strategy to improve the social performance of children with ASD. This session will report results from a current study to determine the effects of implementing Superheroes with a primary-aged home-schooled child. Results indicate that children who are homeschooled lack the settings conducive to help them acquire these skills. Our findings also indicated that these skills can be learned in different settings by implementing the Superhero Social skills game. The child was able to learn and apply the basic foundations being taught to everyday scenarios. We also introduced social settings once a week to see how successful the student would be once out of their element, in remembering and using the skills that were previously taught. Further research needs to be conducted to determine the success rate of integrating previously homeschooled children into classroom environments.

Exploring Factors Linked to Dating Expectations and Satisfaction

Author Andrea Lauritzen
Misty Johnson
Mentor Daniel Hubler
Mark Adams

Poster Display 12
Child & Family Studies

Exploring mate selection has been a challenging area of research in the field of relationship science, especially with the advent of new technologies. This can be particularly complex when there are differences in dating experiences and stress levels based on gender, age, religion, and expectations. The current research used data from 310 respondents exploring these differences along with a testing of associations between dating expectations, dating satisfaction, control over one's dating life, and overall stress. Results from independent samples t-tests identified differences in control ($t(303) = 2.66, p < .01$) and dating satisfaction ($t(310) = 2.14, p < .05$) based on gender, with males reporting higher levels of both factors. A bivariate correlations test indicated a significant and positive correlation between a sense of lacking control in the dating process and stress, $r(310) = .12^*, p < .05$. Furthermore, tests indicated a significant and negative association between dating expectations and boundaries, $r(310) = -.12^*, p < .05$. Finally, a negative and significant link was identified between dating satisfaction and stress, $r(310) = .26, p < .001$. The results indicate a need to further explore dating dynamics and consequences for different populations.

The Effect of a Vibration Platform Training Program Versus an Airex Foam Pad Training Program

Authors Zoe Miller
Jennifer Corder
Kayla Cunningham
Mentor Valerie Herzog
Molly Smith

Poster Display 39
Athletic Therapy & Nutrition

Multiple studies have confirmed the importance of sufficient balance in individuals. Balance has been shown to improve neuromuscular coordination, helping to avoid falls and possible injuries. In this study, we examined static lower extremity proprioception and which type of training method may be most effective. We compared the effects of an RS2000 Portable Whole-Body Vibration Platform training program with an Airex Foam Pad training program. Healthy subjects were recruited from classes and posted flyers. Subjects were physically active, between the ages of eighteen and thirty, and did not have chronic ankle instability. Pre-test analysis of single-leg balance was determined by using an AMTI AccuSway Force Plate which evaluated Area 95 (pressure area) and V-Average (reaction time). Subjects performed a set of four tests, two on each limb, for a total testing time of thirty seconds, with one minute of rest in-between testing sessions. Subjects were then randomly assigned a group: control ($n=20$), Vibration Platform training group ($n=20$), or Airex Foam Pad training group ($n=20$). Those in the training groups were asked to participate in observed training sessions using their selected training method, three days a week, for a total training time of five weeks. Those in the control group did not participate in a balance training program. After five weeks, all participants performed a post-test of their single-leg balance. Results are expected to show a significant difference between the control group and those placed in training programs. We further hypothesize a difference between the two training groups. Overall, the study will help to demonstrate that balance can be improved through training. Results from this study will be used to help improve balance training programs by determining which are most effective.

Memories of Bullying: A Qualitative Exploration of Reflections by Adults

Author Kristen Stone
Cassie Decker
Teri Henke

Mentor Daniel Hubler

Poster Display 17
Child & Family Studies

Existing research has shed light on several aspects related to the topic of bullying. This line of research is important because of the negative effects bullying can have on individual health and well-being as well as relationships in the home, school, and work environments. The purpose of this study was to examine personal experiences perceived as bullying and/or victimization. In this study 166 adults were asked to fill out a 37 question survey about bullying, victimization, and parenting factors. Ninety-one respondents answered the open-ended question asking them to describe any experience of being a bully or a victim. The coding process evolved into the following research question: What is important within the descriptions of bullying experiences remembered by adults? In the findings, some important themes stood out. They included: (a) standing up to the bully; (b) a culture of bullying; (c) impact/consequences of bullying; (d) verbal bullying; (e) physical bullying. Findings from this study also indicate that thinking about memories of bullying or victimization can elicit strong emotions, even several years later. Exploring these perceptions of bullying might provide a more nuanced understanding of how bullying experiences impact children and adults.

Changing Perspectives of Preservice Educators Through Service Learning: Juvenile Detention Center

Author Amy Summers
Jordann Tate

Mentors Patrick Leytham
Patrick Leytham

Poster Display 19
Special Education

Service learning in a juvenile detention center is one way in which preservice educators can understand the complex human issues that exist with each student. This study analyzed the experiences of the preservice educators as they tutored and taught self-advocacy to detained youth.

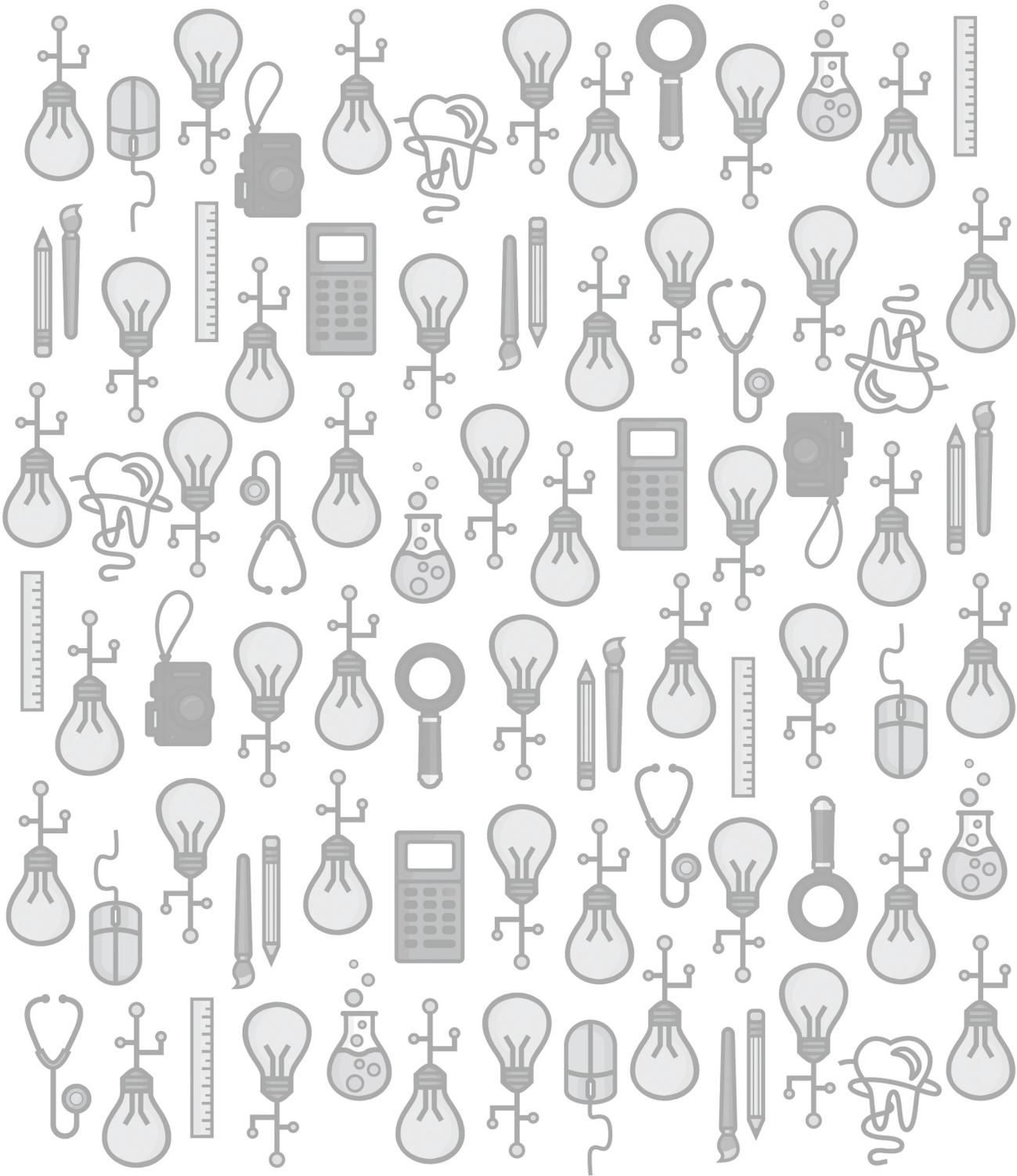
Early Intervention Effectiveness in Promoting Long Term Educational Success of Children from Rural Utah Families

Author Shanalyn Wheeler

Mentor Sheila Anderson

**Poster Display 2
Family Studies**

The purpose of this study was to examine the effectiveness of a Utah early childhood program in promoting child long term language and literacy outcomes into the fifth grade, for children from families with low income. Extant video observation and interview data from the national Early Head Start Research and Evaluation Project Utah site was used for this study (Vogel, Xue, Moiduddin, Carlson, 2010). Participants included 62 families with biological resident fathers from a rural community in Utah. We found that early positive father-child interaction when children were 1-year-old predicted higher language outcomes in 5th grade. Early family conflict predicted lower 5th grade language outcomes, and the intervention showed no effects. Findings suggest that targeting father-child interaction and decreasing family conflict in the homes of young children may be important for intervention programs in promoting children’s long term academic success. WSU students and faculty are currently working on creating an online intervention program to address this need. As funding for the Utah School Readiness Act (Utah School Readiness Initiative, 2014) expands it is important that policy include support for programming that is inclusive of fathers and addresses conflict in the home.





Dr. Ezekiel Dumke College of Health Professions

Project topics in this section include: Dental Hygiene, and Medical Laboratory Science.

Synergistic Effects of Polyoxometalates and Antibiotics Against Antibiotic Resistant Bacteria

Author Candace Adamson
Katie Wilkinson
Tyler Wilkinson

Mentor Matthew Nicolaou

Poster Display 76
Zoology

Methicillin resistant *Staphylococcus aureus* (MRSA), vancomycin resistant *Enterococcus* (VRE), and extended spectrum beta lactamase *Klebsiella pneumoniae* (ESBL) are antibiotic resistant bacteria that have become a major public health concern. These bacteria can cause a variety of serious infections in humans and are very difficult to treat due to their resistance to many antibiotics. Transition metal inorganic compounds known as polyoxometalates (POMs) have been shown to have many biological applications including: antiviral, antitumor, and antibacterial properties. The objective of this study was to determine if two POMs (α -K6P2W18O62 · 14H₂O and K10 [α -P2W17O61] · 20H₂O) could abrogate the resistance of three antibiotic resistant bacteria. These POMs were synthesized and then tested using minimal inhibitory concentration (MIC) panels. Multiple dilutions of antimicrobial drugs and POMs were combined with inoculums of MRSA, VRE, and ESBL to compare the effectiveness of each POM/antimicrobial combination. The POMs enhanced the efficacy of numerous antibiotics for MRSA and VRE but not ESBL. These results will potentially create more treatment options for individuals with antibacterial resistant infections and provide valuable information for other clinical uses.

**F508 Deletion Mutation
in Patients Diagnosed with
IBS and Asthma****Authors** Brody Barney
Aubree Nielsen
Christian Smith**Mentors** Matthew Nicholaou**Oral Presentation**
Medical Laboratory Science

Cystic fibrosis (CF), a genetic disorder, causes thickened secretions in the body. Approximately 70% of CF cases are caused by the F508deletion mutation (rs113993960) in the CFTR gene. People homozygous for the mutation suffer from malabsorption, digestive issues, and pulmonary symptoms. Irritable bowel syndrome (IBS) is the diagnosis for patients experiencing idiopathic disruptions in digestive processes. Asthma also has unknown subset causes. This study will identify the prevalence of rs113993960 in Northern Utah populations diagnosed with IBS and asthma. These researchers theorize that a number of patients with IBS and/or asthma are heterozygous for the mutation. Decreased expression of the CFTR gene could explain the presence of CF-like symptoms in IBS/asthma patients. 250 subjects who have IBS and/or asthmas, plus 50 healthy control will be selected. DNA will be collected by buccal swab and extracted using a DNA extraction kit. A single nucleotide polymorphisms genotyping assay will identify the frequencies of rs113993960 in the participants. This study will find that participants with IBS or asthma have a higher prevalence of mutant alleles compared to healthy controls. Knowing the prevalence of CF mutations in the IBS and asthma populations could impact the treatment of patients with use of CF treatment methods.

Sealant Retention: One Year Evaluation of Sealant Placement in Elementary School Children

Authors Teesha Davis

Stephanie Carranza

Tiana Wolfley

Ashlee Brown

April Rammell

Mentors Frances McConaughy

Stephanie Bossenberger

Poster Display 74

Dental Hygiene

Dental caries is an oral disease that affects children and adolescents, especially in non-fluoridated communities. Dental sealants have been recognized as an effective method to prevent caries in children (Beauchamp, 2008). While dental sealants have traditionally been placed in private practice settings by dental hygienists, not all children and adolescents, especially from low-income families, have access to preventive dental care in that setting. The advent of School-Based Sealant Programs (S-BSP) involving faculty and students in dental hygiene programs have also shown to be effective in providing this preventive care to children. Children that have access to S-BSP are more likely to have dental sealants than their counter-parts at schools without access to S-BSP (Seigal, 2009). The purpose of this project is to evaluate the one-year retention rate of enamel sealants placed in school-age children. The sealants were placed by WSU Dental Hygiene students as part of a School-Based Sealant Program. We expect to find a high retention rate (80% or higher) of enamel sealants. The results will provide valuable information regarding the effectiveness of our School-Based Sealant Program.

Dental Hygienists' Awareness of Celiac Disease

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MiKayla Hawley

Jenessa Lenahan

Karissa Wells

Mentor Frances McConaughy

Shane Perry

Poster Display 75

Dental Hygiene

Celiac disease is an autoimmune disorder triggered by consuming a protein called gluten. Gluten interferes with the absorption of nutrients by damaging the intestinal villi. Accurately diagnosing CD can be complicated as the symptoms often mimic those of other diseases resulting in misdiagnosed or undiagnosed cases (Sewell, 2013). A review of the literature revealed that there is a link between celiac disease and oral manifestations including enamel defects and recurrent aphthous stomatitis. Awareness of these oral conditions and the potential link to celiac disease is important for dental professionals. Using a survey research design, an online questionnaire was developed to assess the knowledge level of dental hygienists regarding celiac disease and its related oral conditions. The results of this project should contribute to the profession and literature regarding celiac disease awareness.

Yoga as a MSD Intervention

Authors Rachel Hansen
Melissa Talbot
Erika Walters
Svetlana Villegas
Tauna Lewis

Mentor Frances McConaughy

Poster Display 73
Dental Hygiene

Musculoskeletal Disorders (MSDs) are a significant occupational issue among Dental Hygienists and recent research suggests that undergraduate students are also prone to MSDs (Hayes et al, 2014). Complementary Alternative Therapy (CAM) approaches to mitigating MSDs, including yoga, have shown to relieve MSD related pain. While some studies have examined CAM therapy among practicing hygienists, no studies have examined the implementation of yoga within the dental hygiene student population. The purpose of this study was to determine if dental hygiene students experience MSD related pain, their current engagement in yoga (formal or informal); and if they would consider regular yoga practice as a MSD intervention. Senior dental hygiene students were surveyed to establish their existing pain (severity and location) and assess their current practices and beliefs regarding yoga exercise. Expectations are that the students will report pain in one or more areas and have positive perceptions regarding regular yoga practice to reduce or relieve MSD related pain. It is also expected that the students will consider adopting yoga as a regular practice intervention to avoid MSDs.

Analysis of Urinary Biomarkers in the Diagnosis of Depression

Authors Daniel Hayward
Jeremy Garcia
Grant Jones

Mentors Ryan Rowe
Lauren Fowler

Oral Presentation
Medical Laboratory Sciences

Currently, there is not an objective diagnostic tool for depression and it is frequently misdiagnosed. The study aims to provide clinical values of key biomarkers that will objectively differentiate between depressed and healthy patients. This study analyzed levels of Brain-Derived Neurotrophic Factor (BDNF), Norepinephrine (NE), and cortisol, found in participant urine. All analytes will be measured with ELISA methods. The Beck depression inventory will be filled out by participant to classify them as depressed or a healthy control. Adult men and women, currently living in the northern Utah area, will comprise the sample of 100 participants. Each participant will submit a first-morning-void urine sample and respond to the standardized demographic questionnaire and inventory. Results will find that patients who identify as depressed will have decreased BDNF and NE levels and increased cortisol levels. These results will also decrease and increase respectively based on severity of depression in the participant. ANOVA ($p=0.05$) will confirm statistical significance between healthy and depressed group results. This study hopes to show that clinical psychologists and psychiatrists can accurately diagnose depression with the aid of an objective assay of BDNF, NE, and cortisol rather than solely interpreting the subjective feelings of their patients.

Role of Type 3 Deiodinase in Idiopathic Epileptic Patients

Authors Claudemir Lima
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Mentors Matthew Nicholaou
Barbara Trask

Oral Presentation
Medical Laboratory Sciences

Type 3 deiodinase (D3) is the main physiological inactivator of thyroid hormones (THs). Studies have shown a correlation between elevated TH levels in epileptic patients. A lack of type 3 deiodinase activity in idiopathic epilepsy explains an excess of thyroid hormone activity that is considered a key factor in this disease. Mutations in the DIO3 gene have shown to cause functionally inactive D3 enzyme. Real-Time polymerase chain reaction (RT-PCR) will be performed on the DIO3 gene on chromosome 14 to detect for Single Nucleotide Polymorphism (SNP) rs945006. TH levels will also be measured from individuals suffering idiopathic epilepsy and individuals without the disease as a control group. Statistical tests will reveal whether there is a correlation between TH levels, and the DIO3 gene mutation. Members of the epileptic group will have the expected mutation on the DIO3 gene compared to the control group. Likewise, members of the epileptic group will have higher levels of THs. These findings will suggest that there is a correlation between the rs945006 and generalized idiopathic epilepsy that may improve treatment of patients.

The Impact of Magnification Loupes on Dental Hygiene Student Posture

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Shane Perry

Poster Display 72
Dental Hygiene

Musculoskeletal disorders (MSDs) are a significant occupational concern for dental hygienists. MSDs are injuries to the body that disrupt the bodies' normal range of motion. For dental professionals, this primarily affects the neck, wrists, and back areas of the body. Most of the research on MSDs has focused on dental practitioners, with less attention on students (Hayes, Smith & Taylor, 2014). While risk factors for MSDs have been identified, there is little consensus on measures to prevent or manage them (McConaughy & Perry, 2016). The use of surgical magnification loupes has been suggested as one way to improve posture and reduce MSDs among dental hygiene students. Due to the limited number of studies that have examined magnification loupes and student posture, the purpose of this study is to examine the effect of magnification loupes on student posture. Senior students, who have used magnification loupes for approximately one year, will be evaluated by faculty members using posture assessment criteria (PAC). The posture assessment criteria indicates whether students are positioned in an "acceptable, compromised or harmful" position during instrumentation with patients. It is hypothesized that students will engage in few "compromised or harmful" positions while being observed by faculty members in a clinical setting.

Ultrasonic Tip Selection

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Kathryn Wright

Mentors Frances McConaughy
Susan Alexander

Poster Display 71
Dental Hygiene

Periodontal debridement is the therapeutic choice or gold standard for treating periodontal disease (Drisko, 2014). Debridement (scaling and root planing) can be accomplished through the mechanical removal of calculus and biofilm and can be achieved through ultrasonic or hand instrumentation. While there is support in the literature for the effectiveness of both approaches, little is known about the actual ultrasonic tip selection process of clinical dental hygienists. Therefore, the purpose of this project was to understand the strategies and variety of ultrasonic tip selection used by dental hygienists in treating patients with periodontal disease. A cross-sectional survey design was used in this study to collect information about ultrasonic tip selection. Respondents included licensed dental hygienists in the State of Utah. It is expected that in spite of the availability of a diverse design of ultrasonic tips for treating periodontal disease, dental hygienists limit the number of ultrasonic tips actually used in the debridement process.

Intrinsic Factor Inhibition Due to the Use of Isotretinoin

Authors Maikie Sengdeng
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Ashley Rogers

Mentor Kenton Cummins

Oral Presentation
Medical Laboratory Sciences

Isotretinoin (commonly known as Accutane) is a therapeutic drug used for the treatment and prevention of severe acne. This drug is known for its ability to treat acne that has not responded to antibiotics. It is known to express both mild and very serious side effects, such as nosebleeds or spontaneous abortions. A previous study done on the effects of isotretinoin concluded that patients taking isotretinoin showed a significantly prolonged partial thromboplastin time (aPTT). aPTT is a timed, clinical test to detect abnormalities in the intrinsic coagulation pathway. An irregular or prolonged aPTT indicates at least one factor deficiency in the intrinsic pathway. We hypothesize isotretinoin inhibits one of these factors, causing prolonged clotting. The objective of this study is to investigate which factor(s) of the pathway is being inhibited. To determine which factor(s) are affected, normal patient plasma will be treated with a standardized concentration of isotretinoin and undergo a factor assay. The factor assay is comprised of reagent factor deficient plasmas, and the treated patient samples will be added to each reagent plasma. The expected results will show a delay in one or more of the deficient plasmas, indicating which factor(s) are arrested in the presence of isotretinoin.

Vaccination Practices Among Dental Hygienists

Authors Allyson Tolboe
Alexandria Horton
Amy Lantz

Mentor Frances McConaughy

**Poster Display 70
Dental Hygiene**

RDH Vaccinations have been recommended for health care workers because of their contact with patients or infective materials from patients (CDC, 2015; MMWR, 1997). There is a large body of evidence supporting the safety and efficacy of vaccinations, but little is known about the actual practices and beliefs of healthcare workers regarding the CDC recommended vaccinations. For example, no literature could be found that reported on the vaccination beliefs and practices of dental professionals, including Dental Hygienists. Because Dental Hygienists primarily focus on oral health and disease prevention, it is appropriate to explore their preventive health practices. Therefore, the purpose of this project is to ascertain vaccination beliefs and practices of Dental Hygienists. One-hundred Dental Hygienists, who are members of their professional organization, were invited to participate in a web-based survey designed to obtain this information. We expect to find that approximately half of practicing Dental Hygienists adhere to CDC guidelines for the recommended vaccinations.

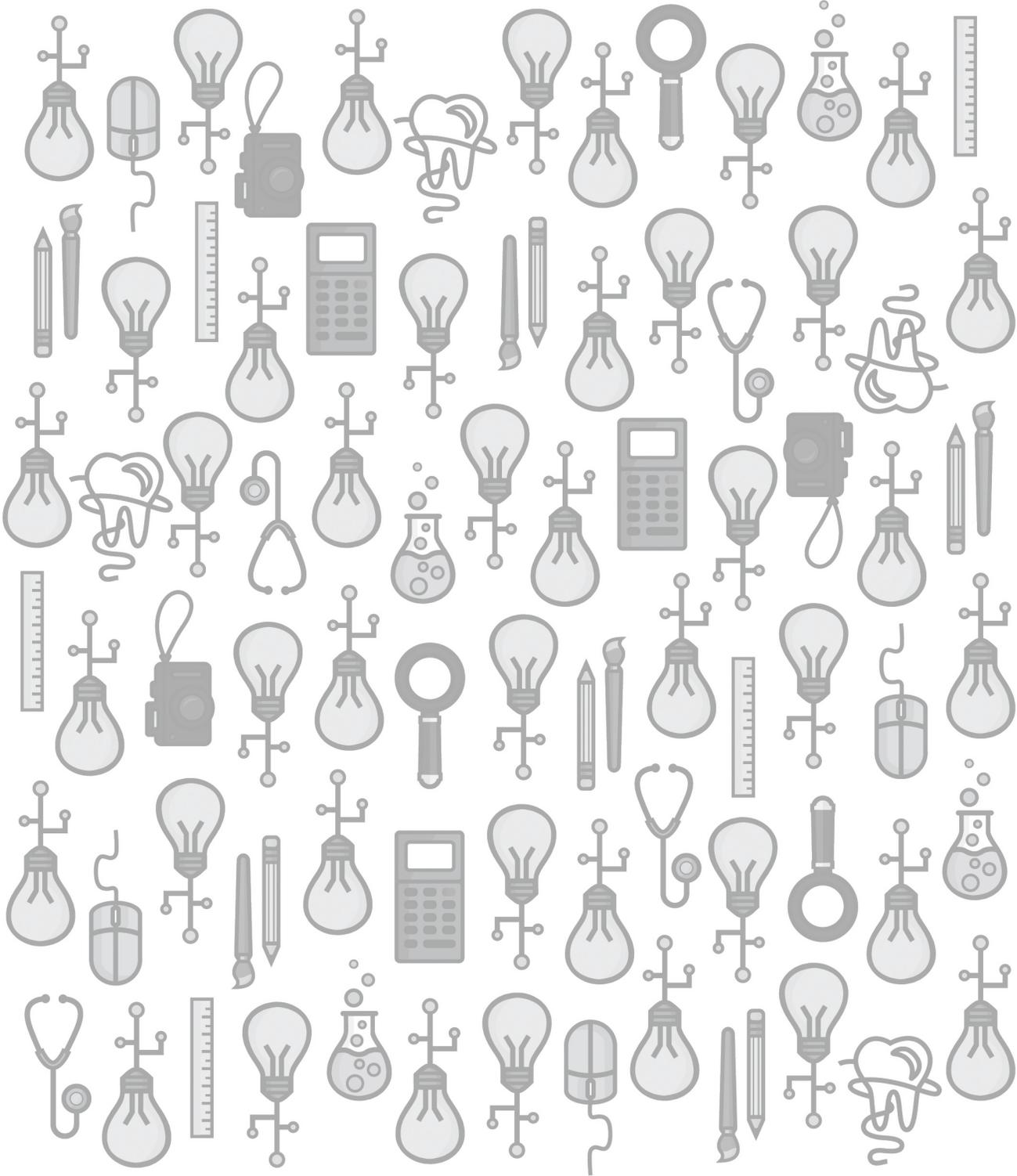
Adult Caries Risk Assessment Practices & Fluoride Varnish Use Among Dental Hygienists

Author Victoria Van Orden
Lara Kennard
Chelsea Black
Toni Terry

Mentor Frances McConaughy

**Poster Display 69
Dental Hygiene**

Dental caries is one of the most prevalent oral health problems in children and adults in the United States. Further, "fluoride products have played an important role in the reduction of caries in the general population" (Eakle, 2004). Although there are many in-office topical fluorides or other technologies that might be used to prevent caries, topical fluoride varnish is currently one of the most popular professionally applied products used in dental practices today. However, there is limited information available in the literature that documents the adult caries risk assessment practices of dental professionals, as recommended by the American Dental Association. Further, there is limited information about the actual frequency of professionally applied fluoride varnish and adult patient acceptance of this product. The purpose of this study was to obtain information, from licensed practicing Dental Hygienists, related to their caries risk assessment practices, the frequency of fluoride varnish use, and actual patient acceptance. One-hundred dental hygienists, who are members of their professional organization, were invited to participate in a web-based survey designed to obtain this information. The results should provide information about the practices of dental professionals in providing preventive care for adults identified at-risk for dental caries.





College of Science

Project topics in this section include: Chemistry, Geosciences, Mathematics, Microbiology, and Zoology.

Reintroduction of Bonneville Cutthroat Trout in Northern Wasatch Front Streams, Utah

Author Tyler Adams
Mentor Christopher Hoagstrom

Poster Display 55
Zoology

The Bonneville Cutthroat Trout (*Oncorhynchus clarki utah*) was once abundant across Utah. Competition and habitat disruption through the late 1800's and early to mid 1900's drastically impacted their populations. Recovery efforts to bolster this native fishes population have had some success since they began in the 1970's. Some of the most recent reintroductions of the species have been in small streams not far from Weber State University campus. As researchers in a Field Zoology course mentored by Dr. Hoagstrom, we sought to examine the success of this reintroduction. We compared established, successful populations of Rainbow Trout (*Oncorhynchus mykiss*) with the recently reintroduced populations in streams of similar size and elevations. We conducted electrofishing surveys in 8 streams; 4 containing rainbow trout, and 4 containing Bonneville cutthroat. Total length and weight measurements were taken of each fish and used to determine relative weight and population density statistics. When these data were compared, we found the cutthroat trout to have an average relative weight similar to that of the rainbow trout. No significant difference was found in population densities, suggesting a positive outlook for future success in these Wasatch Front streams.

Acid and Base Catalyzed Synthesis of Chalcones for Anticancer Properties.

Authors Matthew Bohman
Kimberly Reeder
Mentors Don Davies
Tracy Covey

Poster Display 48
Chemistry

Acid and base catalyzed synthesis of chalcones for their cytotoxic, anticancer properties by aldol condensation reactions is featured. Ten different chalcones of varying purity were produced from various substituted acetophenone and benzaldehyde derivatives. Chalcone identity was confirmed using IR spectroscopy, TLC plate chromatography, and most definitively by Gas Chromatography-Mass Spectrometry. Attempts to purify the chalcones products were difficult due to their inherent insolubility; however, solvation improved when the samples were placed into acetone or DMSO. Cytotoxic activity of the synthesized chalcones is still in the research phase; no definitive relationships have been elucidated.

APEH Enzyme as a Possible Stress Marker, in Correlation with Glycosylated Hemoglobin

Authors Jaclyn Bott
Kyle Palmer
Daniel Chavez

Mentors Matthew Nicholaou
Tracy Covey

Poster Display 49
Chemistry

APEH is an enzyme that belongs to a family of prolyl-oligopeptidases, a group of serine peptidases that hydrolyze peptides up to ~30 amino acids. APEH is involved in cleaving N-acyl peptides to an acyl amino acid and a free N-terminal peptide. While the basic enzymatic function of APEH was described over 40 years ago¹, the physiological role of APEH is a current scientific interest largely due to APEH's association with several types of diseases. However, APEH's role in disease remains unclear. In this study, we aimed to investigate the role of APEH in blood samples to see if it's activity correlates as a possible stress markers. Preliminary studies show an upward correlation with glycosylated Hemoglobin. We would like to further confirm this with a larger sample size.

Determination of Treatments to Reduce Late Gassy Defect in Cheese Due To Lactobacillus Wasatchensis

Author Isaac Bowen
Mentors Craig Oberg
Michele Culumber

Poster Display 52
Microbiology

Lactobacillus wasatchensis WDC04 is a newly discovered lactic acid bacterium, which causes serious commercial losses from bloated cheese packages and textural defects. Experiments were performed to determine its salt tolerance at pH 5.2 and 6.5, resistance to HTST pasteurization, and pH growth range. MRS with 1.5% ribose (MRS-R) was prepared at either pH 5.2 or 6.5 with salt concentrations ranging from 0.0%-10.0%. Two ml of the MRS-R test media was added to each well in a 24 micro-well plate and a pre-inoculated absorbance reading was taken at 600 nm. After, 100 μ L of WDC04 was inoculated into each well, and the plate incubated at 25°C for 3 d (pH 6.5 MRS-R) or 2 d (MRS-R pH 5.2). Plates were placed in a Teacon Infinite 2000 with absorbance readings (A600) taken every 4 h. Results showed WDC04 grew best at 3.0% salt (pH 6.5) and 2.0% salt (pH 5.2) but showed some growth up to 6.0%. Using a narrower salt range (5.25%-6.75%) at pH 6.5 was done to determine if a salt concentration used in cheese could suppress WDC04 growth. Above 6.0% salt, WDC04 was inhibited and ceased to grow. Using the same methodology, the pH range (2-8) for WDC04 was determined. WDC04 grows best at pH 5-6 (cheese pH) but not below pH 4 or above pH 7. WDC04 was heat shocked in a hot water bath at 72°C for 15 sec and plated. With an initial count of 108 CFU/ml, results showed a decrease of 105 CFU/ml in survival of WDC04, indicating WDC04 could be contaminating the cheese by surviving pasteurization. These results suggest using a higher salt/moisture ratio in cheese and increasing pre-pasteurization sanitation to remove biofilms would decrease the likelihood of Lb. wasatchensis WDC04 in ripening cheese, thus, reducing the possibility of late gassy defect.

Acute and Chronic Effects of Selenium on the Brine Shrimp *Artemia franciscana*

Author Jessica deJong
Mentor Nicole Berthelemy

Poster Display 60
Zoology

Selenium, discharged by incoming rivers and local mining operations, accumulates in the terminal Great Salt Lake (GSL). This toxin has been found to cause birth defects in birds and mammals. Previous studies of selenium have focused on bioaccumulation within GSL birds. Therefore, we explored the acute and chronic effects of selenium on the brine shrimp *Artemia franciscana* from the GSL. We exposed larval *Artemia*, hatched from commercially harvested cysts, to various selenium concentrations for 24 hours, to determine doses inducing 100% and 50% (LC50) mortality. We then raised larvae to maturity in non-lethal selenium concentrations, estimating survival and maturation rate, and measuring fertility by counting offspring (cysts or larvae), and noting abnormal or aborted offspring. We assessed physiological stress by examining heat shock protein quantity using western blotting. The 24-h LC50 was 5×10^{-3} g Se/L, much higher than levels measured in the GSL. Maturation rate did not differ between chronic exposure treatments. There did not appear to be a significant difference in fertility when shrimp were raised in 10^{-5} g Se/L, but 10^{-4} g Se/L was lethal to all individuals before reproduction was completed. Heat shock protein Hsp70 seemed to be upregulated by higher selenium concentrations.

Effects of Solvents on Diels-Alder Reaction between Maleic Anhydride and Alpha-Terpinene

Author Landon Foulger
Mentor Don Davies

Poster Display 47
Chemistry

The Diels-Alder reaction, named after the two chemists that discovered it, is the most common method of synthetically creating six membered carbon-carbon rings. It is a topic of study in undergraduate organic chemistry courses in lecture as well as laboratory courses. Specifically, the Diels-Alder reaction between maleic anhydride and alpha-terpinene is a part of the second semester organic chemistry laboratory curriculum at Weber State University. Through the years this lab has produced low yields of the desired product. To attempt to improve this reaction, exploration has gone into trying several different solvents, changes in reaction temperature, changes in reaction times and changes in purification. The yields were measured and verified through melting point observation as well as IR spectroscopy.

Effects of Various Chalcone's on Cancer Cells

Authors Landon Foulger

Mentor Tracy Covey
Don Davies

Oral Presentation
Chemistry

Chalcones are natural products found in certain plants and flavonoids that have anti-inflammatory, antimicrobial and antitumor properties. In this project, we aimed to synthesize various nitro-substituted chalcone molecules and test their toxicity against cancer cells. Derivatives of chalcones were synthesized through an organic chemical reaction called an aldol condensation reaction. We synthesized six chalcone derivatives and verified their structure using IR spectroscopy. We then tested their toxicities against 2 different cancer cell lines. Two of the chalcones showed low micromolar toxicities against the cancer lines tested, illustrating their potential as a chemotherapeutic compound. These chalcones will be investigated further for mechanism of toxicity and can be used in structure-activity relationships to find more potent chalcone derivatives.

Investigation of Adaptive Niche Construction of *Pseudomonas* *Aeruginosa* Under Nutrient Limitation

Author Rebecca Horton

Mentor Mohammad Sondossi

Poster Display 51
Microbiology

Microorganisms can modify their environments in extraordinary ways, some of which characteristically increase their competitive fitness, and this process is defined as 'niche construction.' While evolving in a new environment, organisms can change their phenotype (i.e. adaptive phenotypic plasticity) and/or modify their environment (e.g. niche construction), by means of differential gene expression, therefore altering their metabolism, cellular, physical, and chemical characteristics. As each of these capabilities incur costs and involve adaptive specializations, tradeoffs between plasticity and niche construction may arise within organisms. Niche construction is considered an underserved area of evolutionary biology, many citing the lack of substantial evidence to support the process; however the use of bacteria in experimental models provides direct evidence for the process and its importance in evolutionary theory. In this study, we have used the concentration of carbon and energy sources to subject two laboratory bacterial populations, *Staphylococcus aureus* and *Pseudomonas aeruginosa*, to stress of oligotrophic growth to investigate possible emergence of adaptive niche construction. We have considered the possibility of intergenerational (within the same population) or interspecies (modification by one organisms affecting another organism) concepts using bacterial populations in pure and co-cultures. The supernatant of *Pseudomonas aeruginosa* grown to stationary phase under nutrient limitations have significant effect on *Staphylococcus aureus* in pure and co-cultures. Furthermore, the negative affect of *P. aeruginosa* supernatant on pure culture of *S. aureus* suggests the effect could not be simply explained by competition for available nutrient. Morphological change, an adaptive response to nutrient limitation, was observed in both populations.

**Detoxification Enzyme Expression
in Nasal Epithelium of Woodrats
Consuming Juniper**

Author Daniel Jensen
Mentor Michele Skopec

Poster Display 61
Zoology

Many mammals, including rodents, are herbivores. Plants defend against herbivory in a variety of ways. Chemical defense through plant secondary compounds is a common strategy. If animals consume these toxic plant secondary compounds, it can lead to weight loss, liver damage, and even death. Just as plants have developed strategies to defend against feeding, herbivores have developed strategies to successfully feed on plants without damaging their health. Many species of woodrats are able to consume otherwise toxic plants. One of these plants is juniper, which contains large amounts of terpenes. Terpenes are highly volatile, neurotoxic plant secondary compounds that enter the body through ingestion and inhalation. During feeding, these volatile compounds enter the brain through the nasal cavity. The only barrier separating the nasal cavity from the brain is a small tissue called the nasal epithelium. The nasal epithelium provides a barrier against these inhaled compounds, and contains several detoxification enzymes that respond to inhaled toxins. We have investigated the role of the nasal epithelium in the detoxification of terpenes found in juniper. We studied 3 species of woodrats: *Neotoma stephensi*, *Neotoma lepida*, and *Neotoma albigula*. *N. stephensi* and *N. lepida* are juniper specialists, and *N. albigula* are generalist feeders.

**Geometry in Paintings:
Where Two Dimensional
Becomes Three Dimensional**

Author Blair Lewis
Mentor Sandra Fital-Akelbek

Poster Display 50
Mathematics

In this presentation we will discuss the appearance of art in geometry focusing on paintings and drawings. Even though it is two dimensional art we perceive it as a three dimensional masterpiece. It is not just a matter of where to put a square, triangle or circle, but how they all interact together to grab our eyes (called emphasis). To drag our attention to the correct location and to make us see what is and is not there. We will discuss geometric techniques used in art such as: symmetry, scaling, optics, projection, and perspective.

Biodegradability of Roundup and Effect on Artemia

Author Kimberly Lowder
Mentor Nicole Berthelemy

Poster Display 57
Zoology

The herbicide Roundup and its active ingredient, Glyphosate, are widely used for weed control. Once touted as a harmless and biodegradable compound, it now appears it may cause organ failure, cancer and genetic damages leading to failed or abnormal development. These chemicals end up into streams and lakes, including the Great Salt Lake where they adversely affect wildlife. In previous research, I found Roundup to be more toxic than initially advertised. Abnormal larval development and morphology in the control groups of previous experiments led to furthering this research. The goals of this project are to assess biodegradability and longevity of Roundup in aquatic environments and quantify the effect of exposure to Roundup directly or indirectly of the on survival, maturation and fertility of Artemia. Materials and Methods: For direct chronic exposure, Artemia larvae were raised in a controlled Roundup concentration. Mortality and maturation time rates were monitored. For indirect chronic exposure, Artemia larvae were raised in a container previously soaked in Roundup solution which was subsequently rinsed and filled with clean water. The number of eggs produced in the first brood was used as an index of fertility against the control larval group. The response to stress was assessed by quantifying the up-regulation of stress proteins using western blots. Results: Larvae developing in both the Roundup water and soaked Roundup container showed signs of malformation and morphological changes. The percent of normal larvae compared to abnormal larvae from the Roundup water, soaked in Roundup, and control group was 3.78%, 1.56% and 0.27% respectively. A slight upregulation in the heat shock protein Hsp70 was found. Comet assay tests will be completed to further solidify the damage induced in Artemia. Discussion and conclusion: Roundup does appear to have the ability to remain concentrated in an environment by attaching to exposed surfaces.

Anatomy of the Patagium of Sugar Gliders and Flying Squirrels

Author Carly Milligan
Mentor Ron Meyers

Poster Display 62
Zoology

Gliding as a form of locomotion has evolved independently in different animal groups. For example, sugar gliders (*Petaurus breviceps*) are marsupial mammals and Northern flying squirrels (*Glaucomys sabrinus*) are placental mammals; each evolved gliding convergently. We studied the patagium (gliding membrane) of these species in order to better understand the convergent anatomy and the biomechanics of gliding locomotion. Tissue samples from adult specimens of two *P. breviceps* and one *G. sabrinus* were removed from one side of the body and prepared for histology. The rest of the body was preserved in formalin for anatomical study under a dissecting microscope. The published literature led us to believe that there were distinct sheets of muscle within the patagium. In contrast, we observed only thin strands of muscle. Histological analyses showed widely spaced fibers without a complete layer of muscle. Conclusions cannot be made with a small sample size. However, our observations do not agree with the published anatomy of these species. Future research with an increase in sample size would clarify the anatomy. Further study could also give insight into muscle fiber type morphology and its functional influence on gliding locomotion.

Hsp 70 Gene Regulatory Response in *Paranemertes Peregrina*

Authors Sara Naveed
Naredos Almaw
Kristen Peterson

Mentors Brian Chung
Robert Okazaki

Poster Display 59
Zoology

Intertidal zones are brutal environments that undergo significant variations in light and temperature, constant wave action, and dramatic salinity fluctuations. Most organisms are extremely sensitive to the slightest changes in salinity; however, *Paranemertes peregrina*, a ribbon worm, has adapted to fluctuating saline environments. Our lab previously reported that the stress-response protein Heat Shock Protein 70 (HSP70) in *Paranemertes* alters in response to variations in salinity. This study aims to determine if the HSP70 expression in *Paranemertes* is regulated transcriptionally. We hypothesize that the HSP70 quantity in hypotonic environments correlates to low HSP70 gene expression, and that hypertonic environments correlate to high gene expression, indicating transcriptional regulation of the HSP70 gene. We tested our hypothesis by exposing *Paranemertes* to isotonic, hypertonic, or hypotonic conditions for up to 24 hours. We then extracted transcribed RNA from these specimens to perform Reverse Transcriptase Polymerase Chain Reaction (Rt-PCR) to indirectly quantify the rate of HSP gene transcription. Our preliminary results appear to support our hypothesis that alterations to the amount of HSP protein correlates directly with similar alterations to the RNA code for HSP. Although preliminary, our findings are promising and will allow us to conduct further study with additional samples.

Effectiveness of Vacuum Cleaners on Removing Microorganisms from Household Surfaces

Author Beck Nelson
Marcus Matson

Mentor Michele Culumber

Oral Presentation
Microbiology

Vacuum cleaning is believed to get rid of the dirt, dust, and germs embedded in carpet. Although normal vacuum cleaning may reduce the amount of dirt and dust, the amount of microbes extracted from the carpet remains in question. The purpose of this research was to determine the amount of microorganisms extracted from carpet using traditional vacuuming methods. Out of the many possible variables to be tested, a standard upright vacuum cleaner was used on medium-length carpet that had been exposed to microorganisms via simulated household traffic. Microbial extraction was observed both before and after vacuuming two and ten passes over a specific location. In comparison to the amount of microbes present before vacuuming, the results of this research showed that after two and ten vacuum passes there was an average of an 80.3% increase and an 81.6% decrease in the amount of microbes, respectively. These results indicated traditional vacuum cleaning failed to decrease the amount of microbes present on the carpeted surface. It also indicated that in order to increase the amount of microbial extraction, the number of vacuum passes should also increase. Future studies may be conducted to test the additional variables regarding microbial extraction via vacuum cleaning.

Classification of Bacteriophage Isolated from the Great Salt Lake using Electron Microscopy

Author Brent Nelson

Mentors Matthew Domek
David Belnap (University of Utah)

Oral Presentation
Microbiology

Bacteriophage lyse bacteria and play a crucial role in the recycling of nutrients in a halophilic environment such as the Great Salt Lake (GSL). A previous study showed that the bacteriophage CW02, isolated from the GSL, was a dsDNA bacteriophage with an icosahedral head, short non-contractile tail and belonged to the bacteriophage family Podoviridae. CW02 was also shown to share a conservative protein fold in a capsid protein originally identified in bacteriophage HK97. Very few bacteriophage isolated from the GSL have been assigned within the bacteriophage classification scheme. In this study we attempt to classify recently isolated bacteriophage from the GSL based on morphology using transmission electron microscopy (TEM) and molecular techniques. Bacteriophage were isolated from water and soil in or near the GSL. Bacterial lysate containing bacteriophage were centrifuged and filtered to remove bacterial debris. The sample was concentrated using 100,000 molecular weight cut-off filters. Samples were further purified by CsCl density gradient ultracentrifugation. Six bacteriophages have been imaged using TEM. TEM has shown all bacteriophage infecting *Salinivibrio costicola* bacterium SA-39 to be icosahedral with no detectable tail while bacteriophage infecting *S. costicola* bacterium SA-40 having a circular head with a long tail. This suggests that the structure and shape of the bacteriophage capsid play an important role in the specificity of the bacteriophage to host. Based on shapes found using TEM, the bacteriophage infecting SA-39 likely belongs to the group Podoviridae while bacteriophage infecting SA-40 possibly belong to either long-tailed bacteriophage families Myoviridae or Siphoviridae.

DNA Barcoding of Great Salt Lake Invertebrates

Author Son Nguyễn

Mentor Jonathan Clark

Poster Display 56
Zoology

Arthropods constitute the most conspicuous and abundant animals inhabiting the waters of Great Salt Lake (GSL). These include two principle species of brine flies (abundant in littoral areas); the corixid *Trichocorixa* (found in bays and along island margins); and the pelagic brine shrimp, *Artemia franciscana*. In addition, we have identified other invertebrates whose ecology and distribution have not been examined previously. The dynamic of interactions among these invertebrates is poorly studied and yet is an important influence in the community structure of this saline lake. DNA barcoding is the international recognized standard for species identification based on DNA. The results of this organized effort are freely available and are described at www.barcodinglife.org. A number of studies have shown that DNA barcodes are useful for species classification and are able to discriminate closely related species. This study uses the cytochrome c oxidase gene to establish DNA barcodes for several invertebrates associated with the GSL ecosystem. These results provide genetic information that can be combined with traditional taxonomy to enhance our understanding of the biological diversity of this important ecosystem.

Altitudinal Variation in Terrestrial Isopods

Author Jillian Quilter
Mentor John Cavitt

Poster Display 64
Zoology

Organisms can adapt to environmental challenges through physiological, behavioral or morphological changes. Understanding these changes is key to understanding organisms' ability to survive environmental variation. This ability to survive and adapt to changes can be studied using existing environmental gradients. One such gradient is elevation. Organisms that occur along an elevational gradient may be exposed to extreme changes in temperature, humidity, and oxygen concentrations. *Armadillidium vulgare*, a terrestrial isopod, has a short life-span and inhabits varied habitats, making it ideal for study of adaptation to changes in elevation. *A. vulgare* samples collected from two elevations were examined. Five populations of ten individuals each were collected from Dutch John, Utah (6,430') and Kaysville, Utah (4,300'), and the width of individuals' pseudotrachea (an organ analogous to lungs) was measured and expressed as a ratio over individuals' body width. This examination showed that there was not a significant change in pseudotrachea width relative to body width of individuals living at higher altitudes compared to individuals living at lower altitudes. However, significance was found between individual populations at the same altitude, indicating that microhabitat may play an important role.

Species-area Effect on Water Column Invertebrates of Freshwater Ponds

Authors Calen Rhodes
Austin Hurst
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Poster Display 63
Zoology

Species diversity can be a strong indicator of healthy, stable communities. Diverse communities tend to show higher primary production, resistance to natural disturbance, and resistance to invasion by exotics (Tilman and Downing 1994), all of which lead to community stability. The species-area effect dictates that with an increase in area, there is a corresponding increase in species richness. Water column invertebrates have shown to be an important food source for migratory waterfowl at stopover sites in Utah. However, few studies have quantified these important communities. We examined whether the species-area effect is apparent within freshwater ponds in Northern Utah. We sampled invertebrates from five different sites. The results of this study found support for the species area effect as modeled by Arrhenius (1921).

Fiber Type Distribution and Tail Muscle Function in Birds

Author Kyle Spainhower
Mentor Ron Meyers

Oral Presentation
Zoology

The avian tail facilitates locomotion and performs specific behaviors. For example, woodpeckers use their depressed tail as a prop to increase stability while on trees. We quantified fast and slow fiber types in eight tail muscles from five Northern Flickers, three Rock Pigeons, three Yellow-headed Blackbirds, two Red-winged Blackbirds, four Black-billed Magpies, and one Western Scrub-Jay to ascertain a relationship between fiber composition and behavior. Muscle fiber types differ in contraction speed: fast fibers are best suited for dynamic actions while slow fibers are associated with postural functions. *M. levator caudae* (tail elevation) contained fast and slow muscle fibers in all species. *M. depressor caudae* (tail depression) was entirely fast in blackbirds, jays, and magpies; in flickers it contained slow fibers. We believe that slow fibers in these muscles correlate with distinct behaviors in these species. Birds generally maintain an elevated tail, implying a postural function for the slow fibers in levator caudae in all species. Woodpeckers rely on their tail for support during climbing and maintain it in a depressed position. Slow fibers in depressor caudae would facilitate sustained tail depression associated with this behavior in flickers. Study of additional species to validate the structure/function relationship is warranted.

Geodatasets for Emergency Management

Author Brian Stearmer
Mentor Michael Hernandez

Poster Display 46
Applied Environmental Geosciences

The project scope had two components, (1) collaborate with the appropriate teams and individuals within the Utah National Guard and Emergency Operation Center to identify important Intelligence Requirements (IR) and (2) identify, organize and create key Geographic Information System datasets that could answer IR's in Defense Support of Civil Authorities operations across the state of Utah. Each feature on the surface of the Earth has a different energy reflectance that can be identified by multispectral imagery. A statewide multispectral baseline image would enable us to understand the components of a disaster and better tailor response efforts, but yet there wasn't one available. It took several thousand hours to identify, adjust and compile Utah's 17 different Landsat scenes. I narrowed the timeframe to September, early fall had the least amount of cloud cover while still having a good vegetation reflectance. There are automated tools, however manual color adjustment yielded the best result. Because of the accuracy of the adjustment, seamlines between images are nearly undetectable. The end result was a 99.99% cloud-free mosaic, with an average date of Sept 4th, 2015. Looking to the future, continued work in creating seasonal baselines and integrating airborne platforms that can assess post catastrophe change.

Anatomy and Histochemistry of Flight Hindlimb Posture in Birds

Author Amanda Walker
Mentor Ron Meyers

Poster Display 58
Zoology

During flight, birds employ one of two hindlimb postures. Typically, songbirds utilize a flexed posture (with the legs tucked beneath the body) whereas shorebirds utilize an extended posture (with the legs extended behind the body). Both postures require muscles to maintain these positions for extended periods of time. Slow muscle fibers are fatigue resistant and used for postural activities, whereas fast fibers are used for dynamic movements such as running. A previous study examined the fiber-type composition of hindlimb muscles used for the extended hindlimb posture in shorebirds and found that all muscles contained slow fibers. I expanded on this study by examining the anatomy and fiber-type profile of hindlimb muscles used for the flexed hindlimb posture of Yellow-headed Blackbirds (*Xanthocephalus xanthocephalus*). Data for six muscles from two specimens showed similar fiber type distribution patterns and all muscles contained 0 to 14 percent slow fibers. These percentages are much lower than those of corresponding muscles of shorebirds. The greater percentage of slow fibers in shorebirds may correspond to the biomechanics of a larger moment arm produced by their extended hindlimb posture. Future work will expand on this study and involve in vivo analysis of hindlimb muscle activity during flight.

Determination of Antagonism between NSLAB Strains and *Lactobacillus wasatchensis* WDC04

Author Marissa Walker
Mentor Craig Oberg

Poster Display 53
Microbiology

Lactobacillus wasatchensis WDC04 is part of the nonstarter lactic acid bacteria (NSLAB) cheese microbiota, originally isolated from “gassy” cheddar cheese. Recent evidence indicates WDC04 may be an important cause of late gassy defect in aged cheese. Controlling growth of this unwanted organism could be done by incorporation of NSLAB strains into cheese that inhibit its growth. Determination of inhibition between NSLABs and WDC04 was done using the agar-flip method. MRS supplemented with 1.5% ribose (MRS-R) and 4% NaCl and pH 5.2 conditions to mimic the environment of cheese. *Lactobacillus curvatus* showed the greatest inhibition by WDC04 while *Lb. F19* and *Lb. rhamnosus* were most resistant. The second experiment showed *Lb. curvatus* was most inhibitory towards WDC04 while all other NSLABs didn’t show a great difference. In the first experiment, most NSLAB cultures showed more inhibition by WDC04 grown for 4 days compared to 2 days. This probably allowed greater production of inhibitory compounds, especially if produced during the stationary growth phase. Compound diffusion into the media shows that inhibition was due to secretion of inhibitory compounds. Examining the antagonism between NSLABs and WDC04 allows for selection of NSLAB strains that could inhibit this problematic bacterium during cheese ripening.

Nutrient and Demographic Characteristics of Sagebrush Foraged on by Pygmy Rabbits

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Poster Display 54
Zoology

The pygmy rabbit (*Brachylagus idahoensis*), the world's smallest rabbit, has a limited distribution due to its year round dependence on sagebrush (*Artemisia tridentata*) for food and shelter. As much as 99% of the pygmy rabbit diet consists of sagebrush. With such a specialized diet, obtaining the full spectrum of needed nutrients can be difficult. In this study, we sought to determine whether pygmy rabbit foraging patterns were driven by the nutritional quality of sagebrush. Sagebrush samples were taken from burrow areas at 5-20m in 5m increments. Demographic data (height, major and minor crown) was collected for each sagebrush sampled, and sagebrush bushes were labeled as foraged or non-foraged based on evidence of herbivory by pygmy rabbits. Sagebrush samples were then analyzed for nutrient content using near-infrared spectroscopy for percent dry matter (DM), crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), and total digestible nutrients (TDN). The two areas of study are on U.S. Bureau of Land Management (BLM) land near Woodruff and in Park Valley in northern Utah. This study was initiated in winter 2013 and is ongoing.



College of Social & Behavioral Sciences

Project topics in this section include: Criminal Justice, Geography, History, Neuroscience, and Political Science.

Physiological Measures and Genetic Predictors of Empathy

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Poster Display 11
Psychology & Neuroscience

Over the past few decades, novel methods for measuring and quantifying empathy have been introduced to the scientific community. Many studies have used the “Reading the Mind in the Eyes” (RMET) test in order to obtain an objective empathy score for participants. While this measure may be useful, other methods have recently been introduced that allow scientists to further investigate the phenomenon of empathy in an objective manner. For example, facial electromyography (EMG) has been shown to be a valid method for measuring empathy using the Corrugator supercilii (CS) and Zygomaticus major (ZM) muscles to infer negative and positive affective states, respectively. In addition, there have been several genetic determinants identified as having a relationship with empathic responses. Chiefly, a single-nucleotide polymorphism (rs53576) of the oxytocin receptor gene (OXTR) has been found to be a significant predictor of empathic behavior. This study is designed to assess whether the presence of genetic predictors of empathic behavior correlate with the magnitude of EMG measures. DNA samples will be collected for genotyping via a saliva sample, and subjected to polymerase chain reaction (PCR) for amplification. Facial EMG data will also be collected from each participant. These data will be compared with RMET scores for each participant. It is hypothesized that individuals with a copy of the A allele in the OXTR gene will have lower RMET scores, as well as lower mean EMG activation from baseline when compared to individuals that do not express this polymorphism. Finding a significant relationship between these measures would provide further evidence that these methods are reliable for use in future empathy studies.

Who Knows What Little Red Riding Hood Believes and Feels?

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Poster Display 9
Psychology

The Little Red Riding Hood (LRRH) story has been used to investigate children's understanding of false beliefs and emotions. Although children from 4 – 5 years recognize LRRH falsely believes that only grandmother is in the house, they attribute fear to LRRH due to the wolf's actual presence. To better understand the source of the misunderstanding, 60 4- to 7-year-old children were assigned to play various roles in a theatrical version of LRRH. Children were assigned to one of three characters (Little Red, the Wolf, or the Narrator) and then acted out the character's role. Just as Little Red knocks on Grandma's door, the participants were independently asked three questions about what LRRH believes and feels. Children playing the Wolf ($M = 2.05$) out-performed those playing LRRH ($M = 1.13$) with those playing the Narrator ($M = 1.59$) performing in the middle. Only the difference between LRRH and the Wolf was statistically significant ($p < .05$). The same pattern emerged for the false belief and the emotion questions analyzed separately. The findings suggest that acting out the deception may support children's understanding of not only false belief but also the emotions which follow as a consequence.

Restrict Sex Offenders, but not Too Much: Restrictions on Symbolic Sex Offender Laws in Nebraska

Author Gary Duran
Mentor Monica Williams

Poster Display 1
Criminal Justice

Sex offender laws that create residence restrictions fail to provide a solution for sexual crimes. In the majority of states, sex offender laws that have been passed include residence restrictions. These restrictions affect how sex offenders can live a productive life in society. These sex offender laws seem largely symbolic; they address public fears of sex crimes but fail when attempting to reduce recidivism rates and prevent future sex crimes. This study takes an in-depth look at the state of Nebraska because it, unlike the majority of states, actually places regulations on what residence restrictions can be placed on sex offenders within the state. This study looks at legislative bills that have been made laws and legislative bills that have been postponed indefinitely to understand why the state of Nebraska is unlike the majority of other states. Research was completed using Nebraska state archives from previous legislative sessions, found on the official site of the Nebraska Unicameral Legislature. The findings of this research help us understand how states can impose limits on symbolic policies such as sex offender residence restrictions.

Developing a Methodology for the Use of Lighter-Than-Air Platforms

Author Hailey Hanson
Mentor Julie Rich

Oral Presentation
Geography

Research objectives for this study were, (1) establish a methodology for taking aerial photographs using both lighter-than-air (weather balloon) and wind-powered air foil (kite) platforms, (2) determine which platform performs better in different environmental conditions, (3) create maps from the aerial images compiled. Over the course of a three-month long study, six different locations were selected to take aerial photographs using both platforms. The chosen locations were selected due to the different environmental conditions, and terrain that would be encountered. The locations consisted of two reservoirs, a ski resort, two parks, and a recreation area. In the past, other studies have been done with the use of lighter-than-air platforms or wind-powered air foils platforms. None of these studies have compared the two platforms, and established a methodology. The results from this study indicate that the lighter-than-air platform was the most reliable technology in terms of obtaining photos from every launch, and ease of use. The wind-powered airfoil is only a suitable option if your desired location has sustained wind speeds greater than four mph for extended period of times, so the kite remains airborne. The significance from this research is the ability for anyone to create large scale images from the photographs taken with the lighter-than-air, and wind-powered air foil platforms. The benefit of using large scale images is that they cover large areas, and show a high level of detail because the images are taken from a low altitude.

Empathetic Effects on Autonomic Nervous System Arousal

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Poster Display 67
Psychology & Neuroscience

Empathy is defined as an intellectual and emotional awareness and understanding of another's thoughts, feelings, and behavior. This definition of empathy shows that traditionally empathy has been paired more so with cognitive/emotional states of understanding, but empathy also causes physiological changes as well. Previous studies have shown that empathy can cause temperature changes in the periphery, as a result of autonomic activation (Cooper, 2014). The goal of this study is to better understand physiological empathy and its impact on temperature change, as well as to compare whether time of day would impede upon, or enhance this reaction. To elicit an empathetic response, individuals will view a short video of a researcher inserting their hand into ice water. Physiological empathy will be assessed using a hand thermometer being worn by the participant. Results are expected to show that time of day will have an effect on the physiological empathetic response of temperature change, due to the fact that humans have a temperature circadian rhythm (Weinert, 2007). The results of this study may indicate that at least some components of the empathetic response are affected by circadian rhythms.

Actual and Perceived Effectiveness of Mnemonics among Traditional and Non-Traditional Students

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Poster Display 8
Psychology

Recent statistics suggest that over 70% of students enrolled in college courses are non-traditional students. Memory differences have been documented between traditional and non-traditional students, and this has implications for higher education. One factor that can increase memory performance is the use of mnemonic strategies. However, no research exists on the actual or perceived effectiveness of different mnemonic strategies among traditional and non-traditional students. Participants were shown 4 word-pair lists with unrelated word pairs (e.g., room-pig). Prior to the start of each list participants were instructed which mnemonic to use (verbal repetition, interactive imagery, creating a short sentence, or taking the first letter of each and thinking of a related word pair) and asked how many word pairs they thought they would be able to remember (i.e., how effective they thought the strategy would be). After a brief distraction participants were given a cued-recall test. It is expected that the mnemonic strategies would be more beneficial to non-traditional compared to traditional students' performance. It is also predicted that non-traditional students may display overconfidence in the effectiveness of rote rehearsal and perhaps under-confidence in the actual effectiveness of the other mnemonic strategies compared to their more traditional counterparts.

Perceptions of Public Land Management in Utah

Author Drew Hodge
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Oral Presentation
Geography

In western states, debate about federal control of public lands has caught the public's attention, with tensions erupting into violence recently in the armed standoff at Malheur National Wildlife Refuge, Oregon. Such incidents, plus legislation like the Utah Transfer of Public Lands Act, suggest low trust in federal land managers. To verify this trend, an online survey instrument assessed trust levels in federal and state public land management among a sample of Utah residents active on public lands. Participants, voluntarily solicited through social media and email, rated trust in Bureau of Land Management, National Park Service, United States Forest Service, and Utah Department of Natural Resources, with trust defined as whether participants feel each agency supports public access to public lands. Respondents reported higher trust in all three federal agencies than state, and higher trust in federal over state management both historically and currently. The survey gathered socio-demographic data, like gender, age, and political affiliation, to identify potential independent variables affecting trust in land managers. Results suggest strongest correlation between low trust in all four government agencies and Republican affiliation. Results suggest the public lands debate divides along political lines. Effective dialogue between stakeholders requires respectful engagement built upon shared values.

Temperature Changes due to Empathetic Responses

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Poster Display 66
Psychology & Neuroscience

Empathy is the ability to comprehend and relate to the emotions of others. This ability can have effects on the way people feel, as well as their reaction to others' behaviors. Prior research has shown women, more so than men, have stronger feelings of empathy and are able to recognize these feelings. (Luo et al., 2015). Other studies suggest that race affects the strength of empathic response (Xu et al., 2009). Cooper et al. (2014) found that empathy can affect peripheral physiological responses, but gave no consideration to race or gender variables. The design of this study is intended to assess whether gender and race affect physiological empathetic responses. Participants will view via video an individual who places their hand into cold water. While viewing this scene, participants' hand temperature will be measured to determine if any changes occur. Data collection are ongoing, but results are expected to show that watching another's temperature change will elicit a similar response in the viewer. Furthermore, women are expected to show more empathy and racial differences will be reported. These findings will help understand how gender and racial differences can affect how our bodies respond to one another at an unconscious level through empathy.

Can Love Make Your Worries Disappear?

Author Candace Horne
Mentor Aaron Ashley

Oral Presentation
Psychology

In any given year approximately 5% of the U.S. population experiences chronic anxiety (Mortazavi, et al., 2014) which, when diagnosed, is known as generalized anxiety disorder. To feel a regular, uncontrollable (Kircanski et al., 2015), overarching sense of fear and concern is often debilitating (Mennin et al., 2015); affecting physical health, relationships, and even work responsibilities (de la Parra, et al., 2014). In fact, Rosner (2014) reports that anxiety disorders cost American society \$42 billion a year due to lost work time, seeking medical treatment, and other factors. The current study is designed to explore the relationship between the magnitude and severity of worry an individual experiences as a function of their involvement in a romantic relationship, and other affective experiences. A thorough understanding of emotional interactions could lead to improved pharmacological and therapeutic treatment methods. Participants completed several worry questionnaires and several measures assessing level of romantic involvement in their current relationship. Initial data suggest that the level of worry an individual experiences varies significantly as a function to their current experience of passionate love. Specifically, those individuals in a highly passionate relationship experience more worries than those in a moderately passionate or no relationship.

Self-Compassion and its Effects on Stress Response

Authors Parker Hughes
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Julianne Christopher
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Poster Display 7
Psychology

The current study examined a potential relationship between the attribute of self-compassion, the ability to show compassion towards oneself, and ability to cope with moderate physical discomfort. Literature has shown that individuals higher in self-compassion are better able to cope with mental and social stressors, but little research has studied a physiological component. This study examined the potential protective effects of self-compassion on physiological and self-reported responses to pain. Participants were assessed in regard to their self-compassion, and baseline measurements of heart rate and blood pressure were taken. Participants were then instructed to submerge their hand into cold water (four degrees Celsius) for up to three minutes. The subject's heart rate and blood pressure, as well as a self-reported pain ratings (scale from 0-10) were recorded every thirty seconds while their hand remained in the water. It is expected that those with higher levels of self-compassion will display less of a change in physiological responses from baseline and report lower levels of pain compared to those with lower levels of self-compassion. The results from this study may contribute to a better understanding of a relationship between self-compassionate attitudes and ability to respond to and cope with physical stressors.

An Argument against Suspicionless Drug Testing in Public Schools

Author Joe Jessop
Mentor Leah Murray

Poster Display 65
Political Science

After the Supreme Court of the United States abandoned earlier stances of a right to privacy in a string of court cases, suspicionless drug testing of high school athletes was deemed to be constitutional by the top court. In my capstone project, I argue that these drug testing policies have not had a positive impact on drug use, and they are having several negative effects on the student athlete population.

Examining Nitrosamines in the Potable Water of Ketchikan, Alaska

Author Deseret Liu
Mentor Julie Rich

Oral Presentation
Geography

Previous studies have shown that chloramine treatment of culinary water, similar to how drinking water is handled in Ketchikan (with the exception of using Ultraviolet radiation), form N-nitrosamines or nitrosamines, a cancerous chemical for humans. The purpose of the research is to test whether cancer causing nitrosamines are present in Ketchikan's potable water after treatment, and interview the citizens concerning their health after drinking the potable water. Three water samples were taken directly from the faucet at an apartment complex in Ketchikan to test for varying levels and presence of nitrosamines and one of its sub-class N-nitrosodimethylamine (NDMA), a known cancerous chemical. The samples were taken in two week intervals from the apartment at 4871 N Tongass ave. The first two samples were sent to Anchorage, Alaska, for NDMA; to be analyzed for levels that would be a human health risk. The third sample was sent for analysis of nine potentially cancerous nitrosamines, including NDMA, to Kelso, Washington. Surveys were taken by knocking on doors through a randomized street order, then asking participants about noticeable sickness caused by the drinking water and their thoughts on a financially affordable water treatment plan. The first two faucet collected water samples were compromised during shipping, because of temperature and amount of time it took for the samples arrival. The third set of samples were in the correct temperature range and showed that NDMA was not present, although N-nitroso-dipropylamine and N-nitroso-dibutylamine were found but are no immediate risks. This research provides valuable information for following investigation into Ketchikan's water treatment.

Introverts and Extraverts' Physiological and Behavioral Responses to Aggression

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Poster Display 6
Psychology

The current study explored the potential physiological and behavioral difference between introverts and in response to aggression. Prior research has found differences between introverts and extraverts, but there is a lack of research examining how the two differ in regards to someone acting aggressively toward them. Participants in the current study completed a personality inventory to assess level of introversion or extraversion. Following this, participants were connected to BioPac devices to measure physiological responses (heart rate and skin conductance) and engaged in a competitive speeded-reaction time task against an "opponent." In reality, there was no opponent. In this task, participants had to respond to an X on the screen as soon as it appeared. If participants' opponents were faster (which they were on a predetermined half of the trials) the "opponent" blasted them with loud sound as punishment. Physiological responses were recorded during these times. In addition, participants could select the sound level and duration their opponent received (the behavioral indicator of aggression). Consistent with past research, it is expected that extraverts will display higher levels of behavioral aggression than introverts, whereas introverts will display higher physiological arousal levels in response to the aggressive acts compared to extraverts.

Genetic Differences in the Serotonin Transporter Gene and Oxytocin Receptor Gene and their Association with Emotional Sensitivity

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Micah Wolfe

Mentor Shannon McGillivray

Poster Display 10
Psychology

The promoter region of the serotonin transporter gene has been observed to have a polymorphism, or a genetic variation, that is associated with anxiety-related traits (Lesch et al., 1996). This polymorphism (5-HTTLPR) of the promoter region, a site necessary for gene transcription, produces homozygous individuals with short allele (S/S) and long allele (L/L) genotypes, and a heterozygous (S/L) genotype. 5-HTTLPR polymorphisms have been found to play a role in emotional processing where S carriers (S/S or S/L) were found to be more sensitive to emotional stimuli than those with the L/L allele (Jonassen & Landrø, 2014). A similar model has been found in the oxytocin receptor gene (OXTR) where a polymorphism is responsible for homozygous individuals with A allele (AA) and G allele (GG) genotypes, and a heterozygous genotype (AG). A carriers (AA or AG) were found to be more reactive to stressful situations than those homozygous for the G allele (Rodrigues et al., 2009). To date, there have been no published studies on both the serotonin transporter gene and oxytocin receptor gene and how they relate to emotional sensitivity. In this study we are investigating sensitivity to emotional stimuli in the context of genetic polymorphisms in the serotonin transporter gene and the oxytocin receptor gene. Using DNA isolation techniques, polymerase chain reactions, and gel electrophoresis, these polymorphisms can be analyzed. Sensitivity to emotional stimuli can be observed using the Dot Probe Task which is designed to test fixation with emotional stimuli. The data collected are expected to show that participants having the S/S and AA/AG alleles are more sensitive to emotional stimuli. Studies such as these are instrumental to understanding the genetic basis of depression and anxiety disorders, as well as the development of individualized treatment for these disorders.

The Commodification of Water and Leisure at North America's Mineral Springs

Author Skyler Pyle
Mentor Susan Matt

Oral Presentation
History

Seventeenth century enterprising entrepreneurs recognized an opportunity to make their fortunes by capitalizing on the long time practice of "taking waters" to heal ailments of the body and mind. Mirroring European "spa culture," colonial capitalists transformed mineral water into a commodity and sold it to not only the wealthy, but also the burgeoning, thriving middle-class. Using primary sources, such as Valentine Seaman's A Dissertation of the Mineral Waters of Saratoga (1793), John De Normandie's "Letters from Dr. John De. Normandie: An Analysis of the Chalybeate Waters of Bristol (1768), and The Fashionable Tour, in 1825 by Gideon Miner Davidson, the author indicates how entrepreneurs effectively commercialized mineral springs by advertising them as desirable vacation destinations that promised an interesting, unique, and leisurely experience with the added bonus of improving health. Marketing springs as vacation destinations, combined with bottling mineral water and shipping it throughout the world, transformed mineral water into a global commodity that has become one of the most profitable businesses in the United States.

A Walk in Someone Else's Shoes: Empathy through Embodiment

Author David Sleight
Mentor Aaron Ashley

Oral Presentation
Psychology

The purpose of this study is to evaluate the relationship between participant empathy scores and the type of engagement in the acting out of a date rape scenario (using dolls) that is designed to trigger an empathetic repose. For the experimental groups, participants were asked to read a script to a date rape scenario then asked to act out said scenario using two small dolls and a diorama of what the environment could have looked like as the researcher narrates. Once the scenario was acted out the participants completed a survey consisting of (in order as they appeared to participants): date rape scenario follow up questions, which assess the participant's opinion of the male and female characters in the scenario; an empathy scale, which consisted of several sub scales; and a brief demographic questionnaire. The results of this study are in favor of our hypothesis, which is that a participant who takes on the perspective of an opposing gender though the reenactment process will then have more empathy for that particular character. Likewise, a participant that takes on the perspective of the same gender will have more empathy for the character that is the same gender of the participant.

The Compulsory Cure? Competing Values in the Attempt to Raise Voter Turnout

Author Jamie Stokes
Mentor Leah Murray

Poster Display 3
Political Science

The compulsory voting method appears to be the simplest solution to a somewhat international dip in voter participation, one that has yielded big results among countries that have adopted compulsory voting laws, most notably in Australia. For this reason, many political scientists have advocated the adoption of compulsory voting laws in the United States. It remains to be seen, however, if compulsory voting has a positive effect on other classical civic attitudes which compel a citizen to vote and to participate politically. Though some political scientists argue that compulsory voting could also lead to a more informed and politically efficacious populace, my research, a statistical comparison between Australia and the United States, suggests a more nuanced view of compulsory voting. While certain groups appear to benefit from a compulsory system, the system itself does not seem to produce a special nationwide bump in efficacy or knowledge among Australians. Major conclusions from my research suggest that while compulsory voting is effective at raising participation, governments may need to look elsewhere for a method to include and inform voters. Furthermore, in the attempt to raise voter turnout, democracies must consider whether an informed citizenry or a participating citizenry is more valuable.

UFOs in Post War America: An Alien Viewpoint of Utah

Author Christina Summers
Mentor John Sillito

Oral Presentation
History

A society's interpretation of "signs in the skies" reveals to historians how a society perceived unexplained events within that era. As humanity entered the technological age of the 20th century, a new explanation for unknown things in the skies surfaced, dubbed Unidentified Flying Objects. During World War II, UFOs were generally interpreted as enemy spy technology. However, in Post War America, yet another explanation for strange things in the skies became prevalent; aliens. How did Post War Americans explain paranormal activities, specifically UFOs? Several case studies will be presented to show that the Post War inhabitants of Utah interpret UFOs in four general ways: as enemy spy technology, aliens, hoaxes, or natural phenomena misinterpreted. The interpretation of UFOs as spy technology demonstrated that society's acknowledgement of the possible threat that technology posed to public safety. The interpretation of aliens not only showed America's advancement into the space age, but also revealed societal concerns with government ineptitude and conspiracy. Generally, aliens were interpreted as either god-like beings who came to earth to help and observe humanity, or devils who came to harm and destroy human civilization. UFO hoaxes displayed a segment of American society with a lack of scientific knowledge, as well as the need for notoriety and monetary gain. Natural phenomena misinterpreted as ghostly UFO tales provided community unity as well as entertainment. If the natural phenomena had a rational explanation, the UFO event was generally discarded as unimportant, which documented that society's acceptance of modern aerial technology and natural science. This paper will present a snapshot of how Utahans in the Post War period interpreted such occurrences. The stories were collected in Utah newspapers, the United States Air Force Blue-book files, and by Dr. Salisbury, a botanist from Utah State University with a penchant for chasing UFOs.

Perceptions of Bullying: Connecting Elementary Students, Teachers, and Administrators

Author Blake Tubbs
Mentor Aaron Ashley

Poster Display 5
Psychology

The purpose of this research is to assess perceptual differences and similarities that exist between experiences of elementary students (second grade), their teachers, and school administration about bullying at their school. This research will employ use of a semi-structured qualitative interview with each participant. Specifically, this research will seek to find where inconsistencies lie between the three groups outlined and where improvements can be made for the perception of bullying and intervention therein. The main researcher will do coding of interviews with Atlas.ti software (used to organize information. All coding and methodology will be verified through a research committee for reliability and validity.

Do the “Nones” Matter

Author Zachery Venstra

Mentor Leah Murray

Poster Display 4

Political Science

An important factor in understating political behavior is understanding how people identify themselves, or what groups do they see themselves as belonging too. Religion is a strong indication of how people view, feel, and participate in the political sphere. Strong distinctions can be drawn between people who hold and value different religious views and beliefs. Recently there has been an uptick in those who identify as Religiously Unaffiliated, or the Nones as commonly referred too. By conducting a case study of the Nones and identifying who they are, what is leading to their growth and how they behave political, this research provided a more detailed understating of this emerging identity. Part of this research also included conducting a survey on Weber State to compare national macro findings to the local micro level to see traits are still evident.

A Patriotic Duty: John Sherman's Efforts to Preserve the Union

Author Daniel Weller

Mentors John Sillito

Kathryn MacKay

Oral Presentation

History

Despite extensive study of the American Civil War by many historians, few have focused on Ohio Senator John Sherman and his contributions to preserving the Union. This neglect is partly based on the fame (or infamy) of his better known older brother, General William Tecumseh Sherman. My study examines both the significance of John Sherman's work as a senator, and also as a common, but patriotic, citizen in support of the Union. As part of my research, I visited the Library of Congress in Washington, D.C. to conduct research in John Sherman's papers. Additionally, I analyzed other primary sources, including John Sherman's autobiography, William Tecumseh Sherman's memoirs, and contemporary newspaper accounts. In them I discovered that John Sherman contributed significantly to creating the financial legislation that helped finance the war, and went to great lengths to support the army by raising troops from his home state while not engaged in his duties as a senator. I believe that an assessment of John Sherman and his many contributions constitutes an important case study, which provides a better understanding of the complexity of the Civil War.

**Mormonism and the Progressive
Era: Urban Housekeeping,
1918-1930**

Author Brian Whitney
Mentor Kathryn MacKay

**Oral Presentation
History**

During the Progressive Era in America, reform movements affected industry, education, religion, and public welfare. Women's societies, fighting for suffrage and temperance, began an "Urban Housekeeping" movement, which aimed to address social problems in society through efforts of education, delinquency, sanitation, prohibition, nursing, public housing, and maternity care. From the tireless efforts of public figures like Jane Addams, a new field of "social work" was born. Historians maintain that the Urban Housekeeping movement began to phase out with World War I, when women were asked to fill in the labor shortage while men were sent abroad as soldiers. However, the Urban Housekeeping movement continued and the Social Work movement began to professionalize within state departments and religious organizations. This study examines the female organizations within the two largest Mormon denominations, The Church of Jesus Christ of Latter-day Saints and the Reorganized Church of Jesus Christ of Latter-day Saints (now Community of Christ), examining the programs that each organization independently developed in areas of maternity and foster care, education and delinquency, and licensing of case workers from 1918-1930 as examples of the continued influence of Urban Housekeeping within religious organizations.

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