

Acknowledgements

The Office of Undergraduate Research would like to thank Amy Douangdara, Valerie Frokjer, and Jennifer Wozab for organizing this event, Nathan Gines for designing all event promotional material, Chelsie Jones for designing the event program, and all the campus staff who worked behind the scenes to make today's event possible. We want to especially thank our oral session moderators and all the students and faculty participating in today's celebration.

Schedule

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9:00 – 11:00 a.m. Registration

Check in and registration for Symposium participants
Shepherd Union Ballroom

11:00 a.m.

Posters available to view in Atrium

10:45 a.m. - 12:30 p.m. Oral Session 1

12:30 – 1:00 p.m. Break

Refreshments will be served

1:00 - 3:00 p.m. Oral Session 2

3:00 - 4:00 p.m. Poster Session

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 Michael Vaughan, Ph. D., Provost
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Welcome Messages



Welcome to the Seventh Annual Undergraduate Research Symposium and Celebration! I am pleased that you have joined us for this year's celebration of student innovation, creativity, and scholarship. Today, students from a variety of academic disciplines have come together to showcase their work through oral and poster presentations and we applaud their efforts.

These students have had the opportunity to experience the dynamic combination of scholarship, teaching and research; their mentors have had the opportunity to extend their knowledge and to enjoy the rewards of collaboration. In the spirit of exploration, many have also reached out to our community to learn.

I hope you enjoy today's celebration of their experiences and accomplishments. These students' work, with the guidance of our dedicated faculty, is helping Weber State to grow as an institution of discovery and to create connections with our neighbors. As an institute, we appreciate both researchers and mentors for working to continue the tradition of scholarly achievement at Weber State.

A handwritten signature in black ink that reads "F. Ann Millner". The signature is written in a cursive, flowing style.

F. Ann Millner
President



WSU takes great pride in the work our undergraduate students do with faculty in conducting pure and applied research. The students' experiences prepare them for the demands of post-graduate education and their professional careers. The WSU Undergraduate Research Symposium provides an opportunity for our students to share their work.

This year marks the seventh year for the WSU Undergraduate Research Symposium. I am consistently impressed with both the breadth and quality of student research presented at the symposium. Some of our students' undergraduate research has received national attention.

I congratulate our students for the quality of their work, and I extend my thanks to the many WSU faculty who devote their time and effort to serve as mentors to our students as they pursue their research.

A handwritten signature in purple ink that reads "Michael Vaughan". The signature is fluid and cursive, written in the same color as the shirt in the portrait above.

Michael Vaughan
Provost

Welcome Messages



On behalf of the Office of Undergraduate Research, welcome to the Seventh Annual Undergraduate Research Symposium and Celebration. This year's program includes over 100 projects from each of the seven colleges at Weber State University. Today, the entire campus community comes together to celebrate our students as they have explored their disciplines in search of answers and helped contribute new knowledge. We also celebrate today the work of their faculty mentors. These mentors are each dedicated academic professionals who give of their time and talents to help launch future scholars on their life-long journey of discovery.

Some of the projects presented are in the early stages of the research process and are thus, preliminary results. Others are completed and the students have already disseminated their work at national conferences or have published their results in peer-reviewed journals. In either case, our students are learning the value and importance of communicating and sharing knowledge to others.

Once again the presentations at this year's symposium are evidence that the pursuit of knowledge and creative expression are an integral part of the campus culture at Weber State University. Please join me in congratulating all the participants and celebrating their outstanding accomplishments. I hope you enjoy listening to, talking with and meeting the student presenters. I am certain you will be impressed by the diversity and quality of their presentations.

John F. Cavitt
Director
Office of Undergraduate Research

Poster Display Listing

1: Justin Rague

Virtual Student World

2: Brett Hein

Cognitive Dissonance and Consumer Decisions

3: Rebecca Ruble

Symbolic Analysis of Jobs Daughters

4: Chance Kendall

Contingent Valuation of an Environmental Resource: A New Perspective of Great Salt Lake

5: Kelly Boi

The Effects of Short Term Vitamin D Supplementation and Weight Bearing or Non Weight Bearing Exercise on the Bone Mineral Density of Women Age 65 and Older

6: Elizabeth Merrell

The Physiologic Relevance of an Interaction between MAGP-2 and TGF-B in Elastic Extracellular Matrices

7: Tara Whiting

The Effects of Community Drumming on Generalized Anxiety and Academic Performance in Teenagers

8: Jani Ashbaker

The Effects of Self-Monitoring on Making Healthy Food Choices

9: Misty Bell

Depression: A Comparative Look of Prevalence of Depression Among Dental Hygiene Undergraduates vs. Non-Dental Hygiene Undergraduates

10: Danielle Burningham

A Systematic Review of the Effects of Kinesio Taping on Proprioception and Pain Perception

11: Danielle Burningham

Effect of Kinesio Taping on Ankle Proprioception

12: Danielle Burningham

Radial Collateral Ligament Ruptures of the 4th and 5th Metacarpophalangeal Joints in a Collegiate Male Cheerleader: A Case Report

13: Nathan Caulford

Mate Selection Practices and Preferences in San Pedro and Guatemala City, Guatemala

14: Landon Deru

A Case Report Entitled Running Through a Fibula Fracture

15: Landon Deru

An Evidence Base Medicine on Second Impact Syndrome

16: Kayla George

The Effects of Previously Unrecognized Spinal Stenosis on an Athlete's Career and Life

17: Randi Haynes

Effectiveness of Sanitization on Therapeutic Modality Equipment in Rehabilitation Settings

18: Randi Haynes

Effectiveness of Sanitization on Therapeutic Ultrasound

19: Jamie Heslop

Right Distal Tibial Malunion of a Salter-Harris Injury in an 18-year-old Male Athlete: A Case Report

20: Amanda Kwok

Moving Away from Childhood Obesity

Poster Display Listing

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22: Levi LeFevre

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23: Heather Moore

The Effects of a Point System on Assignment Completion of a Junior High Student

24: Joshua Anderson

The Multi-Sensor Array - Detection of Aerosols using Embedded Systems at High Altitudes

25: James Arnold

Classification of Vegetation Communities in High Alpine Wetlands Using Imagery, Uinta Mountains

26: Carlie Benson

Isolation of Novel Phage from the Great Salt Lake that Infect *Idiomarina*

27: Charla Boom

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28: Paul Buttars

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29: Paul Buttars

Biological Function of the von Willebrand Domaine in Fibrillin-2

30: Christy Cottrell

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37: Kristen Gurr

Incubation Behavior of Snowy Plovers at Great Salt Lake

38: Brent Hansen

Using GIS to Analyze Watershed Scale Features to Test the Theory of Island Biogeography

39: Jon Hansen

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40: Gregory Hill

Investigating Algae Growth with Varying Levels of Salt, Nitrogen, and Phosphorous for Use in Biodiesel Production

41: Ryan Hoggan

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42: Alix Hoskins

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43: Jeremy Kunz

Atomic Force Microscopy Imaging Techniques for Piezoelectric Materials

44: Rachelle Maass

Aromatic Impurities in Zirconium Chloride

45: Krystle Minear

DNA Barcoding Reveals the Diversity of GSL Brine Flies

46: John Metcalf

Weber 2m Amateur Radio Repeater

47: James Moyes

An Investigation of a New Predatory Bacterium (BALO) Inhabiting the Great Salt Lake, UT

48: Karen Nelson

Prophage Induction in Halophilic Bacteria Isolated from the Great Salt Lake, UT.

49: Jeana Nielson

Nocturnal Observation of Brine Shrimp Cyst

50: Mary-Virginia Parker

The Effects of Ultraviolet Radiation on Halophilic Bacteria Isolated from the Great Salt Lake

51: Jared Phelps

Survey of Chitinase Activity in Halophilic Microorganisms from the Great Salt Lake

52: Scott Rollins

Deployable Parachute for HARBOR Module

53: Amanda Truong

Population Genetic Analysis of Great Salt Lake Brine Shrimp, *Artemia*

54: Richard Wangsgard

Ultra Violet Reflectance on Seeds and Eliosomes

55: Cynthia Balzomo

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56: ShayLynne Clark

A Wildcat Major: Factors that Influence Undergraduate Choice of Specialization at Weber State University

57: Gregorio Coronado

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58: Karlin Hicks

A Vehicle for Equality in the Gilded Age: Feminist Perspectives on the Bicycle Era

59: Kimberlee Taylor

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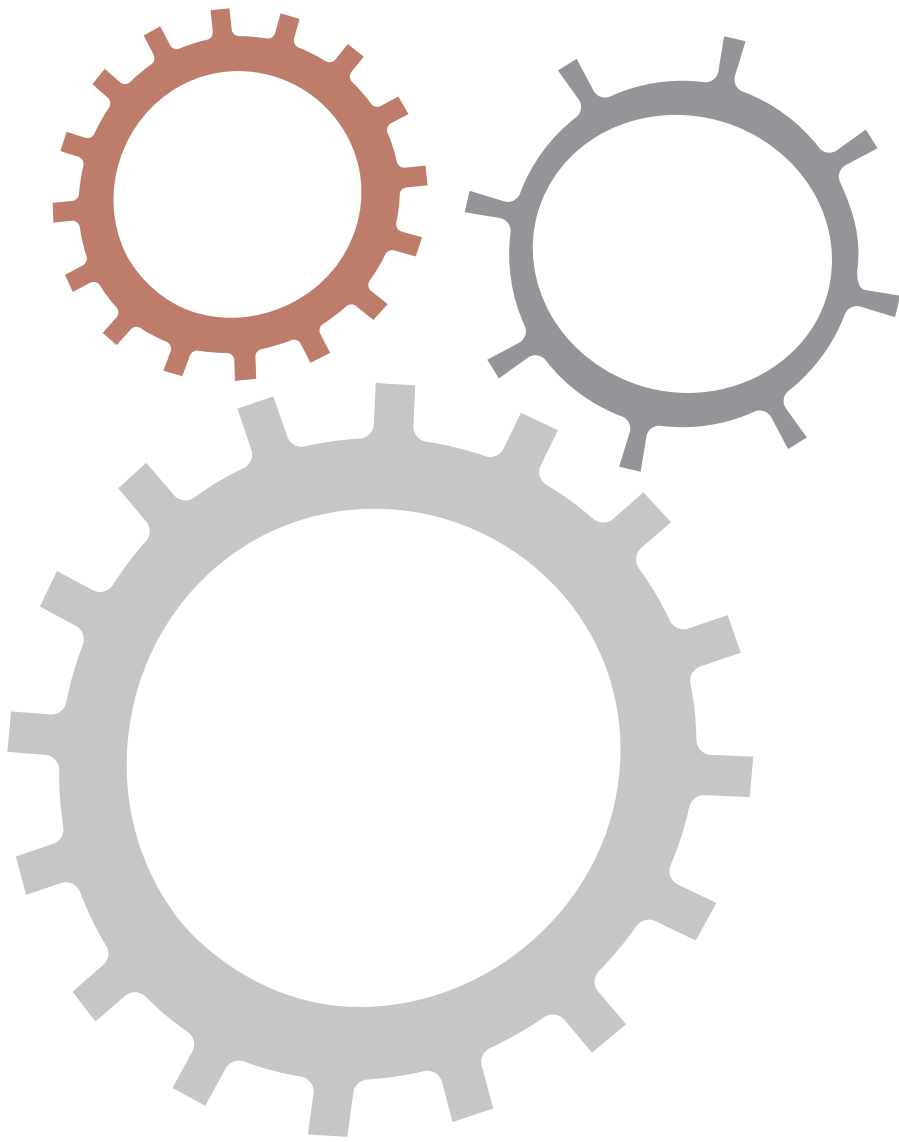
60: David Webb

The Effects of Exercise Duration and Intensity on Serum Levels of Brain-Derived Neurotrophic Factor in Healthy Adult Human Males

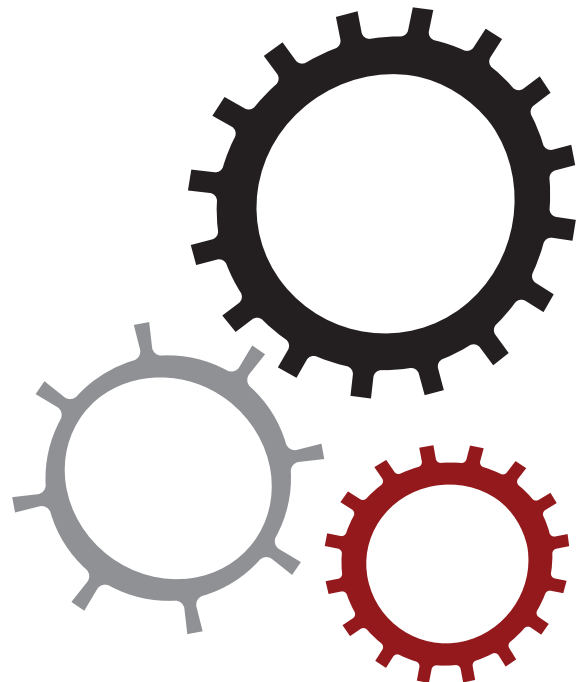
Oral Presentation Schedule

| | 312 | 316 | Ballroom C |
|---|---|--|---|
| 10:45 a.m. | Paula Fiet ----- Improving Working Memory Capacity in School Children Using Computerized N-Back Training | N/A | Corey Dahl et al. ----- Perceived Emotional Aptitude of Clinical Laboratory Science Students Compared to Students in Other Health Care Profession Majors |
| 11:00 a.m. | Amanda Kwok ----- Nutrition and College Student Mental Health | Heide Rathbun-McVeigh ----- Military Marriages | Aaron Barrett et al. ----- C-Reactive Protein and Alpha 1-Antitrypsin Levels in Tears of Extended-Wear Contact Lens Patients |
| 11:15 a.m. | Shannon Tortolano ----- Musical Mood Management: an Exploration of the Efficacy of Music Exposure upon Perceived Mood States and Physiological Indices | Maria Hein ----- Genderlect in Facebook | Cory Callister & Jeremy Hobbs ----- Antinuclear Antibody Assay: Local Result Discrepancies in Testing Methods |
| 11:30 a.m. | Tiffany Allen ----- The Effects of Oral Phosphatidylserine on Saliva Cortisol After Strenuous Exercise | Chance Kendall ----- Maximizing the Value of Thoroughbred Mares: A Hedonic Approach to Foal Value | Sherri Gagnon et al. ----- Lyme Disease a Potential Deferral for Blood Donation |
| 11:45 a.m. | Valerie Wheelwright ----- Effect of Exercise on Brain-Derived Neurotrophic Factor in Obese Women Initiating a Six Week Exercise | Matthew Limb ----- American Icon, African Past: The Orgins of Bugs Bunny | Ray Stanford et al. ----- Sickle Cell Solubility Testing- Applications to Third World Countries |
| 12:00 p.m. | Landon Deru ----- Effects of Relaxation and Imagery Script Interventions to Reduce Cortisol and DHEA Levels in Competitive Athletes | Benjamin Wheeler ----- The History of the Stormy Mountain Boys a Bluegrass Band from Utah | Allan Dubon et al. ----- The Effects of 2009 H1N1 on Weber State University |
| 12:15 p.m. | Bradly Radle et al. ----- The Effects of Therapeutic Heat on the Amplitude Required for a Motor Contraction | N/A | Curtis Farr & Shawn Spjut ----- Determining QC Outdates for TCA & OXYC Reagents on the VITROS 5, 1 Fusion Chemistry Analyzer |
| 12:30 – 1:00 p.m. Break with Refreshments | | | |

| | | | |
|-----------|---|---|--|
| 1:00 p.m. | Megan Martinez ----- Investigation of Serum Ghrelin Levels in Obese Women Initiating an Exercise Program | James Grundy et al. ----- Predigested vs. Polymeric Food Source Does Not Determine Growth Rate | Jeri Hampton et al. ----- Treatment of Salmonella Infections with Probiotic Escherichia Coli and Ciprofloxacin |
| 1:15 p.m. | Michael Heath ----- High Altitude Radiation Measurements | Jason Herman et al. ----- Growth/Development Rate Increase When More Work is Required in Digestion | Kirsten Pollard et al. ----- Antimicrobials vs. Homeopathic Remedies |
| 1:30 p.m. | Sarah Anderson ----- GIS Mapping Potential of Halogeton Invasion in a Native Plant Community | William Mohn et al. ----- The Affect of Peptide Transporter on Growth Rates in C. Elegans | Jennifer Salmond et al. ----- MT/MLT Program Size Correlation with Vacancy Rates and Wages |
| 1:45 a.m. | Joshua Jones ----- Land Use and Planning: Open Space in Weber County | Carl Turner ----- Poison in a Peanut Butter Sandwich: Can Turmeric Protect Against Cirrhosis? | Brandon Bullough et al. ----- Reference Range for Bone Specific Alkaline Phosphatase |
| 2:00 p.m. | Michelle Genung et al. ----- A Day in the Life of ... | Lisa Allred et al. ----- Sexual Dimorphism of Syringeal Muscle Fibers in Male and Female Songbirds | Joshua Clark & Shannon Reighard ----- Identification of Respiratory Pathogens in Hospitalized "Non-Influenza" Utah Patients Using Real-Time PCR |
| 2:15 p.m. | Heide Rathbun-McVeigh & Bliss Stinson ----- Transgender: Finding My Way | Sarah Ahmad et al. ----- Effects of Androgen & Denervation of Zebra Finch Syrinx Morphology | Christen Gee & Jessica Liegel ----- Phlebotomy Tourniquet Protocol in the Western United States |
| 2:30 p.m. | Shawna Rowley et al. ----- A Typical, Red-blooded, American Boy: An Exploration of Social Expectations for Males | Lucas Hall ----- Comparative Study of Methods Used to Trap Nesting Snowy Plovers (Charadrius Alexandrinus) | Cindi Kranek et al. ----- Effects of Centrifugation on the Chemical Analysis of Urine |
| 2:45 p.m. | Anastasia Wood et al. ----- Unspoken Rules: the Flipside of Gender | Jeana Nielson ----- Winter Habitat Selection of the Snowy Plover in Mexico | Amie Mjos-Reisig & Rachel Henry ----- Vitamin D Deficiency in College Students at Weber State University |



College of Applied Science & Technology



Abstracts

Virtual Student World

Justin Rague, Douglas Alves (Brian Rague)

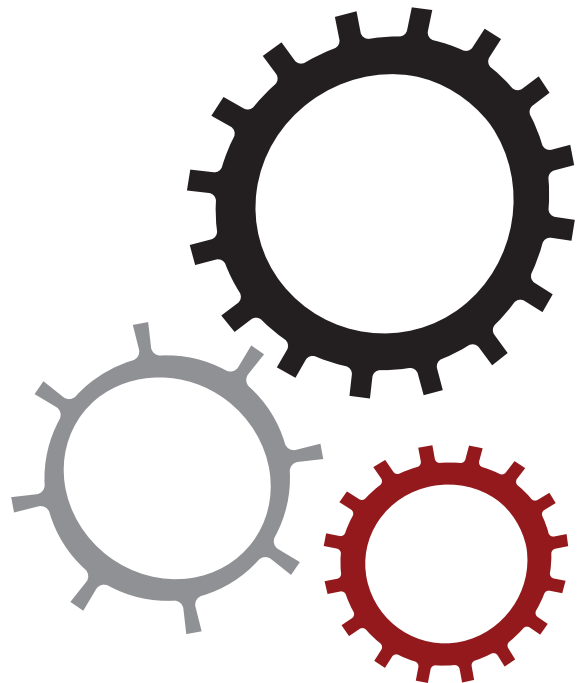
Poster Display 1

Computer Sciences

Eccles Undergraduate Research Scholarship

A virtual world is a simulated environment that can depict fantasy or real world features. When a virtual world is utilized to portray an environment, such as a campus, it can provide more of an impact on prospective students interested in that college. The purpose of this research was to address the challenge that static and aerial photos provide when touring the campus. Although static and aerial photos do give a spacial location of the campus they do not allow a prospective student to actively interact with the environment. When static photos are the only source of information a user would have to assimilate these into a campus layout that may not be accurate.

College of Arts & Humanities



Abstracts

A Day in the Life of...

*Michelle Genung, Kara Jensen, Josh Patel,
Jemaica Kane, Tyler Hess (Colleen Garside)*

Oral Presentation Communication

Society casts men and women into gender specific roles often restricting those who want to challenge normative gender behaviors. The purpose of this staged presentation is to examine the wrongful assumptions pertaining to stereotypical gender roles. Through narrative methodologies, this presentation challenges society's ideals of the traditional family and males and females in the workplace. Cultural and critical theories of gender, including symbolic interactionism and standpoint theory provide the theoretical foundations upon which this presentation is based. This performance brings awareness to the audience that gender roles are not inherently specific to men or women. This presentation demonstrates that men and women can integrate cognitive paradigm shifts to challenge gendered societal norms where both genders have previously been hindered.

Cognitive Dissonance and Consumer Decisions

Brett Hein (Susan Hafen)

Poster Display 2 Communications

To buy, or not to buy? Most of us have been faced with this question. For many, however, this question is answered for us, as spending money is as much a part of our lives as are eating and sleeping. The real questions become: When do I buy? What brand? How much should I spend? These decisions on spending money can sometimes cause us to doubt our decisions or motivations. The purpose of this study is to see whether cognitive dissonance as proposed by Leon Festinger is common during consumer decisions. By using cognitive dissonance theory, our consumer decisions can be analyzed based on the concepts of selective exposure, post-decision dissonance, and minimal justification, among other concepts. Through a survey of thirty-six students at Weber State University, it was found that elements of cognitive dissonance are definitely common during and after purchase decisions. A large majority of respondents reported experiencing doubt during their decisions, and about one-quarter reported that the doubt lingered after the purchase was made. A correlation was also found between reported doubt and whether the respondent considered the purchase to be a "luxury" or "necessity."

College of Arts & Humanities

Genderlect in Facebook

Maria Hein (Susan Hafen)

*Oral Presentation
Communication*

A common colloquialism refers to life as a game.” According to genderlect, the game women play is “Do you like me?” The game that men play is “Do you respect me?” (Tannen 129). This paper explores the ideas of Deborah Tannen’s genderlect theory as it applies to Facebook use. Facebook has become an important and prevalent arena for interpersonal communication. By using genderlect theory, Facebook can be analyzed based on several concepts including: connection versus status, private speaking versus public speaking, story-telling, listening, asking questions, and conflict. A textual analysis of Facebook was performed, with Facebook messages chosen at random from a sample of 222 men and 216 women, a majority of whom were between the ages of 18 and 25. It was found that many users do engage in the concepts of gendered communication listed.

Military Marriages

Heide Rathbun-McVeigh (Colleen Garside)

*Oral Presentation
Communication*

The purpose of this study is to identify the common issues military marriages face with reintegrating when soldiers return home. The topic of military marriages is important because in the last eight years soldiers have seen countless deployments and, due to current policy, will see many more. When soldiers return home, their relationships with their spouses can be problematic as they search for a “new normal” because separation brought changes in both husbands and wives as life moved on and each learned to cope without the other. Then they are reunited and faced with the reality of how to be a married, connected couple again. Relational dialectics theory (Baxter, 1988) predicts the separateness and connectedness dialectic that affects most marriages, but can be especially distressing in military marriages, along with the other five internal and external dialectics. These blogs showed the problematic dialectics that some couples faced after their first deployment, while others did not have problems reintegrating until after the fourth or fifth deployment. Like Leslie Baxter’s research, my analysis illustrated “the contradictions, contingencies, non-rationalities, and multiple realities to which people gave voice in their narrative sense-making of their relational lives” (Griffin, 2009, p.154).

Abstracts

Transgender: Finding My Way

*Heidi Rathbun-McVeigh, Bliss Stinson
(Colleen Garside)*

*Oral Presentation
Communication*

In this day and age there are many changes occurring within our society such as technological advancements, feminist movements, cultural diversity and many more, but the one change that seems to be the hardest for society to accept is sexual and gender orientation. Society has slowly come to accept gays, lesbians, and bi-sexuals, however, they seem to have a harder time understanding transgenders. Our purpose in preparing and performing this staged reading is to gain empathy for what transgender people experience. We neither support nor reject the beliefs and principles of being a transgender but simply are here to help them be more understood by society. We have related the Biological Theory of gender to our research, explaining that although someone might be biologically a male, they may feel like a female on the inside. By presenting multiple transgender case studies and results from surveys given to non-transgenders on the Weber State Campus we will share perspective from both situations; trans and non-trans. This presentation shows how transgenders are misunderstood, and takes a step into their life allowing the audience to experience firsthand their conflicting feelings and the judgments made by society.

A Typical, Red-blooded, American Boy: An Exploration of Social Expectations for Males

Shawna Rowley, Maria Hein, Brett Hein, Ashley Jensen, Shay Baker, Rachael Cummings, Jody Lake (Colleen Garside)

*Oral Presentation
Communication*

Historically, women have suffered a great deal from a gender-biased society centered on power and patriarchal oppression. The Feminist Movement has made great strides in changing the social conscience of how we think about and treat women, but what about men? Manhood is also constructed and dictated by society. The theory of Symbolic Interactionism suggests that through communication with others, such as our parents, we learn who we are and how our culture views our identity. From birth we are taught that men aren't supposed to show human emotions and doing so portrays weakness and endangers their reputation in society. This staged presentation follows the story of a young man as he deals with the constant pressure to conform to society's expectations. He asks, "What is the typical red-blooded American boy?" Combining research on masculinity and informal survey results regarding manhood- this presentation indicates that true men should fit our culture's aggressive masculine mold. Study results suggest that the evidence of male success has been measured by an accumulation of wealth power and status. Brett faces the reality that no man can ever live up to all of society's expectations.

College of Arts & Humanities

Symbolic Analysis of Job's Daughters

Rebecca Ruble (Colleen Garside)

Poster Display 3 Communication

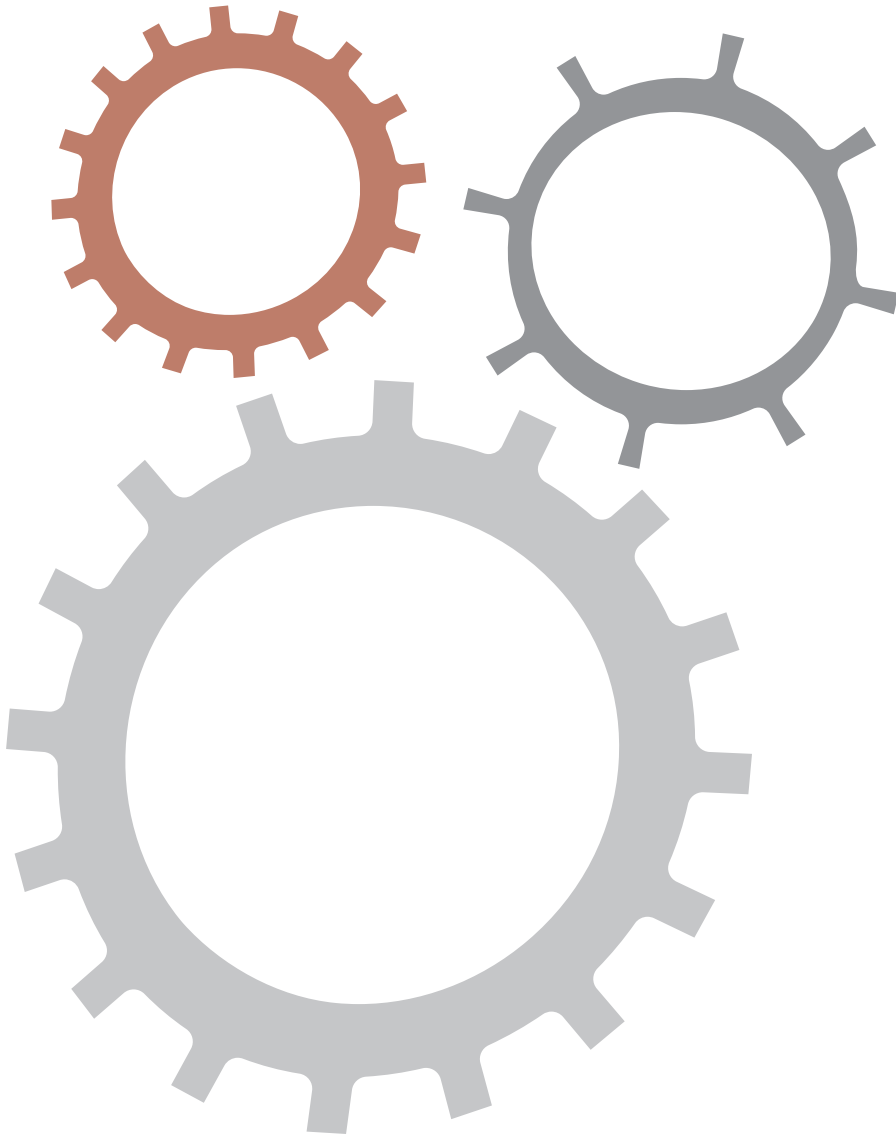
Job's Daughters International is a Masonic sponsored youth organization for girls aged 10 to 20. Yet, there are some who perceive this organization as a cult because of its relation to the Masonic Fraternity. The purpose of this study is to examine the uses and meanings of organizational symbols in an effort to provide a better understanding of the organizational culture and its values. The study is grounded in the theoretical foundations of Semiotics. A qualitative semiotic analysis of the three primary symbolic artifacts within the Job's Daughters organization provides the methodological framework for this study. Findings suggest that the symbols used by the Job's Daughters organization reflect the values and social constructs of the organization. Additionally, the semiotic meanings create identification with and facilitate enculturation into the organization. Findings are consistent with previous studies contending that understanding the meanings of signs through semiotic analysis increases awareness of organizational cultural values.

Unspoken Rules: The Flipside of Gender

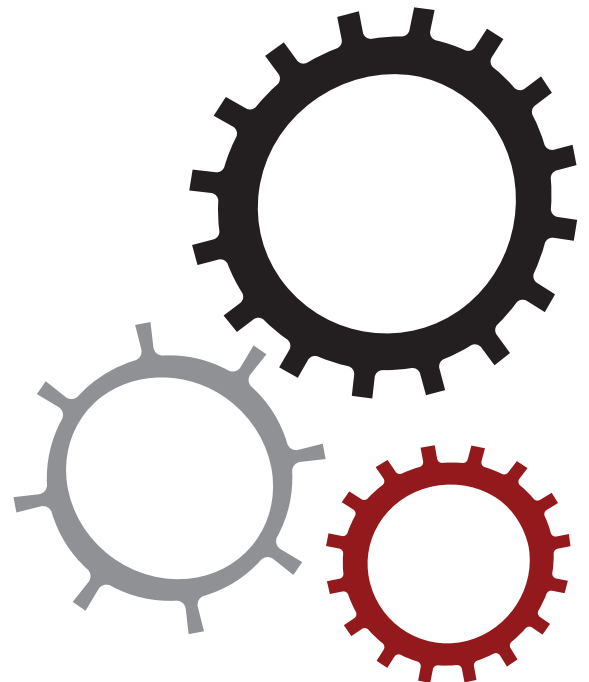
*Anastasia Wood, Jordan Hamler, Bronwyn Janzen,
Royce Fhan, Peter Golde, Charles Burkes
(Colleen Garside)*

Oral Presentation Communication

The purpose of our presentation is to bring awareness to socially constructed gender expectations and roles in a dating environment. We will be using the genderlect styles theory developed by Deborah Tannen to illustrate and explain the differences between male and female communication and how it affects personal relationships and social situations. The genderlect style theory states that "male-female communication is cross-cultural communication." The genderlect styles theory also focuses on the different ways that males and females tell stories, listen, ask questions and deal with conflict. As for our research we will be using collective example of our group's dating experiences and situations we have seen through the media and social situations. Our presentation will show that society has unspoken rules and expectations of gender roles in a dating environment. It will also bring attention to the different ways males and females communicate with each other.



John B. Goddard School of Business & Economics



Abstracts

Contingent Valuation of an Environmental Resource: A New Perspective of Great Salt Lake

Chance Kendall (Therese Grijalva)

Poster Display 4

Economics

Nye Undergraduate Research Scholarship

The Great Salt Lake (GSL) offers many different benefits to society, such as environmental preservation benefits as well as development benefits. As such, members of society wish to use the GSL in different ways. The most efficient allocation of the resource is one that yields the greatest net benefits to society. Currently, there are no economical values placed on the GSL as an environmental preservation asset since it is not traded on the market. This study attempts to identify preservation values using a contingent valuation method based on preferences of area residents. A questionnaire was mailed to a random sampling of residents asking if they would be willing to donate a predetermined sum to protect the GSL. In addition, a scope test was conducted to compare the value residents placed on the GSL as compared to the migratory flyway that includes the GSL. These estimated values are only one piece of information that should be included in an allocation decision. For completeness, all preservation and development values need to be assessed. Initial findings indicate that area residents do value the GSL. This study was replicated for the Marismas Nacionales, Mexico, which is also part of the migratory flyway.

Maximizing the Value of Thoroughbred Mares: A Hedonic Approach to Foal Value

Chance Kendall (Doris Geide-Stevenson)

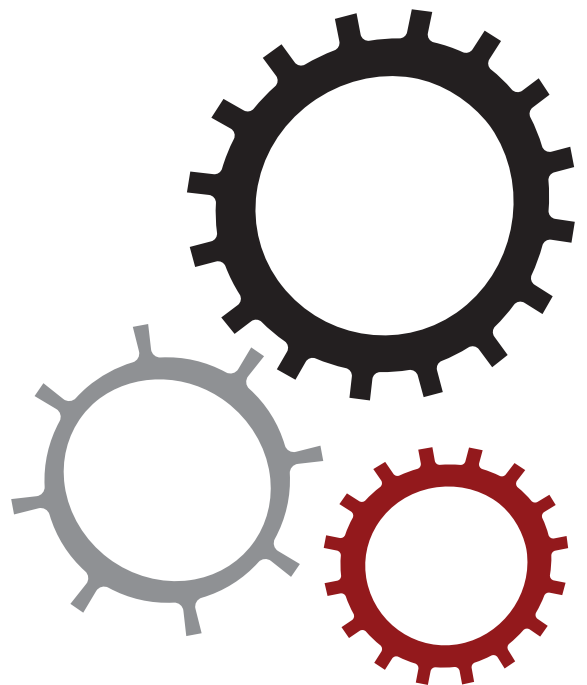
Oral Presentation

Economics

Nye Undergraduate Research Scholarship

The purpose of this research is to identify whether or not a link exists between the racing career and value of the a foals of a female thoroughbred racehorse. Such a link clearly exists for male thoroughbred racehorses. This paper utilizes the hedonic pricing model in order to determine if the dam's performance as a racehorse impacts the selling price of her foals. It is discovered that there is no statistically significant relationship between said performance and the selling price of the foal.

Bachelor of Integrated Studies



Abstracts

The Effects Of Oral Phosphatidylserine on Saliva Cortisol After Strenuous Exercise

Tiffany Allen (Rodney Hansen)

Oral Presentation

Bachelor of Integrated Studies

Denkers Undergraduate Research Scholarship

The practicality of using phosphatidylserine (PS) as an ergogenic aid is being investigated along with the potential of using PS to reduce cortisol levels in athletes to increase the build-up of muscle with strenuous exercise. Endurance runners were randomly placed in a group receiving oral PS supplementation or a group receiving a placebo. The base levels of salivary cortisol and blood pressure were collected and athletes were stressed to measure salivary cortisol levels after a VO₂ max test. The groups then received PS or the placebo at 600mg a day for ten days and their salivary cortisol levels and blood pressure were tested before and again five and ten minutes after a 20 minute treadmill run. This is as a crossover study and each subject does the entire procedure on the placebo and on PS supplementation. The data from the PS groups will be compared against the data from the placebo groups in a pre and post design to determine if PS is effective in decreasing cortisol levels. I have completed data collection for seven of the ten athletes and have begun a literature review. Following data collection I will analyze the data and present the results.

The Effects of Short Term Vitamin D Supplementation and Weight Bearing or Non Weight Bearing Exercise on the Bone Mineral Density of Women Age 65 and Older

Kelli Boi (Rodney Hansen)

Poster Display 5

Bachelor of Integrated Studies

Eccles Undergraduate Research Scholarship

Background: It is well established that weight bearing exercise and supplementation of calcium and vitamin D are helpful in increasing and maintaining bone density. This study investigated the effect of supplemental vitamin D on the bone mineral density (BMD) of women over 65 with established exercise patterns of either weight bearing or non-weight bearing activity. **Methods:** This was a two-by-two prospective study with an intervention that enrolled 21 healthy women age 65 and older from four area senior activity centers. Participants were divided into two groups based on their exercise patterns of either weight bearing or non-weight bearing activity as reported on a food and exercise frequency questionnaire. All subjects received 2000 IU vitamin D tablets to take once per day with a meal. Bone density was measured before and after the 6 month trial. **Results:** Only 12 participants completed the study. The mean preliminary T-scores of the Weight-bearing exercise (WBE) group were significantly higher than the No exercise/non-weight-bearing exercise (NE) group ($p = 0.01$). There were no significant changes in bone mineral density (BMD) from the initial scan to the post-intervention scan in either group. **Conclusion:** In this trial, short term vitamin D supplementation did not have a significant effect on the bone mineral density (BMD) of women age 65 and older. The higher initial BMD of the WBE group suggests that lifelong healthy habits have a stronger effect on bone density than short-term supplementation. As the attrition in both groups likely affected the results, further study is warranted.

Bachelor of Integrated Studies

Land Use and Planning: Open Space in Weber County

*Joshua Jones Tricia Cook, Sidney Noyce
(Bryan Dorsey)*

*Oral Presentation
Bachelor of Integrated Studies*

Combining community-based research with community service-learning is an incredibly effective way for undergraduate students to learn and produce substantial, meaningful work. This presentation demonstrates how identifying and undertaking an undergraduate research project that is linked to a government or community organization in need of research findings, leads to applied research that provides a service to the community. Our case study from the field of land use planning/geography shows how students learn the importance of protection of the “public good” through a variety of avenues such as reduced dependency on the automobile that leads to carbon emissions reductions leads to applied research that provides a service to the community. Through civic engagement and community based service-learning we have become better prepared for both professional and volunteer roles in community service.

The Physiologic Relevance of an Interaction between MAGP-2 and TGF- β in Elastic Extracellular Matrices

Elizabeth Merrell (Barbara Trask)

*Poster Display 6
Bachelor of Integrated Studies
Denkers Undergraduate Research Scholarship
Nye Undergraduate Research Scholarship*

Extracellular matrices are comprised of glycoproteins and proteoglycans that contribute to the structure and function of tissues and organs. Elastic extracellular matrices are found in organs such as lung and skin; components of the elastic extracellular matrix contribute to the stretch and recoil characteristic of these organs. The extracellular matrix in these elastic organs is rich in the protein elastin, but it is also rich in 12nm microfibrils. The principle protein components of these microfibrils are members of the fibrillin family, although other proteins, including microfibril-associated glycoproteins-1 and -2 (MAGP-1 and -2), are also present and may contribute to the function of these structures. Both fibrillin and MAGP-1 have been already shown to interact with members of the TGF- β family of growth factors and to modulate their activity in vitro and in vivo. To investigate whether MAGP-2 might also interact with growth factors, the binding properties of recombinant MAGP-2 were studied using surface plasmon resonance. These studies revealed a novel interaction between MAGP-2 and the active form of TGF- β 1. This association is of particular interest given the biological importance of binding between the latent form of this growth factor and fibrillin. To assess the physiologic relevance of the MAGP-2/TGF- β 1 interaction, matrix incorporation of recombinant MAGP-2 was assessed by immunofluorescent microscopy. Upon confirmation of MAGP-2's matrix incorporation, cellular responses to TGF- β 1 were measured in the presence and absence of MAGP-2 protein, using cells isolated from MAGP-2 null mice.

Abstracts

Effect of Exercise on Brain-Derived Neurotrophic Factor in Obese Women Initiating a Six Week Exercise Program

Valerie Wheelwright (Rodney Hansen)

Oral Presentation

Bachelor of Integrated Studies

Eccles Undergraduate Research Scholarship

This research project will examine the effect of exercise on increasing brain-derived neurotrophic factor (BDNF) in obese women initiating an exercise program. BDNF is found in the hippocampus and cerebral cortex of the brain. It can also be found in circulating blood within the platelets and plasma. BDNF may prevent neural death; promote neuronal growth and neural regeneration. Therefore BDNF may improve brain health; and lifestyles to enhance BDNF levels may be beneficial. There is evidence from previous studies that shows the positive effects of exercise on brain health and function. Exercise or physical activities can increase the level of BDNF in animals. In regards to studies that investigate BDNF levels in obese subject, there is no research at all. Additionally, there is no research that has investigated BDNF in obese humans that are exercising. This study may show evidence that exercising is good for brain health in obese, exercising women. We hypothesize that BDNF levels will increase in obese subjects after exercise which will improve brain function as well as improve physical health.

The Effects of Community Drumming on Generalized Anxiety and Academic Performance in Teenagers

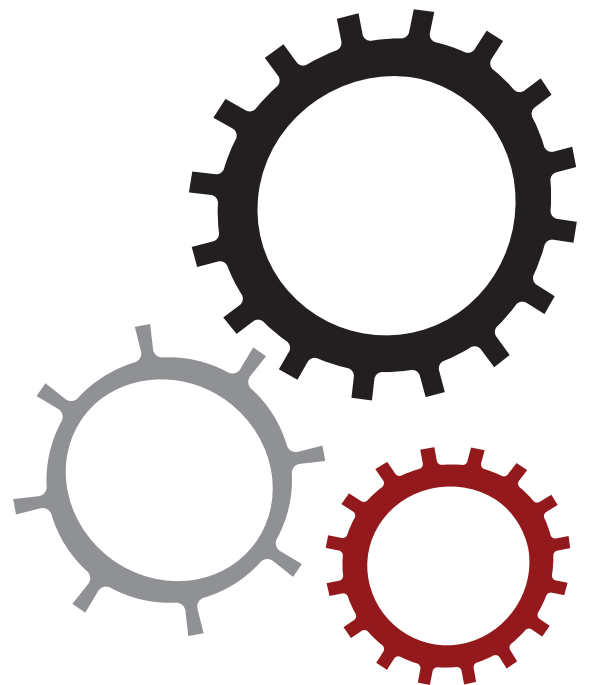
Tara Whiting (David Akombo)

Poster Display 7

Bachelor of Integrated Studies

Generalized anxiety and academic performance were measured in five middle school students receiving group drumming as music intervention. Participants served as their own controls in the study. Participants received instruction in group drumming for seven weeks. Generalized anxiety was measured using the State-Trait Anxiety Inventory (STAI) using pre-intervention and post-intervention data collection. Academic performance was measured with the Utah Basic Skills Competency Test (UBSCT) math and writing tests. It was hypothesized that group drumming would decrease anxiety and increase academic test scores. Analysis of the data found no statistically significant findings with the implementation of group drumming.

Jerry and Vickie Moyes College of Education



Abstracts

The Effects of Self-Monitoring on Making Healthy Food Choices

Jani Ashbaker (Natalie Williams)

*Poster Display 8
Teacher Education*

This poster will describe how, in an effort to promote healthy food choices, a single-subject function-based intervention was implemented for a 58-year-old female whose food consumption consisted of a diet high in sugars and saturated fats and low in protein. The target behavior of this intervention was for the participant to make healthy food choices by replacing unhealthy foods with healthy alternatives. Following baseline, a single subject changing criterion design was implemented with a goal to increase protein and decrease sugar and saturated fat intake. Results showed attainment of initial targeted criterion within one day of starting intervention and maintenance over the following 14 days at which time a criterion change was implemented. Results showed attainment of the designated criterion within 2 days of the criterion change and maintenance for the next 8 days. Maintenance data collected 10 months following the intervention will also be provided. The author will present and discuss data and offer suggestions for replication of the intervention.

Depression: A Comparative Look of Prevalence of Depression Among Dental Hygiene Undergraduates vs. Non-Dental Hygiene Undergraduates

Misty Bell (Michael Olpin)

*Poster Display 9
Health Promotion & Human Performance*

The belief that dentists have the number one suicide rate among health professionals is often accepted without question. There is little reliable data that verifies this alleged risk. Dental staff members' stress allegedly has been a significant factor in practices, but there are no supporting data that correlate the work environment with suicides or suicidal attempts by dental assistants, hygienists and other personnel. For further investigation into this discrepancy and to provide more accurate research about this myth on campus, this study administered the Beck Depression Inventory to 60 dental hygiene undergraduates and 60 non-dental hygiene undergraduates at Weber State University's Ogden Campus located in Northern Utah. The researcher expected to find depression rates lower among dental hygiene undergraduates than non-dental hygiene undergraduates. The study compared the mean scores of those tested in a two-sample t-test. Results indicate that depression is slightly lower among dental hygiene undergraduates versus non-dental hygiene undergraduates.

College of Education

A Systematic Review of the Effects of Kinesio Taping on Proprioception and Pain Perception

*Danielle Burningham, Kayla George,
Sadie Olmstead (David Berry)*

Poster Display 10

*Health Promotion & Human Performance
Nye Undergraduate Research Scholarship*

Context: The use of Kinesio® tape in the acute stages of healing and rehabilitation for athletes has increased in recent years. However, the question to its efficacy is still relatively unanswered. **Objective:** The purpose of this systematic review was to investigate the efficacy of Kinesio® tape on joint proprioception and pain perception. **Data Sources:** Articles were identified from the following databases: SPORTDiscus, CINAHL, Google Scholar, and KinesioTaping.com from January 1999 through 2009, using the following key-words: kinesio tape, kinesio taping, pain, and proprioception. **Study Selection:** The inclusion criteria were (1) articles published in the English language, and (2) articles that examined the efficacy of Kinesio® taping on joint proprioception or pain perception. **Data Extraction:** Five articles met the inclusion criteria, three full reports and two abstracts. The articles were divided into two categories, proprioception (two articles) and pain perception (three articles). The articles had a combined PEDro score of 5.87, the proprioception articles PEDro score average was 4.67, and the pain articles PEDro score average was 6.67. **Data Synthesis:** Although Kinesio® taping is marketed to improve proprioception and decrease pain perception in injury, strong evidence to support these claims appears lacking and unavailable to a large extent.

Effect of Kinesio Taping on Ankle Proprioception

Danielle Burningham (David Berry)

Poster Display 11

*Health Promotion & Human Performance
Nye Undergraduate Research Scholarship*

Context: Kinesio® tape has reportedly been used by health-care providers in reducing edema, strengthening muscles, decreasing pain, and relieving abnormal muscle tension. Product manufacturers also advertise the tape's ability to increase proprioceptive awareness. However, research examining this property is limited. **Objective:** To determine the efficacy of Kinesio® tape on ankle joint proprioception. **Design:** Single blinded, randomized, counter-balanced design. **Setting:** Controlled, laboratory setting. **Participants:** Healthy subjects (13M and 9F, age=23.68±4.65 years, mass=76.69±16.32 kg, height=175.43±9.73 cm) meeting the following inclusion criteria (1) 18-45 years of age, (2) right foot dominant, (3) without foot or ankle abnormalities, and (4) without foot or ankle injury in the past 9 months. **Intervention:** Subjects were randomly allocated into tape first or no-tape first groups. Ankle proprioception was determined by subjects' active reproduction of joint position sense (RJPS) for 26° dorsiflexion (DF) and 20° plantar flexion (PF), after holding these positions 3 times for 5 seconds. Data was collected using a Kin-Com 125AP. The subject's forefoot was strapped to the footplate, and subjects were blindfolded. They were instructed to move into 26° DF for 5 seconds; and then instructed to move into 20° PF position for 5 seconds. This series was repeated three times. From neutral, subjects were instructed to reposition their foot into DF to where they believed their foot was when the machine stopped them and signal researchers when there; this angle was recorded. This was recorded for PF as well. This series of DF to PF RJPS was repeated a second time. **Main Outcome Measures:** Pre and post RJPS angle measurements were recorded for ankle DF and PF. Dependent variables were relative and absolute error for ankle DF and PF joint angles using the means of the two trials. Data was analyzed using a paired t-test. **Results:** Testing revealed a significant difference in the relative error for ankle RJPS of 26° DF (tape M=6.57±5.07, no-tape M=3.89±5.97, P=.027). There were no significant differences for the absolute error (P=.131) for DF, or in the relative (P=.847) or absolute error (P=.730) for 20° PF. **Conclusions:** The significant difference in the DF relative error suggests Kinesio® tape hinders ankle RJPS in this movement. The lack of significant differences in all other measurements is supportive of previous work suggesting that Kinesio® tape does not likely enhance proprioceptive awareness in active ankle RJPS in healthy adults.

Abstracts

Radial Collateral Ligament Ruptures of the 4th and 5th Metacarpophalangeal Joints in a Collegiate Male Cheerleader: A Case Report

Danielle Burningham (David Berry, Shannon Hansen)

*Poster Display 12
Health Promotion & Human Performance
WSUSA Undergraduate Research Travel
Fellowship*

Objective: To present a case study of a male cheerleader who sustained a rupture of the 5th metacarpophalangeal joint (MCPJ) radial collateral ligament (RCL) and partial rupture of the 4th MCPJ RCL, and the course of treatment. **Background:** During a stunting practice, a 23-year-old male cheerleader sustained forced abduction and extension of the 3rd, 4th, and 5th phalanges of the left hand, resulting in a complete rupture of the 5th MCPJ RCL and partial rupture of the 4th MCPJ RCL. **Differential Diagnosis:** Metacarpophalangeal RCL sprain, metacarpophalangeal joint dislocation/subluxation, and contusion. **Treatment:** The athlete was placed in a Velcro buddy tape device, to stabilize the 3rd-5th phalanges to prevent further abduction. Ten weeks post-injury, the 5th MCPJ RCL was healed and the 4th MCPJ RCL was 80% healed, allowing for a strengthening protocol to be developed. **Uniqueness:** Metacarpophalangeal RCL sprains are rare injuries, especially in cheerleading. In professional football the incidence of any finger MCPJ sprain occurring is approximately 2% of hand injuries. The athlete also maintained his practice routine while wearing the Velcro buddy tape device as the only means of support. **Conclusion:** The nature of this injury is highly uncommon, and while treatment is conservative it is normally effective.

Mate Selection Practices and Preferences in San Pedro and Guatemala City, Guatemala

Nathan Caulford (Paul Schvaneveldt)

*Poster Display 13
Child and Family Studies*

This study examined mate selection preferences and practices among two samples of adults from Antigua and Guatemala City, Guatemala and from San Pedro, Guatemala, respectively. These two research groups represent different values on mate selection characteristics largely influenced by the broader cultural context, and provide a valuable foundation for understanding Latino culture in the United States, and learning from a more traditional culture which espouses a more pragmatic approach to mate selection. These principles are a valuable basis for divorce reduction strategies and programs. The goals of this study are to identify concepts of mate selection theory such as homogamy and propinquity, and aspects of social exchange theory in two distinct adult populations in Guatemala. A questionnaire used in previous studies and adapted for cultural validity was administered to 96 adults from San Pedro and 96 adults from Antigua and Guatemala City. Results reflect endorsement of exchange theory: Persons of more perceived worth are more desirable as potential partners. Important differences identified between the two groups include rural respondents being more likely to avoid perceived costs such as drug and alcohol use, STD's, and health issues, and were more likely to select mates who value work, children, and family.

College of Education

A Case Report Entitled Running Through a Fibula Fracture

*Landon Deru, Craig Allen, Robbie Stagg
(David Berry)*

*Poster Display 14
Health Promotion & Human Performance
Denkers Undergraduate Research Scholarship*

Objective: To present the case of an 18 year-old collegiate cross-country runner who ran for three weeks on a left distal fibular fracture.

Background: The athlete reported to the athletic training room with a chief complaint of posterior lateral ankle pain after twisting his ankle during a race; not finishing the race due to pain.

Differential Diagnosis: Ankle sprain, peroneal strain, peroneal tendonopathy, fracture.

Treatment: He was diagnosed with a peroneus brevis strain and treated for one week, gradually returning to unrestricted, pain-free running. Twenty-one days later a protrusion along the distal fibula developed. He was referred to the team physician for radiographs, revealing a healing fibula fracture. He was prescribed a walking boot for two weeks, returning to activity seven weeks after the original injury.

Uniqueness: Normal management of fractures requires removal from weight-bearing activities and rest for approximately six weeks. Despite continued weight-bearing activities for three weeks, the athlete returned to pain-free activity seven weeks after the original injury.

Conclusions: Early recognition of bony trauma is necessary to prevent the secondary injury and allow for timely return to function. Traditional recovery time is 6 - 12 weeks. Recovery while running was six weeks.

An Evidence Base Medicine on Second Impact Syndrome

*Landon Deru, Vanessa Farris, Jacob Cooper
(David Berry)*

*Poster Display 15
Health Promotion & Human Performance
Denkers Undergraduate Research Scholarship*

Context: Second-Impact Syndrome (SIS) is believed to be a condition (usually fatal) that results from suffering a second concussion before symptoms from the previous concussion has ceased. The repetitive impact causes the brain to rapidly swell, causing severe head trauma.

Objective: The purpose of this systematic review was to investigate the written literature concerning Second-Impact Syndrome (SIS).

Data Sources: Articles were identified from the following journals: Western Journal of Emergency Medicine, Clinical Journal of Sports Medicine, Journal of Athletic Training, Journal of American Medical Association, Journal of Forensic Science, and Acta Pædiatrica.

Data Synthesis: Although Second-Impact Syndrome is thought to have fatal effects, strong evidence to support these claims appears lacking and unavailable to a large extent. This is due to the unrecognized and undiagnosed initial concussion.

Study Selection: The inclusion criteria were (1) articles published in the English language, and (2) articles that examined the diagnosis and effects of Second-Impact Syndrome.

Keywords: Second Impact Syndrome, Concussion, Brain Injury, Subdural Hematoma, diffuse cerebral swelling.

Abstracts

Effects of Relaxation and Imagery Script Interventions to Reduce Cortisol and DHEA Levels in Competitive Athletes

Landon Deru (Rodney Hansen)

Oral Presentation

Health Promotion & Human Performance

Denkers Undergraduate Research Scholarship

Objective: To answer the following questions through quantitative methods: (1) Will relaxation and imagery scripts reduce both mental and physical stress in those who have experienced injuries? (2) Will this result in an overall increased recovery speed? (3) Will it help to motivate athletes to adhere to the rehabilitation program set out for them? **Settings:** Weber State University Stress Lab, and Nutritional Biochemistry Lab. **Participants:** Participants were recruited from university and club sports teams at Weber State University. A total of 80 samples are being tested. **Results:** Saliva samples were collected by expectorating into a cryovial and will be assayed with a sandwich ELISA. Though all saliva samples have been collected, saliva testing is still in progress. Therefore, results have not been compiled completely. We expect to see significant results and hope that this study will show the significance of relaxation in athlete recovery time. I am excited to present the progress of my study this year as an oral presentation, and plan on presenting the final results of the study in the following year as a poster.

The Effects of Previously Unrecognized Spinal Stenosis on an Athlete's Career and Life

Kayla George, Stacey Davis, Adam Cunningham, Shannon Hansen (David Berry)

Poster Display 16

Health Promotion & Human Performance

Objective: Spinal stenosis is a narrowing of the spinal canal resulting in compression of the spinal cord and nerves. It usually occurs with aging, but can be found at any age. **Background:** An 18-year-old male football player was struck in the head during a football game sustaining a "stinger." He returned to play suffering a head-to-head collision which resulted in transient quadriplegia lasting approximately two minutes. **Differential Diagnosis:** Spinal cord shock, spinal cord contusion, cervical fracture. **Treatment:** The athlete was referred to a neurologist who ordered an MRI which revealed severe narrowing of the cervical spine canal. The narrowing was so severe there was inadequate space for normal flow of cerebral spinal fluid. The extensive narrowing of the spinal canal resulted in disqualification from future collegiate football participation. **Uniqueness:** Spinal stenosis is not rare and is quite common in athletes; however, the degree of narrowing found in this case was quite rare given the fact that the athlete never experienced any prior symptoms. **Conclusions:** While spinal stenosis may be common in athletes and normally causes no lasting affects, it is important for athletic trainers to understand neurological symptoms may suggest something larger than compression or stretching of a nerve root.

College of Education

Effectiveness of Sanitization on Therapeutic Modality Equipment in Rehabilitation Settings

Randi Haynes, Angela Perkins, Benjamin Whicker, Trever Gray, Jared Smedley (David Berry)

*Poster Display 17
Health Promotion & Human Performance
Denkers Undergraduate Research Scholarship*

Background: Everyday patients are treated with therapeutic modalities at physical therapy clinics and athletic training rooms. In these fast paced environments hygiene is both a concern and priority. Failure to maintain good hygiene could pose a threat when working with surgical, wound care, or even with the general healthy patients. The spreading of bacteria to surgical or injury sites, can cause further damage and delay the rehabilitation process. Objective: The purpose is to examine sanitization methods of self-adhesive electrodes used for electrical stimulation in rehabilitation settings. Methodology: Our aim is to include 10-20 healthy subjects (both male and female over the age of 18 years old) daily, for each control and experimental groups at each clinic. Experimenters will wash their hands before electrode placement and after. The three experiment groups are UV-C (Ultra-Violet C light), 70% Isopropyl Alcohol wipes, and a commercial disinfectant. Within 36 hours of last treatment, pads will be refrigerated and cultured for MERSA (staphylococcus), fecal matter, and general growth. All cultures will be examined by the WSU Microbiology Department. Results: Results will not be completely analyzed at the time of abstract submission.

Effectiveness of Sanitization on Therapeutic Ultrasound

Randi Haynes, Angela Perkins, Benjamin Whicker, Trever Gray, Jared Smedley (David Berry)

*Poster Display 18
Health Promotion & Human Performance*

Background: Therapeutic ultrasound units are used in a variety of settings, from outpatient rehabilitation to athletic training rooms. There has been little research to determine the levels of possible bacteria transfers with these units. One cleaning method that has not been tested for its effectiveness is UV-C (Ultra-Violet) light. This method may prove to be more effective than some of the traditional methods. Objective: The purpose is to examine the most effective sanitization methods to limit bacteria transfer with therapeutic ultrasound units used in rehabilitation settings. Methodology: Ultrasound units in the WSU athletic training classroom, five athletic training rooms, and three outpatient physical therapy clinics will be analyzed. Ultrasound data will be collected in parts 1) before any cleaning method used, and 2) after each disinfecting method using cotton swabs. The three experiment groups are UV-C light, 70% Isopropyl Alcohol wipes, and a commercial disinfectant. Within 36 hours, swabs will be refrigerated and cultured for MRSA (staphylococcus), fecal matter, and general growth. All cultures will be prepared and examined by students of the WSU Microbiology Department. Results: Results will not be analyzed at the time of abstract submission.

Abstracts

Right Distal Tibial Malunion of a Salter-Harris Injury in an 18-year-old Male Athlete: A Case Report

Jamie Heslop, Jennie Largent, Lindzee Yates, Sadie Olmstead (David Berry, Shannon Hansen)

*Poster Display 19
Health Promotion & Human Performance*

Objective: To present the case of right distal tibial malunion of a Salter-Harris injury and the subsequent management in an 18-year-old male athlete. **Background:** An 18-year-old male football player reported to the athletic trainer complaining of medial ankle pain and complaints of his ankle falling and rotating outward while running. He reported sustaining an ankle injury in the 8th grade after falling 6 ft. Radiographs noted prior injury to the growth plate and poor tibial growth, creating a shallow cup for the talar dome to sit.

Differential Diagnosis: Ankle sprain, tibialis anterior and Poster Displayior strain, pes planus. **Treatment:** Conservative therapy failed to resolve the ankle instability. The athlete underwent a right tibial osteotomy, Achilles tendon lengthening, and ankle debridement to correct the tibial malunion. Following four months of rehabilitation the athlete returned to pain-free activity. **Uniqueness:** A distal tibial malunion secondary to a Salter-Harris resulting in a right tibial osteotomy are rare. In a non-active individual tibial malunions may present few problems. However, as an active individual the instability presented by the athlete increases the risk of further tissue damage. **Conclusions:** Chronic ankle pain failing to resolve with conservative care requires referral to the appropriate healthcare provider for further evaluation.

Moving Away from Childhood Obesity

Amanda Kwok, Danielle Taylor (Theresa Kay, Dianna Abel)

*Poster Display 20
Child and Family Studies*

Childhood obesity is a prevalent issue that is affecting children in the United States. Minority children from low-income families are overrepresented in the overweight population. The aim of our study was to obtain information regarding the nutrition, media usage and physical activity of children enrolled in the Ogden-Weber Community Action Partnership (OWCAP) Head Start program. More than 90% of these children lived in poverty and over 50% were from Latino families, placing them at a higher risk for developing childhood obesity. From November 2009 to January 2010, a total of 50 OWCAP parents completed a survey that included 45 questions on their children's physical activity pattern, eating habits, and media behavior at home. In addition, basic demographic information was collected from these parents. The results of our study will be utilized to guide the development of a multidimensional intervention program among this at-risk population. Our ultimate goals were to increase children's physical activity, reduce sedentary media time, support healthy eating, and inform teachers and parents of effective ways to prevent childhood obesity.

College Of Education

Bilateral Femoral Shaft Stress Fractures in an 18-Year-Old Collegiate Female Distance Runner: A Case Report

*Benjamin Leishman, BreAnne Perkes,
Chris Barber (David Berry)*

*Poster Display 21
Athletic Training*

Objective: We present the case of an 18-year-old female long distance runner with bilateral femoral stress fractures. **Background:** The athlete began experiencing right anterior hip pain high in the groin and low back/gluteus pain while running long distance. She trained through pain for two-three weeks, but started to cross-train to decrease impact activity level. It was not until she was unable to compete in distance race did she seek out medical attention. **Differential Diagnosis:** Pubic rami stress fracture vs. right hip intraarticular process **Treatment:** The athlete complained of right, anterior inguinal pain, exacerbated with extremes of external and internal hip rotation. A bone scan demonstrated femoral stress fractures in the proximal shaft of the both femurs. The athlete was removed from weight bearing activities, referred to a dietitian and initiated a cross-training program. She continues to improve, light running on treadmill every other day, with elliptical on off days. **Uniqueness:** Femoral stress fractures account for only about 10% of stress fractures sites; however, bilateral femoral shaft stress fractures are more unique. **Conclusions:** While bilateral femoral stress fractures are rare in athletics, proper management includes early identification of the etiology and unloading of the limb through non-weight bearing activities such as aquatic exercise and cross-training.

Achilles Tendon Repair in a 16 Year Old High School Football Player: A Case Report

*Levi LeFevre, Jacob Cooper, Courtney Birch,
Shannon Hansen, Teresa Ingram (David Berry)*

*Poster Display 22
Health Promotion & Human Performance*

Objective: To present the case of a 16-year-old male athlete with an Achilles tendon rupture and his successful return to athletics. **Background:** A 16-year-old African American male suffered an injury to his lower left extremity while playing flag football during a school period. He believed he had sustained a lateral ankle sprain and did not immediately seek medical attention. Upon medical examination, two weeks later, it was determined that he had suffered a grade III Achilles tendon rupture. **Differential Diagnosis:** Ankle sprain, calf strain, acute bursitis, tendonitis. **Treatment:** The athlete underwent an operative procedure to repair the Achilles tendon. After five months of rehabilitation he was cleared to participate in full contact sporting activities. **Uniqueness:** Achilles tendon ruptures most commonly occur in adult males, ages 30-50 years who are normally sedentary individuals who then exert themselves at a high rate (e.g., bursts of jumping, pivoting, and running). The athlete in this case was otherwise a strong, healthy adolescent who did not seem to present with any known risk factors associated with an Achilles tendon rupture. **Conclusion:** Based on the prevalence of Achilles tendon ruptures, it is very uncommon to see an injury in such a young individual with no known risk factors.

Astracts

Investigation of Serum Ghrelin Levels in Obese Women Initiating an Exercise Program

Megan Martinez (Rodney Hansen)

Oral Presentation

Nutrition

Eccles Undergraduate Research Scholarship

Ghrelin, an orexigenic hormone that stimulates GH secretion, food intake, growth and is secreted primarily by the stomach has been associated with hunger (Cummings, 2002). An inverse relationship existing between plasma ghrelin concentrations and obesity has been identified. In obese human subjects, plasma ghrelin levels are lower (Ukkola, 2002). Total fat mass and BMI are inversely correlated to plasma ghrelin in premenopausal women (Sondergaard, 2008). Ghrelin increased in response to weight loss from either food intake reduction or exercise intervention (Kelishadi, 2008). A woman in Motion, a group training program for women with a BMI over 30, is being held at WSU. Participants meet 16 weeks for education, strength training and walking. At the end of the 16 weeks, the women compete in the Ogden Marathon. This research project will look into the association between ghrelin and obese women beginning an exercise program. Beginning with an initial blood draw before the women begin to implement the exercise program, ghrelin levels will be tested and monitored throughout six weeks. The levels of ghrelin will be tracked to determine if initially the women did show a decreased ghrelin level and also if adding exercise increased their levels of ghrelin.

The Effects of a Point System on Assignment Completion of a Junior High Student

Heather Moore (Natalie Williams)

Poster Display 23

Teacher Education

This poster describes the use of positive reinforcement to modify the undesirable behavior of a teenager. The dependent variable was the latency of the student starting his homework and the number of two minute periods he was engaged in on task behavior after beginning the task. The independent variable was the reinforcer earned, depending on the points received by starting the task in a timely manner and continuing to work on the task. One junior high school student, who struggled to begin and complete assignments quickly and independently, participated in this study. This study implemented a single subject research design with a reversal in order to verify the effectiveness of the intervention. The intervention involved awarding points for each two minute period the student was on task and additional points were awarded for starting in a timely manner. During baseline the student averaged 23.58 minutes to begin the task and 25% on task behavior. During intervention time to begin the task reduced to 1.59 minutes and 70% on task behavior. The author will present the data, student comments related to the intervention, and suggestions for future research in an applied setting for students with undesirable behaviors.

College Of Education

The Effects of Therapeutic Heat on the Amplitude Required for a Motor Contraction

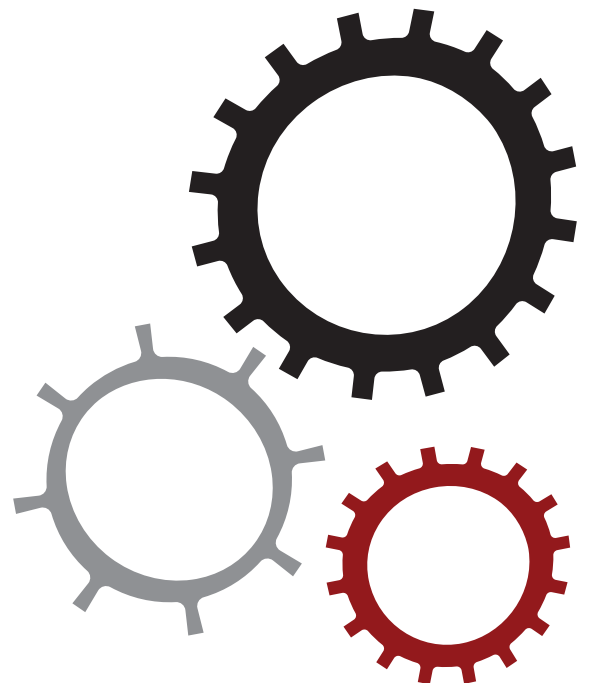
*Bradly Radle, Jason Hall, Tim Tenney
(David Berry)*

*Oral Presentation
Health Promotion & Human Performance*

We studied the effects of heating the muscle tissue prior to electrical stimulation and measured the amplitude needed for a motor contraction. Twenty adults consented to help with this study. Each had their Vastus Medialis Oblique (VMO) muscle stimulated via a high volt pulsed waveform. The parameters were equal for all patients (High Volt, Positive Polarity, 2-4 PPS, continuous, 1 sec. ramp). Day One- the amplitude was slowly increased until sensory level was reached, this amplitude was recorded. The amplitude then continued to rise until the first visible motor contraction occurred. This amplitude was recorded. Finally the amplitude was raised until the subject no longer felt comfortable and this level was recorded. Day Two- the patient went through the exact same treatment although the subject received a heat pack for 20 minutes over the VMO before being stimulated. The same process was then applied and records were taken. We hypothesize the findings will show significant decreases in the amplitude level for sensory and motor contraction as well as level of discomfort. These findings prove that heat reduces resistance of the electrical current thereby reducing required current to provide a therapeutic effect.



Dumke College of Health Professions



Abstracts

C-Reactive Protein and Alpha-1-Antitrypsin Levels in Tears of Extended-Wear Contact Lens Patients

*Aaron Barrett, Derek Gnehm, Jordan Jones
(Leonard Gary Nielsen)*

Oral Presentation

Clinical Laboratory Sciences

*Eccles Undergraduate Research Scholarship
2010 NCUR Participant*

Silicon hydrogel is a contact lens material that is FDA approved to be slept in and referred to as extended wear. Sleeping in contact lenses has often been correlated with inflammation induced corneal ulcers, conjunctivitis, and possible blindness in extreme cases. Current methods for ocular inflammatory identification are primarily based on superficial clinical evaluations.

C-Reactive Protein and Alpha 1-Antitrypsin are common markers used in the identification of inflammation in blood plasma. We propose that biochemical testing of the tear film will reveal that these inflammatory markers are increased in those who sleep in silicon hydrogel contact lenses. Poly-urethane mini sponges will be used in the collection of tears. A sample size of seventeen current contact lens wearers will be used in a cross-over study. A baseline tear sample will be collected and optometric evaluation performed by a licensed optometrist after participants have worn their glasses for one week without contact lens wear. Participants will then sleep in their contact lenses for a period of one week after which another optometric evaluation will take place and samples recollected. Inflammatory markers will be identified via high sensitivity ELISA screenings.

Reference Range For Bone Specific Alkaline Phosphatase

*Brandon Bullough, Kendal Beazer, Ryan Martin,
Jonathan Campbell (Leonard Gary Nielsen)*

Oral Presentation

Clinical Laboratory Sciences

Denkers Undergraduate Research Scholarship

Bone specific alkaline phosphatase is a glycoprotein found in the plasma membrane of osteoblasts. It is necessary for mineralization of bone and has been shown to be an indicator of bone turnover. Potential clinical applications for this assay include detection and monitoring of Paget's Disease, osteoporosis and bone related cancer. As more knowledge of this marker becomes available, testing for BSAP may become common among other disease states as well. Reference ranges have been established for women ages 7 and older and men 7-18 and 24 and older. Currently there is no reference range for children ages 6 months to seven years, which is the purpose of this project. To determine the reference ranges for children we will be using serum from the previously stated age groups and test them on an analyzer using chemiluminescent immunoassay. We will collect 60 samples from boys of each age group and 60 samples from girls of each age group. We will then determine the appropriate reference ranges for clinical use by physicians, which will enhance the overall assessment and treatment of patients.

College of Health Professions

Antinuclear Antibody Assay: Local Result Discrepancies in Testing Methods

Cory Callister, Jeremy Hobbs (Janet Oja)

Oral Presentation

Clinical Laboratory Sciences

Eccles Undergraduate Research Scholarship

Antinuclear antibody testing are used in assisting rheumatologists to diagnose and plan treatment regimens for patients with diseases such as systemic lupus erythematosus, rheumatoid arthritis, scleroderma, and other autoimmune disorders. To ensure accurate results for ANA testing at Davis Hospital and Medical Center, an in-house test by Enzyme Immuno-assay is first ran after which any positive specimen are sent to an offsite laboratory for confirmatory follow up testing by Immuno-Fluorescence Assay. Occasional discrepancies are found between these two methods. One contributing factor is the EIA's lack of specificity. Consequently, the sum of two low titer antibodies can be enough for a combined titer giving a positive concentration. For this study roughly 50 samples, which tested positive using EIA and negative using the IFA, will be sent to Bio-Rad for analysis on the Bio-Plex 2200. This instrument is a solid phase analyzer using multiplexing technology which tests the concentrations of each of these ANA's individually at a higher level of both accuracy and precision than the IFA and EIA methods. The information obtained will be used to determine which low fluorescent antibodies may be causative in the discrepant results between the two methods.

Identification of Respiratory Pathogens in Hospitalized "Non-Influenza" Utah Patients Using Real-Time PCR

Joshua Clark, Shannon Reighard (Scott Wright)

Oral Presentation

Clinical Laboratory Sciences

Denkers Undergraduate Research Scholarship

Between September 23, 2009 and October 21, 2009, Utah Public Health Laboratories (UPHL) received 294 specimens from hospitalized patients for molecular influenza viruses testing. Only 134 samples were positive for Influenza A/H1N1. The remaining half (54%) of the samples were negative for all seasonal and non-seasonal Influenza virus strains. The current procedure at UPHL is to test these negative samples using a viral culture technique that is labor intensive and unreliable if the virus is dead or fastidious. This research will assess if an additional predominant virus or bacteria is causing illness in the Utah population, by using a molecular diagnostic technique (Real-Time PCR), which targets eight viruses and five bacteria that are common causes of respiratory illness. Comparisons will be made between the viral culture technique used at UPHL and the Real-Time PCR technique to determine if it is cost effective and time efficient to add additional molecular tests to the UPHL's protocol. This project has the potential to improve public health by shortening time to identify pathogens resulting in rapid and specific treatment.

Abstracts

Perceived Emotional Aptitude of Clinical Laboratory Science Students Compared to Students in Other Healthcare Profession Majors

Corey Dahl, Austin Adams, Cassandra Zundel, Kristin McCabe (Travis Price)

*Oral Presentation
Clinical Laboratory Sciences*

Emotional aptitude is the ability to recognize one's own personal emotions and those of others. It has been speculated that clinical laboratory science students may lack the emotional skills to interact with patients and other health care professionals. While this has been a topic of discussion in health care, no research has been conducted to validate this assumption. This study will help assess the perceived emotional aptitude of clinical laboratory science students compared to students of other health care majors in the Dumke College of Health Professions. The perceived emotional aptitude of the health care students will be determined by completing a questionnaire that includes questions inquiring to their own emotions, understanding emotions of others, and how they manage conflict. After all questionnaires have been completed and submitted, scores will be calculated using a predetermined grading scale to evaluate the perceived emotional aptitude of each designated group. We expect to find that students in health care profession majors with significant direct patient contact will perceive themselves as having a higher emotional aptitude than students in health care majors with minimal patient contact.

The Effects of 2009 H1N1 on Weber State University

Allan Dubon, Megan Keyes, Dave Hamaker, Ashley Butters (Travis Price)

*Oral Presentation
Clinical Laboratory Sciences*

H1N1 "Swine flu" is a strain of influenza that became a pandemic during 2009. There was concern among the scientific community about the virulence and morbidity of this strain with media channels covering the progress daily. Thirty-two million cases in people between the ages of eighteen and sixty-four have been reported by the CDC. This pandemic caused alarm among many organizations, particularly college campuses where students are at a higher risk because of dorm life and close proximity in class. We will be looking at the effect of 2009 H1N1 on Weber State University. The university implemented a policy concerning the closure of campus were it necessary; the plan was never executed. Our exploratory research aims to address and answer such concerns as changes of student opinion towards the pandemic, student views of effectiveness of vaccine, and student view of campus policy. A stratified survey will be conducted to evaluate the impact of 2009 H1N1 on Weber State campus; results will be presented using graphs and charts.

College of Health Professions

Determining QC Outdates for TCA & OXYC Reagents on the Vitros 5, 1 Fusion Chemistry Analyzer

Curtis Farr, Shawn Spjut (Leonard Gary Nielsen)

*Oral Presentation
Clinical Laboratory Sciences*

Can Oxycodone (OXYC) and TCA (Tricyclic Anti-Depressants) reagents (manufactured by Microgenics and validated only for use on the Abbot Architect c8000 analyzer) be validated for use on the Vitros 5, 1 Fusion chemistry analyzer? The Primary Children's Medical Center (PCMC) laboratory is currently in the process of procuring a new analyzer to facilitate and consolidate drug and hormone analysis. PCMC decided the most cost-effective resolution to this problem, is to validate the quality control (QC) of TCA on the Vitros 5, 1 Fusion. Also, the laboratory is in the process of transferring qualitative urine drug screens for analysis on the Vitros 5, 1. Oxycodone will be the first reagent calibrated and quality controlled for analysis on the Vitros 5, 1. Determining valid stability outdates for these reagents is necessary in meeting accreditation quality control and quality assurance standards for accurate analysis on the Vitros 5, 1. Our project will establish the onboard stability times on the Vitros 5, 1, for TCA, and OXYC reagents specific for the Abbott Architect c8000.

Lyme Disease a Potential Deferral for Blood Donation

*Sherri Gagnon, Crystal Nelson-Miller,
Sara Pierce, Kaelyn Udy (Janet Oja)*

*Oral Presentation
Clinical Laboratory Science*

Borrelia burgdorferi, a spirochete, is the causative agent in Lyme disease. Lyme disease is often misdiagnosed. The opportunity of transmitting this disease through blood products is possible. While some organizations, such as the National Bone Marrow Registry have a permanent deferral for Lyme disease, the AABB (formerly known as the American Association of Blood Banks) doesn't recognize it as an issue. Research has shown that *B. burgdorferi* is viable in stored blood products and can be transmitted via transfusion. While there has been no documentation that transmission of Lyme disease occurs through blood transfusions, our research will determine: "Is there enough evidence to support the addition of a Lyme disease question on the AABB pre-donor questionnaire?" Our research, being conducted through surveys, will show the prevalence of the disease across the United States and the debilitating effects to individuals. The survey will highlight the incidence of infected people donating blood prior to diagnosis of Lyme disease and their feeling about the possibility of infecting unknowing recipients.

Abstracts

Phlebotomy Tourniquet Protocol in the Western United States

Christen Gee, Jessica Liegel (Kara Hansen-Suchy)

Oral Presentation

Clinical Laboratory Sciences

Phlebotomy tourniquets are apparently used and discarded according to the discretion of the phlebotomist without any protocol or general guidelines. A phlebotomist is someone who draws blood from patients for tests performed by a clinical or reference laboratory, as ordered by the patient's physician. Phlebotomists use several different techniques and equipment to collect the blood sample in the most sterile manner possible. A tourniquet is wrapped around the patient's upper arm to make the vein chosen for sample collection to become more prominent and easier to access. Tourniquets are usually strips of latex or a latex-substitute and resemble a large rubber band. Tourniquets can act as vectors for pathogen transmission, particularly methicillin-resistant *Staphylococcus aureus* (MRSA). The goal of this study is to determine what guidelines, if any, are in place for phlebotomy tourniquet usage and disposal in hospitals and their associated laboratories. A survey of nine questions was sent out to hospitals in the western United States. As expected we found that most hospitals do not have a protocol regarding phlebotomy tourniquet usage. We found that about half of the hospitals that were surveyed use single-use tourniquets which reduce pathogen transmission. References Sinia Medical, Tourniquets and HAI, <http://www.sinia.co.uk/page/tourniquets-and-hai> 2009.

Treatment of Salmonella Infections with Probiotics Escherichia Coli and Ciprofloxacin

Jeri Hampton, McKenzie Oldham, Leslie Denson, Jason Rignell (Travis Price)

Oral Presentation

Clinical Laboratory Sciences

Nye Undergraduate Research Scholarship

Salmonella typhimurium is a pathogenic bacterium that can cause gastrointestinal infections. In most cases, individuals receive treatment for dehydration only, but with severe infections antibiotics may also be prescribed. Treating with antibiotics can lead to an opportunistic infection by killing normal bacteria, allowing opportunistic pathogens to grow. Probiotics, which are microorganisms that are similar to the normal bacteria in the body, can repopulate the intestinal tract and help to prevent further infections. This study will attempt to answer the question: Does the addition of a probiotic strain of *Escherichia coli* to an antibiotic regimen improve the treatment of a *Salmonella* infection? To evaluate this, varying concentrations of *Salmonella typhimurium*, ciprofloxacin, and *Escherichia coli* will be cultured together in broth, and then grown on plate media. After plating, the number of colonies present will be counted in order to investigate the interactions of the organisms and ciprofloxacin. It is expected that the addition of the probiotic to the ciprofloxacin will result in decreased growth of *Salmonella*.

College of Health Professions

Effects of Centrifugation on the Chemical Analysis of Urine

*Cindi Kranek, Andrea Jackson, Lydia Christensen
(Travis Price)*

Oral Presentation

Clinical laboratory Sciences

Nye Undergraduate Research Scholarship

Urinalysis is a quick and powerful diagnostic tool and is often the first step in detecting kidney and other urinary tract disease. First the chemical analysis is performed on a well-mixed urine sample, then the urine is centrifuged and the sediment is examined microscopically. The chemical analysis consists of a reagent strip that test for specific elements in the urine. There are times in the clinical lab when the urine is unintentionally centrifuged before the chemical analysis is performed. At this point the technician can test the supernatant (the liquid portion of the centrifuged specimen), re-suspend the sample and then test, or have the sample recollected. Chemical analysis will be done on randomly collected urine samples before and after centrifugation and then once again after re-suspension to determine if the supernatant or the re-suspended urine is acceptable for testing. In comparing these results we hope to determine whether or not a centrifuged specimen is acceptable for chemical analysis. This may be helpful in cases where there is not sufficient sample to accommodate retesting for chemical analysis.

Vitamin D Deficiency in College Students at Weber State University

*Amie E. Mjos-Reisig, Rachel M. Hedrick
(Leonard Gary Nielsen)*

Oral Presentation

Clinical laboratory Sciences

Gardner Undergraduate Research Scholarship

Vitamin D deficiency contributes to bone deterioration, cardiovascular disease, fatigue, decreased immunity, and is the causative agent of rickets. The question is whether Weber State University's (WSU) students, 18-35 years of age, are being affected by a lack of vitamin D. College students are notorious for displaying characteristics of fatigue and low immunity, along with poor diets which put them at an increased risk for vitamin D deficiency. Previous studies have concentrated on the exposure to sunlight and dietary intake for the synthesis of vitamin D in age groups both younger and older than our target population. This study will use a two prong approach, the first of which is a survey to determine dietary intake, sun exposure, and daily routines (relative risk for vitamin D deficiency). The second part of the study will require chemical analysis of a blood sample of 105 WSU students to determine vitamin D serum levels, which will be correlated with the information collected in the survey. The chemical analysis will be done using EVOLIS instrumentation with Elisa Immuno-Assay at the Davis Hospital and Medical Center laboratory, and verified using the hospital's normal ranges.

Abstracts

Antimicrobials vs. Homeopathic Remedies

*Kirsten Pollard, Kiera Gomm, Phronsie Buckner,
Shalane Jones (Scott Wright)*

Oral Presentation

Clinical Laboratory Sciences

Eccles Undergraduate Research Scholarship

In recent years, essential oils and colloidal silver have become popular homeopathic remedies. The purpose of this research project is to compare the antibacterial effectiveness of these popular alternative medicines to commonly prescribed antimicrobials. Colloidal silver and seven essential oils are being tested separately on strains of *Streptococcus pyogenes*, *Escherichia coli*, and *Propionibacterium acnes*. The oils being used are clove, cinnamon, rosemary, eucalyptus, wild orange, melaleuca, and On Guard (a proprietary oil blend). The three antimicrobials being used in comparison to the oils and colloidal silver include cephalexin, tetracycline, and azithromycin. The in-vitro antimicrobial activity of each dilution will be tested by broth macrodilution. In this method bacteria are added to serial dilutions of the oils, colloidal silver, and antimicrobials in broth tubes and incubated overnight. A sample from each tube will be plated onto culture media and incubated overnight. The bacterial colonies are then counted in order to determine the minimum inhibitory concentration (MIC). The MIC is the lowest concentration of treatment that will inhibit the growth of the bacteria. The MICs of each homeopathic remedy will be compared to the MICs of the antimicrobials.

MT/MLT Program Size Correlation with Vacancy Rates and Wages

*Jennifer Salmond, Shannon Baulch,
Amy Nordstrom (Kara Hansen-Suchy)*

Oral Presentation

Clinical Laboratory Sciences

Gardner Undergraduate Research Scholarship

The purpose of this study is to correlate the number of clinical laboratory science graduates with the overall vacancy rates and wages of medical technologists and medical laboratory technicians in the western United States. Every two years, the American Society of Clinical Pathology conducts a survey that looks at the wages and vacancy rates within regions of the United States. The western region consists of thirteen diverse states making it difficult to accurately depict wage and vacancy rates. The number of training programs and graduates in each area may directly affect vacancy rates and wages. To collect data, medical technologist and medical laboratory technician training programs will be surveyed to obtain the number of graduates for the 2009-2010 school year. Also, hospitals and clinics in the western region will be polled for current vacancy rates and wage statistics. It is hypothesized that the number of training programs and graduates has a direct correlation with the vacancy rates and wages in each state. By compiling and analyzing the vacancy rates and number of graduates, training programs may need to reassess their enrollment size to help alleviate the shortage of laboratory personnel.

College of Health Professions

Sickle Cell Solubility Testing-Applications to Third World Countries

*Ray A. Stanford, Justin S. Clark,
Nickolas M. Noble (Kara Hansen-Suchy)*

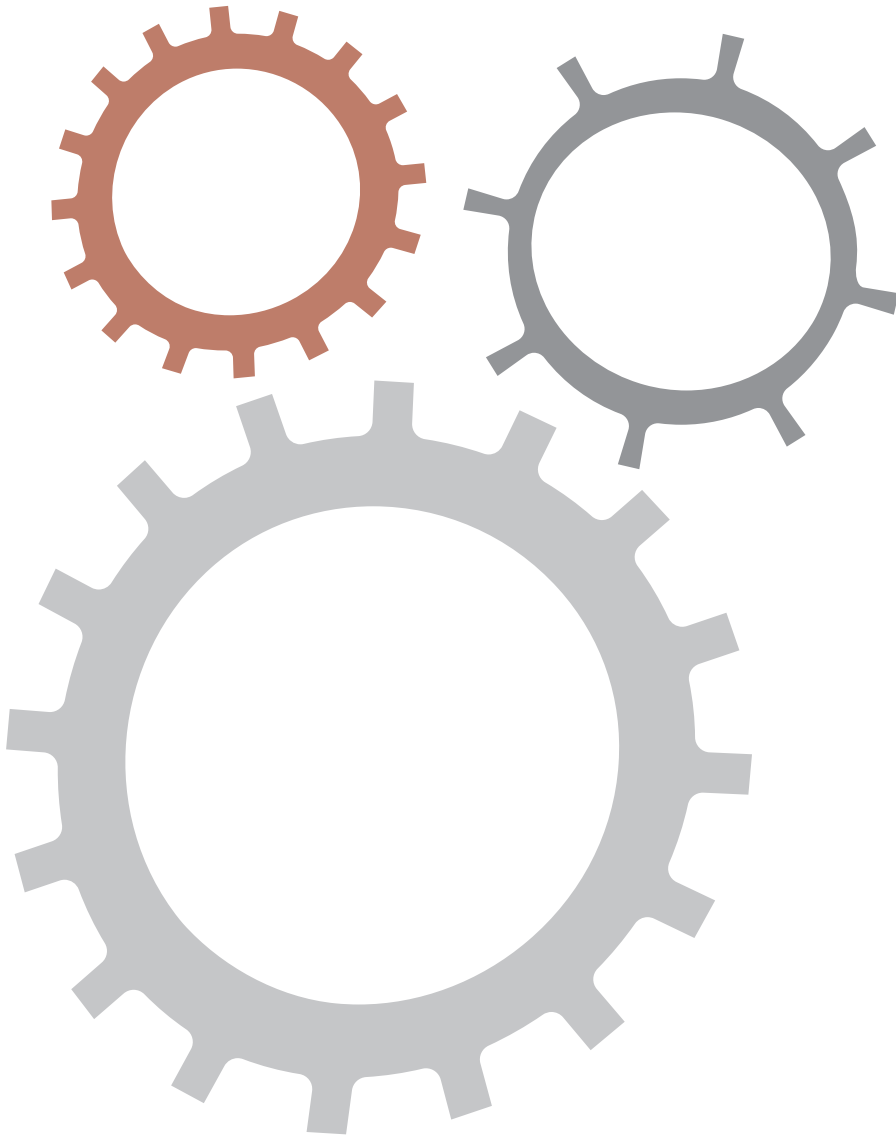
Oral Presentation

Clinical Laboratory Science

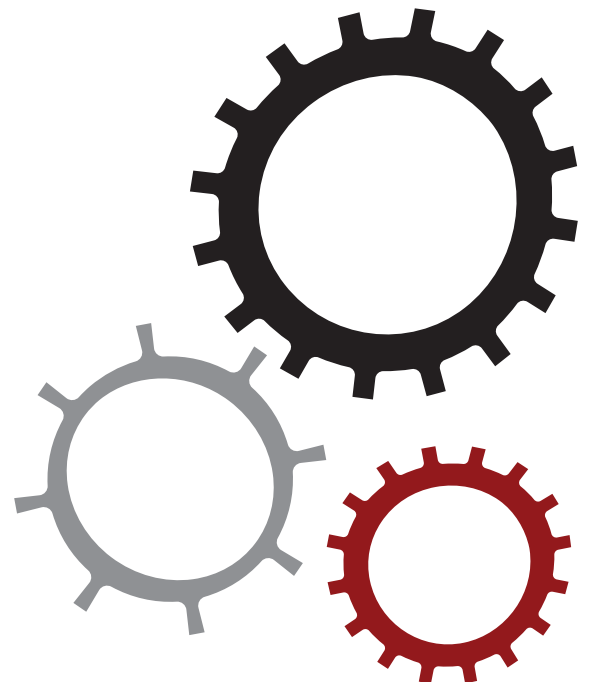
Denkers Undergraduate Research Scholarship

2010 NCUR Participant

Sickle cell disease is most prevalent in tropical countries, most having lower economic status. In some parts of Africa, where good health care isn't always available, about half of children with sickle cell disease die before their first birthday. Sickled cells become trapped in vital organs leading to their shut down and ultimately death. Since preventative treatment has shown to be extremely beneficial in keeping sickle cell victims healthy, The World Health Organization has stated that there is a need for an applicable screening test. The goal of the research group is to adapt a sickle cell screening test by making it quick, cost effective, requiring limited training and interpretation. The test is based on advancing previous research and adapting it for use in tropical conditions in areas without reliable power for the early detection of sickle cell disease. Its method is based on the low solubility of reduced sickle hemoglobin. Patient's blood with sickle cell disease remains turbid when reduced where as normal hemoglobin turns clear in solution, making interpretation quick and easy. Advantages of this adaption are affordability, and rapid testing with little equipment and training. Sensitivity, specificity and the test's performance under tropical conditions were validated.



College of Science



College of Science

Abstracts

Effects of Androgen & Denervation of Zebra Finch Syrinx Morphology

Sarah Ahmad, Lisa Allred, Amiko Mae Uchida, Jared Green, Franz Goller (Ron Meyers)

Oral Presentation

Zoology

Denkers Undergraduate Research Scholarship

The vocal organ of birds, the syrinx, is functionally similar to the human larynx, and is controlled by four pairs of muscles. Muscle fibers are categorized as slow, fast, or superfast based on their contraction speed and the type of muscle protein they contain. The syrinx contains two distinct muscle fiber types, superfast and fast, with superfast fibers implicated in the extremely fast contraction dynamics (~250 Hz) of the male Zebra Finch (*Taeniopygia guttata*) syringeal muscles. Male and female Zebra Finches have markedly different syringeal muscle characteristics “males possess a majority of superfast fibers (85% superfast, 15% fast), while females have a majority of fast fibers (25% superfast, 75% fast). This morphological difference parallels a behavioral difference: males sing; females do not. We assessed the effects of two experimental manipulations on muscle fiber composition and size: 1) testosterone treatment of the female syrinx, and 2) unilateral denervation to the male syrinx. In testosterone-treated females, fiber size and distributions (74% superfast, 26% fast) changed to a phenotype more characteristic of males. Denervation caused the percentage of superfast fibers to decrease (64% superfast, 36% fast). Muscles are therefore dynamic systems, capable of changing their morphology in response to hormonal and neurological treatments.

Sexual Dimorphism of Syringeal Muscle Fibers in Male and Female Songbirds

Lisa Allred, Sarah Ahmad, Amiko Mae Uchida, Jared Green, Franz Goller (Ron Meyers)*

Oral Presentation

Zoology

Nye Undergraduate Research Scholarship

The avian syrinx is a complex vocal organ comprised of four pairs of muscles that controls song. Using histochemistry and immunochemistry, our lab has previously shown that the syrinx is comprised of two muscle fiber types, fast and superfast; the later displaying rapid contractile ability (~250 Hz). In species where males and females both sing, e.g. European Starlings, percentages of superfast fibers were similar (~70%). In species where males sing but females don't, e.g. Zebra and Bengalese Finches, males have significantly higher percentages of superfast fibers (70% vs. 30% and 85% vs. 25%, respectively). These findings suggest superfast fibers are associated with singing; however, male and female Brown-headed Cowbirds show similar percentages of superfast fibers (~67%), even though males sing and females do not. This encouraged us to investigate species in different families to better understand the diversity of superfast fibers. We are currently collecting data on syringeal muscles fibers of male and female Canaries, Yellow-headed Blackbirds, Brewer's Blackbirds, and Brewer's Sparrows. Yellow-headed blackbirds are of particular interest as they are in the same family as Brown-headed Cowbirds. We hope to determine if singing behavior or taxonomic distributions are driving forces for the presence of these superfast fibers.

**Dept of Biology, University of Utah, Salt Lake City.*

College of Science

The Multi-Sensor Array - Detection of Aerosols Using Embedded Systems at High Altitudes

Joshua Anderson, Rob Eckel (John Sohl)

*Poster Display 24
Physics*

Weber State University's High Altitude Reconnaissance Balloon for Outreach and Research (HARBOR) is a high altitude balloon system designed to fly to near space as a platform for research in science and engineering. The Multi-Sensor Array (MSA) is a small sensor package designed and built to measure and store data used for atmospheric science: such as temperature, pressure, and humidity. In addition, the Multi-Sensor Array is designed to measure the acceleration and magnetic orientation of the balloon system during flight, and to detect various aerosols. The MSA is designed around an embedded PIC microcontroller. During the design, several varieties of sensor chips were investigated and tested before being integrated onto the main printed circuit board. The MSA was then constructed, tested, refined, and coded to measure and store the data of interest. The MSA also has built into it several expandable slots to encourage outreach and guest scientific experiments. Testing has been done both on tethered flights of the balloon system and in various extreme environments in order to simulate the conditions above 99% of the atmosphere.

GIS Mapping Potential of Halogeton Invasion in a Native Plant Community

Sarah A. Anderson (Barbara Wachocki)

*Oral Presentation
Botany
Denkers Undergraduate Research Scholarship*

Winterfat (*Ceratoides lanata*) is the second most dominant shrub in the Great Basin salt-desert shrub-land and an important food source to both wild and domesticated grazing animals. Over the past fifty years Winterfat biomass and range has been decreasing due to the invasion of the non-native and largely poisonous species Halogeton (*Halogeton glomeratus*). Monitoring the changes in species cover can be labor intensive if done in the field. We examined the ability to more efficiently differentiate and map Halogeton, Winterfat and the intermediate Ecotone through hyperspectral imagery. A georectified half foot resolution visible and near infrared image was acquired via aerial photography of a Halogeton and Winterfat study area at the Desert Experimental Range in southwestern Utah. On the same day the image was acquired, multiple ground points were established on site in the Halogeton, Winterfat and Ecotone areas using a GPS unit. These images were analyzed using ENVI software to identify differences in the spectral signatures that would allow for mapping and/or modeling from future images. Preliminary results are encouraging that the three spectral classes (Halogeton, Winterfat and Ecotone) are likely dissimilar enough to be distinguished.

Abstract

Classification of Vegetation Communities in High Alpine Wetlands Using Imagery, Uinta Mountains

James Arnold (Michael Hernandez)

Poster Display 25

Botany

2010 NCUR Participant

High alpine wetlands are some of the first indicators of a changing climate. Vast computing power and improved access to high resolution imagery has made remote sensing one of the most applicable tools in life and physical science. The use of aerial imagery allows us to survey large areas relatively quickly and efficiently. In the face of a rapidly changing climate efficient ways of documenting and assessing these shifts is crucial. This particular study was conducted using National Agricultural Imagery Program (NAIP) digital imagery of the Dry Fork drainage basin along with an additional study conducted in the nearby Reader Lakes drainage basin. Both locations are located in the Uinta Mountains, just north of Vernal, Utah. Twelve particular wetland plant communities were identified in the field and sample locations of each community were collected using GPS. A supervised classification was run on the images using these locations to yield an image with each plant community identified throughout the entire image. The classified image can then be analyzed to identify the vegetation patterns which exist in the area. The objective of classifying these pristine high alpine wetland areas is to establish baseline plant community profiles which can be applied to other alpine wetlands in the region. We are also exploring the level of detail that can be distinguished using these classification methods and this type of imagery. Preliminary results from an initial classification look promising. A final classification will be conducted along with an accuracy assessment to determine how correct our assignment of plant communities was in the image. Ultimately, this data could be used to conduct longitudinal studies in the future in order to compare the effects of global climate change on these alpine wetland regions.

Isolation of Novel Phage from the Great Salt Lake that Infect *Idiomarina*

Carlie M. Benson (Matthew Domek, Craig Oberg, Michele Zwolinski)

Poster Display 26

Microbiology

Characterization of halophilic bacteria from the South Arm of the Great Salt Lake (GSL) revealed a number of *Idiomarina*-like organisms. Since phages play a role in controlling bacterial populations and facilitate lateral gene transfer, GSL water samples were tested against four *Idiomarina* GSL isolates. Initial screening showed a large number of plaques with a wide range of sizes. Plaques were tentatively grouped into four categories: plaques with a 10 mm clear zone with a much larger opaque halo extending around each plaque, two mm plaques, one mm plaques, and a fourth group with variable shapes. A host comparison performed with purified phage isolates against the *Idiomarina* strains indicated five different phage types. One type only infected *Idiomarina* S3. A second phage type could infect two hosts, *Idiomarina* S3 and S11. The third phage type infected both *Idiomarina* S3 and S21, while a fourth type only infected *Idiomarina* S21. The fifth phage type only infected *Idiomarina* S11. The 16S rRNA gene sequences of the *Idiomarina*-like isolates had less than 0.5% difference over 1,300 bp indicating phage typing may provide greater strain resolution than 16S sequencing. There appears to be some correlation between plaque morphology and host range.

College of Science

High Albedo Events Indicate Water Ice in Mars' Southern Polar Craters

Charla Boom (John Armstrong)

Poster Display 27

Physics

WSUSA Undergraduate Research Travel Fellowship

Continuing the work done previously in the northern polar craters examining crater-interior water ice deposits, a sample of craters in the southern polar region of Mars has been analyzed using Mars Global Surveyor Thermal Emission Spectra (TES) temperature and albedo measurements. Using the JMARS program, we specifically analyze the depth, latitude, size, and elevation of these craters, hoping to gain better insight into the distribution and causes of these high albedo events. Variations in albedo distinguish 81 craters with high albedo events (HAEs) starting at Ls between 200 and 230 degrees. Data for morning albedo is less abundant than afternoon data, but appears consistent, supporting 52 of the 81 craters. The remaining craters did not have enough data taken in the morning to support or contradict the afternoon evidence. Data was taken external to each crater (to verify it is not an artifact of the entire pole), and HAEs were present in twelve of the 277 area observed. Eleven of these areas were found in a region that appears to be caused from variations in polar layered deposits from the seasonal ice cap. A χ^2 analysis was conducted to determine statistical significances. There is no difference between the depth of craters with or without HAEs, nor is there a difference in the diameters. The HAE craters are higher in elevation by 219 m. This could be an artifact of the distribution of the craters. HAE craters tend to be closer to the pole, which has higher elevation. As we compare the results and distributions to the northern polar region, we find the southern polar HAE craters appear to cluster toward the pole, where the northern HAE craters appear evenly distributed. HAE craters in the southern region did not extend below where the seasonal cap freezes, at $\sim 65^\circ\text{S}$.

Academic Job Market, Case Study

Paul Buttars, John J. Dennehy, Thomas Callahan, D. James Harris, Markus Mika (Jonathon Marshall)

Poster Display 28

Zoology

WSUSA Undergraduate Research Travel Fellowship

Over the last several decades, the percentage of permanent faculty positions at universities has declined significantly. Increasingly, courses are taught by adjunct instructors, graduate students, and postdoctoral fellows rather than by permanent faculty members. This creates intense competition for permanent positions. Data summarizing the general qualifications of newly hired first-time professors in permanent jobs are valuable for students contemplating graduate school and academic careers. These data should also help graduate students and postdoctoral fellows set goals that will enable them to be competitive for permanent academic jobs. Here we present data collected in a survey from 181 newly hired faculty members in the fields of ecology and evolutionary biology from around the world. We report the average number of publications, courses taught, years as postdoctoral fellows, and research grants received for successful job applicants. Our results indicate an extremely competitive environment for permanent academic jobs in the fields of ecology and evolutionary biology.

Abstract

Biological Function of the von Willebrand Domaine in Fibrillin-2

Paul Buttars (Barbara Trask)

Poster Display 29

Zoology

Denkers Undergraduate Research Scholarship

Elastic extracellular matrices, which are localized to elastic tissues such as arteries and lung, are comprised of both elastin and 12nm microfibrils which contribute to the stretch and recoil of these elastic organs. Although many different proteins have been associated with the 12nm microfibrils, the principle proteins that make up these microfibrillar structures are members of the Fibrillin family. The Fibrillins are large, multi-domain, modular proteins comprised of several repeating Epidermal Growth Factor (EGF) and Latent TGF-beta binding (TB) domains. A reconstruction of the phylogenetic history of Fibrillin proteins identified an unusual domain that is conserved across all vertebrate species. This domain is homologous to one found in von Willebrand Factor protein (vWF), a protein involved in the blood clotting cascade. Similar vWF domains are also found in many other proteins. To date, the contribution of vWFA domain to Fibrillin protein function is unknown. The cross-species conservation of this domain, as well as the linkage between mutations in both Fibrillin and von Willebrand factor proteins to several heritable disorders, suggest that this domain has an important biological function. To investigate the biological function of the vWF domain in Fibrillin proteins, the vWF domain of Fibrillin 2 was cloned and expressed in bacteria. This truncated, recombinant protein was purified and its biological activity examined. Although this domain has been linked to numerous physiologic processes in various proteins, the Fibrillin-2 vWF domain was assessed with respect to its effects on cellular adhesion and motility of skin fibroblasts.

Metagenomic Analysis of Brine Fly Larvae from Great Salt Lake, an Extreme Environment

*Christy Cottrell (Jonathan Clark,
Mohammad Sondossi)*

Poster Display 30

Zoology

*WSUSA Undergraduate Research Travel
Fellowship*

Brine flies are important components of the Great Salt Lake ecosystem, removing organic matter and serving as a food source for millions of birds. In spite of their biological and economic importance, little is known regarding the adaptation of brine flies to the extreme conditions associated with Great Salt Lake. It is possible that bacteria may play a role in allowing brine flies to thrive in this high saline environment. Metagenomics involves the study of DNA isolated directly from environmental samples, permitting identification of organisms regardless of whether they can be cultured in the laboratory. In this study, a metagenomic analysis was used to identify prokaryotes associated with Great Salt Lake brine flies. Primers specific for 16S ribosomal RNA (rRNA) were used to amplify this gene from microbial DNA isolated from larval samples. Based on DNA sequence comparisons the bacteria associated with the larvae are closely related to bacteria that have been described from other saline environments. Ultimately, information gained from this study will help determine whether these microbes contribute to the brine fly's ability to thrive in the extreme environment of Great Salt Lake.

College of Science

Seed Dispersers of the Dwarf Bear-Poppy

Fredrick Drysdale (John Mull)

Poster Display 31

Zoology

Denkers Undergraduate Research Scholarship

Distribution of seeds by animals is critical to many plant species. The final location of seeds is of great importance in desert plant species, where safe sites for germination are limited. The dwarf bear-poppy (*Arctomecon humilis*) is a federally endangered species endemic to the Moenkopi formation near St. George, Utah. Previous research showed that ants may be important dispersers of the seeds. We used pitfall sampling to assess ant communities at three locations where the poppy grows in May and June of 2009. Samples contained 1264 ants and 871 other arthropod specimens. At least 6 species of ants were present in the samples. *A. humilis* seeds were collected and measured for comparison with the seeds of other species known to be dispersed by ants. There was an average of 32 seeds per flower. The seed elaiosome—attachment associated with dispersal—is about 17% of total seed size, less than in many ant-dispersed species. These findings will be used to inform ongoing research on the dispersal of dwarf bear-poppy seeds.

History of Lahontan Cutthroat Trout in Spring Creek, Utah

*Jared Eames, Tim Healy, Bryce Galbraith
(Christopher Hoagstrom)*

Poster Display 32

Zoology

The Lahontan Cutthroat Trout is native to the Lahontan Basin of northwestern Nevada and adjacent areas. A large strain was historically present in Pyramid Lake with individuals attaining 41 pounds or more. By the early 1900s, this strain was presumed extinct, but in 1977 a population was discovered in Bettridge Creek, Box Elder County, Utah. In an attempt to preserve it, individuals were introduced to other streams in 1986, including Spring Creek near Uintah, Utah. The Spring Creek introduction was believed to have failed until October 2009, when 16 specimens were collected in two sampling trips. The fish appeared to be restricted to a 200 m stretch, with individuals distributed sporadically among habitats and separated by intervals of 15 to 30 m. They ranged in size from 186 to 280 mm total length, which, assuming normal growth, would put them in the range of 3 to 4 years of age. The population appears quite small (< 20) although more may be present upstream. However, surveys extended several hundred meters upstream produced no fish.

Abstract

Biochar Applied as a Soil Amendment for Fertility Improvement and Possible Carbon Sink in Welsh Soils

Marie Fair (Dawn Gatherum)

*Poster Display 33
2010 NCUR Participant
Botany*

Biochar is a carbon-rich product obtained when biomass is heated in a closed container with little or no available air. With the advent of anthropogenic induced world climate change, researchers are looking for ways to offset greenhouse gasses, particularly carbon. Biochar additions to soil could sequester large amounts of atmospheric carbon and improve soils. The purpose of this study was to determine if amounts of biochar applied at differing amounts would affect fodder maize chlorophyll contents and soil respiration rates. The experimental method consisted of a randomized block design with no biochar and treatments of 25 tonnes/ha and 50 tonnes/ha. Measurements were taken at approximately two week intervals with a SPAD meter and IRGA. Preliminary results with biochar concentrations in Welsh soils growing fodder maize showed there was no significant difference between 0ton/ha, 25 ton/ha and 50 ton/ha on fodder maize chlorophyll content and CO₂ rates. Effects of biochar on chlorophyll content and CO₂ rates in soil may therefore be influenced by a variety of edaphic factors.

PCR screening of Trimethyl Psoralen-Mutated nematode *C. elegans*

*Andrew Fisher, James Grundy, William Mohn,
Jason Herman, Eric Smith (Brian Chung)*

*Poster Display 34
Zoology
Nye Undergraduate Research Scholarship*

Protein metabolism is vital for the normal development, growth and reproduction of a species. All forms of life assimilate proteins by first digesting them into smaller peptides or completely digesting them into amino acids before absorption across the intestinal tract and into the body. In our experiment we used the nematode *Caenorhabditis elegans* to examine the relative balance between amino acid and peptide absorption on normal growth and development. We used a control strain (N2) and a knock-out strain (KO) of these nematodes. All worm strains were obtained from the *C. elegans* Research Consortium at the University of Minnesota. Worms were mutated using UV irradiation along with trimethyl psoralen (TMP) to randomly remove genes from the DNA. Upon arrival it was necessary for us to make sure that the correct gene has been knocked out. We designed 2 pairs of primers, which bracketed the site of DNA that was of interest, and then we used PCR to analyze if the correct gene was missing. If the gene were missing then the DNA product was smaller and indicated that the animal had been mutated.

College of Science

Habitat Research for Least Chub Refuge at the Ogden Nature Center

Steffani Geary (Christopher Hoagstrom)

Poster Display 35

Zoology

Denkers Undergraduate Research Scholarship

The least chub is an endemic minnow of the Bonneville Basin, Utah. Since 1950, it has declined due to human disturbances. To offset declines, new populations are being established. I surveyed three ponds at the Ogden Nature Center in spring and summer 2009 to assess suitability for a least chub introduction. I monitored pH, dissolved oxygen, water temperature, areal extent, and conductivity and sampled fishes. Teal Pond had most constant areal extent, lowest water temperatures, and highest dissolved oxygen. It supported three non-native fish species (western mosquitofish, fathead minnow, green sunfish). Avocet Pond had highest water temperature, intermediate dissolved oxygen, rapidly declining areal extent and supported one fish species (western mosquitofish). Despite having intermediate water temperature and being stocked with mosquitofish, Blackbird Pond supported no fish, perhaps due to low dissolved oxygen. Thus, it is probably not suitable for an introduction. Water quality appears suitable in Avocet and Teal ponds, but non-native fishes need to be removed. Thick vegetation in Teal Pond could encumber removal efforts. Established populations at the Nature Center would provide mosquito control and have the added benefit of providing education and outreach for least chub conservation.

Effect of Pramitol on the Great Salt Lake Artemia

Lauralee Gines (Nicole Okazaki)

Poster Display 36

Zoology

Pramitol, a weakly toxic herbicide, is present in the Great Salt Lake. The brine shrimp, *Artemia franciscana*, an invertebrate inhabiting the GSL, is susceptible to this herbicide. We were interested in testing the effects of pramitol on *Artemia*'s survival, maturation and reproduction and biochemical reactions to exposure. In a first part, we determined the effect of various pramitol concentrations on adult and larval mortality. In a second part, shrimp larvae were raised to maturity in various concentrations of pramitol and the females' maturation time and reproductive success were monitored. In a third part, the protein profile of shrimp exposed to pramitol was visualized with polyacrylamide gel electrophoresis. Shrimp survival after 24 and 48 h was 100% at pramitol levels lower than 25 microliter/L, for both larvae and adults. Exposures at 50, 75 and 100 microliter/L yielded 80, 30 and 10% survival, respectively (G-test significant at $p=0.05$) in larvae. Adult survivals were 100% at 250 microliter/L and below and 40% in 500 microliter/L pramitol. Visual inspection of PAGE gel does not show up or down regulated bands. Chronic exposure to pramitol negatively affected the number of females maturing, but not the number of eggs produced per brood.

Abstract

Predigested vs. Polymeric Food Source Does Not Determine Growth Rate

James Grundy, William Mohn, Jason Herman, Eric Smith (Brian Chung)

*Oral Presentation
Zoology*

Dietary nutrients are systematically digested into monomers which are then absorbed by the small intestine for assimilation by the rest of the body. Dietary proteins are unique because we can also absorb peptides (2-3 amino acid chains) in addition to single amino acids. We hypothesized that a drastic dietary alteration from predigested nutrients to polymeric nutrients would influence growth and development. We hatched nematode *Caenorhabditis elegans* eggs in a pre-digested (Exp) medium (protein energy in the form of monomeric amino acids) and sequentially transferred animals each day from the pre-digested medium to a polymeric medium (Con) consisting of the agar and bacteria (intact proteins which require digestion to peptides and amino acids). Animals reared only in Exp or Con medium reached adulthood within 4 days and neither medium appeared to hinder growth in these nematodes. Animals transferred from Exp to Con medium did not indicate any hindrance of growth rate regardless of the day on which they were transferred. We conclude that in normal animals, drastically how dietary nutrients are provided does not appear to influence the rate of growth and development, providing evidence of the adaptability of the digestive system to a changing dietary environment.

Incubation Behavior of Snowy Plovers at Great Salt Lake

Kristen Gurr (John Cavitt)

*Poster Display 37
Zoology
Nye Undergraduate Research Scholarship*

The Snowy Plover (*Charadrius alexandrinus*) is a small shorebird found breeding on alkaline mudflats, playas and beaches. Throughout most of the Snowy Plover's range, populations have been declining. At Great Salt Lake, Snowy Plover populations, as well as other shorebirds, may face important risks to their conservation. Some of these risks include loss of breeding habitat, degradation of breeding habitat and increased predation. In order to predict the potential impacts of these risks we need to understand critical components of breeding biology. We observed the breeding ecology of Snowy Plovers by quantifying incubation behavior of males and females at four different sites. Males spent significantly less time on the nest than females. Other factors were examined including time spent on and off the nest in relation to nest success.

College of Science

Comparative Study of Methods Used to Trap Nesting Snowy Plovers (*Charadrius Alexandrinus*)

Lucas Hall (John Cavitt)

Oral Presentation

Zoology

Nye undergraduate Research Scholarship

The need for the conservation of “threatened” species is becoming progressively imperative. With continuing development and recreational use, some species habitats are receding, resulting in population declines. The Snowy Plover (*Charadrius alexandrinus*; SNPL) is a small shorebird found breeding at Great Salt Lake. Because of population declines, the SNPL is considered a bird of conservation concern by the U.S. Fish & Wildlife Service and the Utah Division of Wildlife Resources. Due to its conservation status, the SNPL is monitored throughout its range. Unfortunately, different methodologies are used for studying populations. For example, at least three different methods are used to trap SNPL at nests and these methods vary in design, cost, set-up time, and operation as well as trapping success. Thus, to manage for the conservation of this species and to provide information on trap effectiveness, data are needed which test each trap design. In this study, we compared the efficacy of three trapping methods used to capture SNPL at their nests. Our research questions were: what are the costs for constructing each trap? And which trap is most efficient/effective? Our results will provide information on trapping techniques for SNPL as well as other ground-nesting birds.

Using GIS to Analyze Watershed Scale Features to Test the Theory of Island Biogeography

Brent Hansen (Michael Hernandez)

Poster Display 38

Geoscience

The theory of island biogeography states that fish species and diversity varies with island size and distance from the source of colonists. In previous studies, watershed scale features were shown to have influenced fish distributions based on this theory. The study area starts at the confluence of the Missouri and Mississippi rivers and runs northwest following the Missouri river ending at the headwaters in North Dakota. The island boundaries are watersheds within the Central Lowlands physiographic province. This study uses watersheds as “islands” and tests the theory using geographic information systems (GIS) and spatial analysis tools to perform hydrologic analysis of the study area. First, the average slope of the watersheds was calculated and correlated with the distance upstream. Distance versus average watershed slope showed a negative correlation due to the higher slopes near the confluence. Watershed area was then compared to the euclidean distances from the confluence to each watershed outlet. No correlation between these two variables was found. A GIS model incorporating many of the above operations and analysis is currently being developed and evaluated by the research team.

Abstract

Biodegradation and Biotransformation of Para-Substituted Hydroxybiphenyls

*Jon Hansen (Timothy Herzog,
Mohammad Sondossi)*

*Poster Display 39
Microbiology/Chemistry*

Microbial degradation of biphenyl (BP) has been extensively studied. Hydroxybiphenyls are produced when one or more hydrogen on one or both aromatic rings are substituted with a hydroxyl group(s). Polychlorinated biphenyls (PCBs), hydroxychlorobiphenyls (HCBPs), hydroxybiphenyls (HBPs) and their metabolites has been shown to affect the endocrine system in human and wildlife (endocrine disruptors). Biphenyl and its hydroxy-substituted intermediate metabolites are produced by microbial biodegradation of BP, PCB, HBP, and many other molecules. Microbial biodegradation of mono-hydroxybiphenyls, described in most published articles, starts with preferential hydroxylation of the unsubstituted ring by dioxygenase enzymes. In our study the analysis of the metabolites resulting from biodegradation of 4-hydroxybiphenyl reveals that both substituted and unsubstituted ring could be attacked by bacterial dioxygenases. This could clearly be demonstrated by using 4,4'-dihydroxybiphenyl where both aromatic rings are substituted at para- position. Enzymatic attack on substituted and unsubstituted ring will produce variety of different metabolites that may or may not be utilized by other enzymes of biphenyl catabolic pathway. Accumulation of these intermediate metabolites could be important when presence of endocrine disruptors in the environment is concerned.

High Altitude Radiation Measurements

Michael Heath (Michelle Arnold)

*Oral Presentation
Physics
Nye Undergraduate Research Scholarship*

The upper atmosphere has been shown to contain varying levels of radiation from a variety of sources. The levels and concentration of this radiation has potentially important ramifications on the environment and health, as well as providing important information about sources and levels of normal background radiation. Ongoing research is being conducted to design, test, and calibrate a device for measuring atmospheric radiation levels in Utah and the surrounding areas. This testing equipment will be designed to fly as part of Weber State University's H.A.R.B.O.R. High Altitude Balloon during their 2010 flight season. The goals of this work are twofold. As the characteristics of a High Altitude Balloon are demanding (temperature swings, vacuum, dramatic impact and acceleration forces), standard radiation testing equipment is not normally designed or tested in these environments. Therefore, how these factors impact the accuracy and feasibility of measurements is currently being studied. The main goal of this project is to provide accurate measurement of radiation measurements throughout the atmosphere, with a specific goal that these measurements can be used as an important reference point for future research.

College of Science

Growth/Development Rate Increase When More Work is Required in Digestion

*Jason Herman, William Mohn, James Grundy
(Brian Chung)*

*Oral Presentation
Zoology*

Premature infants are challenged with immature digestive systems which can be overwhelmed by overfeeding. Dietary proteins are digested into amino acids and short peptides and absorbed by the intestinal tract. We hypothesized that animals lacking the ability to absorb peptides would demonstrate improved growth and development when provided solely amino acids and no peptides. A mutated strain of the nematode *Caenorhabditis elegans* lacking the intestinal peptide transport protein was hatched into elemental medium (CeHR) where protein energy was in the form of amino acids rather than peptides or proteins. Random animals were transferred daily to feed on their natural bacterial protein food source (NGM). Interestingly, animals raised solely in CeHR initially grew 25% slower and took longer to reach sexual maturity than those raised solely on NGM. As animals were transferred from CeHR to NGM they experienced a 35% increase in growth compared to animals remaining in CeHR. Our data indicates that animals which lack the ability to absorb peptides, provision of amino acids does not provide a growth advantage, and that by forcing the intestine to digest large proteins into amino acids also improves growth and development.

Investigating Algae Growth with Varying Levels of Salt, Nitrogen, and Phosphorous for Use in Biodiesel Production

Gregory Hill (Timothy Herzog)

*Poster Display 40
Chemistry*

The principal objective of our research project was to study what nutrient and environmental conditions provide optimized algae growth. Levels of nitrogen, phosphorous, and salt were varied using a factorial model. The relative biomass produced and the relative quantity of fatty acids were measured for each sample. Each sample of biomass was transesterified and extracted in hexane. The resulting fatty acid methyl ester samples were tested using a GCMS to find the level of common fatty acids present. Results for the biomass and lipid content were compared to find which conditions provided optimal growth for biodiesel production. There are many benefits for producing liquid transportation fuels from algae. These include an existing infrastructure for biodiesel, the renewable nature of algae, the rapid growth of algae, and a lack of competition between cultivation of algae and that of food crops.

Abstract

Genetic Characterization of Two Halophage Associated with *Salinivibrio Costicola*

Ryan Hoggan, Blake Dahl (Matthew Domek, Craig Oberg, Michele Zwolinski)

Poster Display 41

Microbiology

Nye Undergraduate Research Scholarship

Salinivibrio costicola is a halophilic bacterium originally isolated from salterns in Spain with one known halophage. It was recently isolated from the Great Salt Lake (GSL) and associated with two GSL halophage isolates (NS01 and CW02). To determine if NS01 and CW02 are two unique halophage or variants of the same halophage, a modified protocol for isolation of ϕ phage DNA was used to isolate the genetic material from NS01 and CW02. After cell lysis halophage were pelleted in PEG 8000, re-suspended, and treated with Proteinase K. Genetic material was purified by solvent extraction, and precipitated with ethanol. NS01 and CW02 genetic material was tested for degradation by DNase and RNase. Each halophage genome was then digested with EcoR1 and Hind III, and their band patterns visualized by electrophoresis. DNase and RNase treatments revealed both halophage to be DNA viruses. Restriction digests with EcoR1 or Hind III each showed unique fragment patterns for each halophage. This suggests that NS01 and CW02 are different halophage, not just minor variants of the same halophage. Further investigation is needed to determine the genetic relationship between these two halophage and with the *S. costicola* halophage isolated from the Spanish salterns.

Conservation of the Least Chub (*Lotichthys Phlegethontis*) Due to Negative Interactions with Non-Native Species

Alix Hoskins (Christopher Hoagstrom)

Poster Display 42

Zoology

Denkers Undergraduate Research Scholarship

The least chub is a small minnow endemic to the Bonneville River Basin. It was once widely dispersed, but currently resides in only nine isolated spring pools in central and western Utah. Introduction of nonnative species such as the western mosquitofish into habitats of the least chub contributed to a rapid decline in least chub populations and threatens extinction. The focus of this research was to assess potential removal of nonnative fish populations in order to establish a new refuge population of least chub at the Ogden Nature Center. I assessed the populations of nonnative fish present at Avocet Pond, Blackbird Pond, and Teal Pond and evaluated potential for removal. I found fathead minnow (Teal Pond), mosquitofish (Avocet and Teal ponds), and green sunfish (Teal Pond.) Blackbird Pond had no fish, but was probably unsuitable for least chub. Poisoning nonnative fish of Avocet and Teal ponds with rotenone and toxaphene may be the best management option. Netting or trapping might be feasible but are less likely to result in complete eradication. Reintroduction of nonnative fish is likely, but it is possible to stop incoming canals to these ponds.

College of Science

Atomic Force Microscopy Imaging Techniques for Piezoelectric Materials

Jeremy Kunz (Colin Inglefield)

Poster Display 43

Physics

WSUSA Undergraduate Research Travel

Fellowship

Using an Atomic Force Microscope (AFM) and a Lock-in Detector we investigated the effectiveness of two different methods of imaging local piezoelectricity within a standard commercial piezoelectric material, $\text{Pb}(\text{Ti}, \text{Zr})\text{O}_3$ (PIC 151). In the first method, sometimes known as piezo-mode AFM, we applied an AC voltage to the sample locally through the tip of the AFM; we were able to image the local piezoelectric response while taking a topographical image. For the second set of measurements, we used a sample of the PIC 151 material with a uniform silver electrode over the entire surface. The voltage was applied to the entire sample through the electrodes and the AFM cantilever measured local response. Images based on the two techniques will be compared along with the methods themselves.

Aromatic Impurities in Zirconium Chloride

Rachelle Maass, Spencer Barrett, Chad Jones (Edward Walker)

Poster Display 44

Chemistry

WSUSA Undergraduate Research Travel

Fellowship

Zirconium is an integral part of the nuclear fuel industry. Zirconium tetrachloride (ZrCl_4) is an intermediate in the process of extracting zirconium metal from the zirconium ore. Aromatic carbon is an impurity in pure ZrCl_4 , found in concentrations typically ranging from 10 to 250 ppm. Current analysis is both lengthy and inexact. We describe a new method of analysis for aromatic carbon. Following extraction, aromatic carbon is analyzed by ultra-violet spectroscopy, resulting in increased measurement accuracy and decreased cycle time. The new method utilizes small sample size in comparison to current practices, and eliminates toxic gases produced by traditional analysis.

Abstract

DNA Barcoding Reveals the Diversity of GSL Brine Flies

Krystle Minear (Jonathan Clark)

Poster Display 45

Zoology

Nye Undergraduate Research Scholarship

2010 NCUR Participant

WSUSA Undergraduate Research Travel

Fellowship

Great Salt Lake (GSL), in northern Utah, is one of the largest lakes in the United States, with a total surface area of 4400 km². Shore flies (Ephydriidae) remove an estimated 90 million kg of organic matter from the lake and serve as a food source for bird populations, though relatively little is known of their biology. DNA barcoding examines a portion of the mitochondrial gene, cytochrome oxidase I (COI). This short sequence works as a barcode in that it can be cloned and sequenced relatively cheaply, yet shows enough sequence variability to be useful in distinguishing closely related species. Among the other DNA sequences that can be used to differentiate species is a nuclear non-coding region known as ITS-1. DNA barcoding is particularly useful for studying shore flies because some species are difficult to distinguish morphologically. This study examines how morphology and molecules can be used to compliment each other in the identification of shore flies. Using sequences from both COI and ITS-1, a comparison between interspecies and intraspecies variation will be investigated. The ultimate goal is to characterize all of the species of flies associated with the Great Salt Lake ecosystem.

Weber 2m Amateur Radio Repeater

John Metcalf (Jeff Ward)

Poster Display 46

Physics

Eccles Undergraduate Research Scholarship

The useable radio spectrum is divided up into many small parts from 5 MHz to 150 GHz called “bands” and permission is granted by the FCC to certain groups and organizations to operate there. Weber State has been allowed a frequency to operate a radio repeater in the 2 meter amateur band. Low power stations can communicate with the repeater, which receives the incoming transmission and retransmits it, repeating the transmission. Technical aspects and accomplishments of the design and construction for the Weber 2m amateur radio repeater will be presented.

College of Science

The Affect of Peptide Transporter on Growth Rates in *C. Elegans*.

William Mohn, Jason Herman, James Grundy, Eric Smith (Brian Chung)

*Oral Presentation
Zoology*

Proteins are important life molecules that serve as enzymes and structural support for cells. Dietary proteins are absorbed in the small intestine by digesting them into peptides and their individual amino acids. We hypothesized that intestinal peptide absorption is the paramount pathway versus amino acids for growth and development. We utilized the nematode *Caenorhabditis elegans* as our model and compared normal control worms (N2), to worms which lack the ability to absorb peptides (Null). Worms were hatched into a controlled condition with intact proteins and peptides (Nematode growth medium, NGM), or a fully-digested medium with amino (Experimental medium, EXP). Body length was measured daily over 5 days. Comparison of control worm growth rates found no difference between the two growth conditions; however, Null growth rates indicated a trend for decreased growth in the EXP medium compared to N2. Furthermore, data from day 1 indicates a trend for a significantly (96%) faster growth rate for N2 indicating intestine peptide transport plays an important role during the earliest stage of life. These data indicate the intestinal peptide transport protein plays a key role in normal growth and development and may influence efforts to improve nutritional support for malnourished and premature infants.

An Investigation of a New Predatory Bacterium (BALO) Inhabiting the Great Salt Lake, UT

James W. Moyes (Matthew Domek, Craig Oberg)

*Poster Display 47
Microbiology
Eccles Undergraduate Research Scholarship*

Bdellovibrio-and-like organisms (BALOs) are small predatory bacteria that attack Gram-negative bacteria and replicate inside the host cell. There has only been one published report of the isolation of a BALO from the Great Salt Lake (GSL) but the host organism used was a strain of marine bacteria. A soft agar overlay technique was used to screen water samples from the South Arm of the GSL against a range of halophilic bacterial hosts previously isolated from the GSL. Initial results revealed several unusual plaques characteristic of BALOs. Phase contrast microscopy of a potential GSL BALO (JM01) revealed specific BALO characteristics, such as unusual motility, very small size when compared to the host cell, and distorted spheroplasts of host bacteria all key indicators of BALO. Growth and plating studies showed the formation of migrating plaques and a long lag phase in infected hosts, also indicative of a BALO infection. JM01 showed preference toward a single host strain, *Salinivibrio* S40. Inoculating halophilic broth with host S40 plus JM01 resulted in a marked decrease in turbidity when compared to a control of only host S40 in halophilic broth suggesting that JM01 can inhibit *Salinivibrio* S40 growth in the lake environment.

Abstract

Prophage Induction in Halophilic Bacteria Isolated from the Great Salt Lake, UT.

*Karen E. Nelson, Karli E. Oberg,
Christie N. Jensen, Trever L. Gray, Adam M.
Hutchinson (Matthew Domek, Craig Oberg)*

*Poster Display 48
Microbiology
Eccles Undergraduate Research Scholarship*

Limited research has been performed on lysogenization in halophilic bacteria found in moderately halophilic (8-12% NaCl w/v) environments. Thirteen halophilic bacterial strains were isolated from the South Arm of the Great Salt Lake. Broth cultures of each strain were exposed to either ultraviolet (UV) radiation at various time intervals or to mitomycin C to cause prophage induction. Various growth conditions including NaCl concentrations, nutrient levels, and incubation temperatures were also examined for their effect on prophage induction. A comparison between untreated control tubes and UV treated tubes showed much slower growth in UV-treated tubes over time for many cultures, indicative of prophage induction. Of note, many halophilic strains were very sensitive to UV treatment, which was surprising since these isolates are constantly exposed to UV light in their environment. Spot tests utilizing the soft agar overlay method with filtrates from UV and mitomycin C treated cultures have been inconclusive. Growth curve results suggest the existence of prophage in some halophiles. Continued method development to induce prophage induction will include varying the concentration of mitomycin C and utilizing modifications in UV exposure intensity.

Nocturnal Observation of Brine Shrimp Cyst

Jeana Nielson (Bradley Stringer)

*Poster Display 49
Zoology
Nye Undergraduate Research Scholarship*

The Great Salt Lake is well known for being the one of the largest hyper-saline lakes in the world. Brine shrimp are one of the few organisms that can live in the Lake. Brine shrimp have a short life cycle. They reproduce by laying eggs. Winter conditions at the Lake can be harsh, and in order for the brine shrimp eggs to survive the winter the eggs laid in the fall have thick protective protein shell that allows them to overwinter and remain viable until hatching in the spring. Millions of pounds of eggs are harvested annually. The eggs are highly valued as a relatively pure, protein-rich food for use in commercial fish hatcheries worldwide. The eggs aggregate into long blooms floating on the surface of the water and are able to be seen in daylight conditions by water- and airborne observers directing harvesting boats the blooms. This study examined the practicality and efficacy of using airborne long wave infrared thermal imaging cameras to nocturnally observe the blooms in order to allow for greater harvesting hours per 24 hour period during the short days of winter. Method, apparatus, and results are presented.

College of Science

Winter Habitat Selection of the Snowy Plover in Mexico

Jeana Nielson (John Cavitt)

Oral Presentation

Zoology

Nye Undergraduate Research Scholarship

Snowy Plovers (*Charadrius alexandrinus*) are migratory shorebirds that are found along coast lines, dry salt flats, and estuaries. This species breeds at Great Salt Lake but due to recent population declines is considered a species of conservation concern. Western populations migrate south to winter along the southern California coast and Mexico. Few studies have examined winter habitat selection and none have examined habitat selection within the Marismas Nacionales in Mexico. The objective of this project was to determine the current habitat conditions of the Snowy Plover on their wintering grounds in Mexico. The questions I focused on answering were; What are the components of Snowy Plovers foraging habitat? and What are the components that comprise the roosting habitat for the Snowy Plover? I traveled to the Marismas Nacional in Nayarit Mexico to collect data on the wintering population Snowy Plover. The Snowy Plover were located primarily at inter-tidal zones within the Marismas Nacionales. Once located, Snowy Plovers were observed through a spotting scope for at least 5 min with all behaviors being recorded. Foraging sites were characterized by measuring components of the habitat. In addition a random site was chosen for each location and environmental components were also collected there.

The Effects of Ultraviolet Radiation on Halophilic Bacteria Isolated from the Great Salt Lake

*Mary-Virginia Parker, W. Dane Schofield
(Matthew Domek, Michele Zwolinski)*

Poster Display 50

Microbiology

Denkers undergraduate Research Scholarship

The Great Salt Lake is a hypersaline lake in a desert environment that provides an ecological niche for many species of halophilic bacteria. Flavonoids and other pigments are considered to be protective against solar radiation due to their ability to absorb UV light. The purpose of this study was to test whether pigmented halophilic bacteria show greater survival after exposure to damaging levels of UV light compared to non-pigmented bacteria. Pigmented and non-pigmented bacteria were isolated from the Great Salt Lake and plated on standard methods agar supplemented with 8% NaCl. Halophilic bacterial isolates were identified by 16S rRNA method. Bacteria were subjected to UV-B and UV-C wavelengths for varying times and compared to bacteria not exposed to UV light. Plate counts of surviving bacteria were counted and compared to controls. Initial results suggest pigmented and non-pigmented bacteria survive moderate doses of UV light.

Abstract

Survey of Chitinase Activity in Halophilic Microorganisms from the Great Salt Lake

Jared Phelps (Craig Oberg)

Poster Display 51

Microbiology

Eccles Undergraduate Research Scholarship

Chitin, a polymer of N-acetyl-D-glucosamine (GlcNAG), is the second most common biopolymer in nature. Its abundance in the Great Salt Lake (GSL) suggests that it is a significant source of carbon and nitrogen in that ecosystem. To determine how halophilic microorganisms in the GSL use chitin, a fluorescent assay was used that measures chitinase activity when the fluorescent tag 4-MUG releases from GlcNAG residues as they are metabolized. Six GSL bacterial isolates were incubated with the monomer, dimer, and trimer of 4-MUG GlcNAG and fluorescence was measured with a spectrophotometer to determine chitinase activity for each substrate. Results indicated that, of the six GSL isolates, *Halomonas* sp. and two *Salinivibrio* sp. were able to metabolize chitin, while one *Salinivibrio* sp. and two *Idiomarina* sp. were unable to metabolize chitin. Most isolates cleaved the chitin oligomers giving unique degradation profiles with the three 4-MUG GlcNAG substrates. *Halomonas* sp. metabolized 4-MUG GlcNAG initially, then cleaved the 4-MUG GlcNAG dimer and 4-MUG GlcNAG trimer after about two hours. Two chitinase utilizing *Salinivibrio* sp. cleaved the 4-MUG GlcNAG dimer before the other two GlcNAG substrates. From these results we conclude that each organism expresses unique sets of enzymes for chitin degradation.

Deployable Parachute for HARBOR Module

Scott Rollins (John Sohl)

Poster Display 52

Physics

Nye Undergraduate Research Scholarship

For the past two years Weber State University's high altitude balloon project has been a platform for student research of all scientific disciplines. The balloon carries sensing and communication equipment to altitudes of around one hundred thousand feet before it bursts and descends via parachute. This slow descent gives the equipment ample time to drift, making recovery an arduous task. If the equipment was allowed to descend under the influence of gravity alone it would be much less subject to crosswinds and by deploying a parachute at five thousand feet instead of ninety thousand feet the HARBOR team will be free to choose a smaller range of landing zone. I will work on a design for a circuit, which, by measuring and comparing pressure readings, will effectively deploy a main parachute at a preprogrammed altitude. My circuit will also store pressure readings for comparison with the main sensor array. Future work on the circuit will allow a communications team on the ground to manually fire the parachute. The use of this device will greatly increase the efficiency of scientific testing with this platform.

College of Science

Population Genetic Analysis of Great Salt Lake Brine Shrimp, *Artemia*

Amanda Truong (Jonathan Clark, Nicole Okazaki)

*Poster Display 53
Zoology*

Great Salt Lake (GSL) is a unique ecosystem with an unusually high degree of salinity. Brine shrimp (genus *Artemia*) are among the few animals able to survive in this harsh environment and are of great ecological and commercial importance. They serve as food for many migratory birds and their encysted eggs are harvested for the aquatic industry and used worldwide. As a consequence, GSL *Artemia* have spread throughout the world and in some cases are displacing native shrimp populations. Because different populations are morphologically identical the extent of intermixing is unknown. The purpose of this study is to examine and compare the genetic identity of shrimp collected from various geographical regions. Brine shrimp from Great Salt Lake, San Francisco Bay, and several lakes in China were examined and DNA sequences were determined for two genes, ITS1 and cytochrome oxidase I. These sequences were then used to construct a phylogeny of the shrimp, which may help to reveal the pattern of diversification of the various populations. These results were also compared to those from other studies to provide a more comprehensive view of *Artemia* phylogeny.

Poison in a Peanut Butter Sandwich: Can Turmeric Protect Against Cirrhosis?

Carl Edward Turner IV (Brian Chung, Barbara Trask)

*Oral Presentation
Zoology
Denkers Undergraduate Research Scholarship*

Turmeric, derived from the root of *Curcuma longa*, is a universally used spice that is an ingredient in curry dishes. The active ingredient in turmeric, curcumin, has been shown to have anti-inflammatory, anti-tumorigenic, as well as other beneficial effects according to several *in vitro* studies. To test the potential of curcumin as an anti-tumorigenic agent through oral administration, an *in vivo* study using athymic, nude mice (*Nu/Nu Mus musculus*) was initiated. Unlike previously-published studies, experimental mice (N=5) were provided 600mg dietary curcumin per day for six weeks prior to subcutaneous injection of 5×10^5 human breast cancer cells. Control mice (N=6) received twice-daily peanut butter treats without the curcumin. After tumor cell injection, but prior to development of subcutaneous tumors, control mice developed severe liver cirrhosis, whereas experimental animals were affected to a much lesser extent. Necropsy, histology and bacteriology suggest that the cirrhosis resulted from hepatotoxicity. While the exact cause of this hepatotoxicity is currently unknown, peanut butter-derived aflatoxins are suspected. While no information was able to be obtained regarding the anti-tumorigenic effects of curcumin through this study, these results suggest that daily ingestion of curcumin provides protection against hepatotoxicity.

Ultraviolet Reflectance on Seeds and Elaiosomes

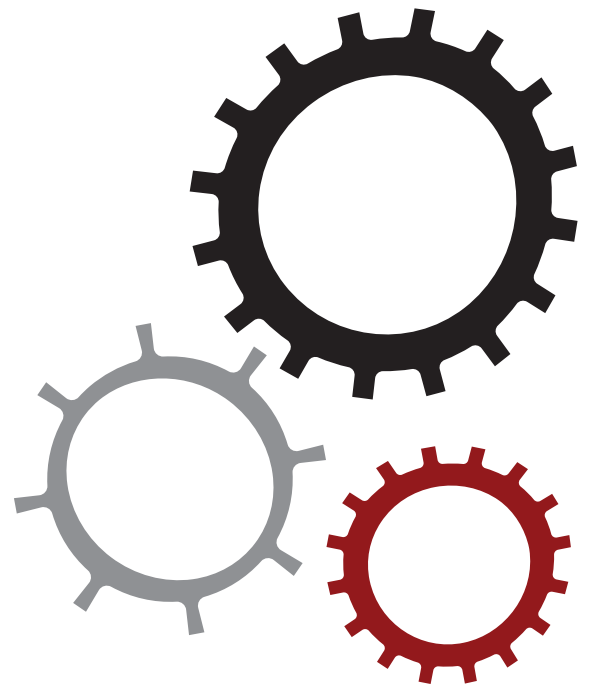
Richard Wangsgard (John Mull)

Poster Display 54

Zoology

Ultraviolet light (UV) is below the human-visible spectrum of (400-750nm). In many animals the UV spectrum plays a vital visual role in mate selection, food gathering, or predation avoidance. We determined whether visualization in the UV could be part of the mechanism by which ants are attracted to seeds. We collected the seeds of two species of plants known to be dispersed by ants *Viola nuttallii* and *Euphorbia esula* and measured their reflectance and that of their attached elaiosome. A uniform black paper background was used to allow us to isolate the spectra of the seeds. We separated the elaiosomes from their seeds and placed them individually on the black paper and measured their UV reflectance under various forms of light. We then subtracted the background spectrum from the sample spectra to determine the overall reflectance of the seeds and elaiosomes. We found that the elaiosome in *Viola nuttallii* has a greater UV reflectance than the seed alone under both black and natural light. We are evaluating different plastics to find ones that will block the UV light and allow us to determine if ants are attracted to the seeds because of their UV reflection.

College of Social & Behavioral Science



College of Social & Behavioral Science

Abstract

Filipinos in the Navy During World War I

Cynthia Balzomo (Kathryn MacKay)

Poster Display 55

History

Eccles Undergraduate Research Scholarship

The Navy, during World War I, heavily recruited Filipinos to fill undesirable, but important positions in their force by not only providing a means to enter the continental U.S., but also by promising and fighting for Citizenship rights for them in the U.S. During the early 20th century, the U.S. courts had always denied Filipinos, as they did all Asians/Pacific Islanders, the right to obtain U.S. Citizenship. This caused a pull mechanism that resulted in Filipinos becoming the second largest ethnic group in the U.S. Navy during WWI. This group continued to grow long after the World War ended, establishing a tradition that continued until recently. It also opened the door for thousands of Filipinos to immigrate into the U.S. in places where they were not previously located, such as Washington D. C. and New York City to name a couple. This did not mean that this was an easy way to immigrate by any means, as the U.S.S. Ajax proved when three Filipino Firemen died after their Officer chained them inside a boiler room. The majority of these men would make it to go on to become productive citizens with one of their number representing the U.S. in the Olympics.

A Wildcat Major: Factors that Influence Undergraduate Choice of Specialization at Weber State University

ShayLynne Clark (Ron Holt)

Poster Display 56

Anthropology

Choice of undergraduate specialization is an important, life changing decision in a young college student's life. I am interested in exploring the phenomenon of how students at Weber State University choose their major, and evaluate different aspects of their life including the frequency of information-seeking behavior which influence that decision. Furthermore, the ethnographic approaches proposed for this study will add anthropological dimension and insight into what has already been published in this area of inquiry, as well as give specific information relating exclusively to the student population at Weber State University. The topic of what influences an undergraduate choice of major has been undertaken by a number of researchers in the social sciences, including sociology, anthropology and psychology. I believe that the proposed research is relevant and will help not only contribute to the existing body of literature on the topic itself, but also help Weber State University professors better understand and tailor their teaching styles the specific group of students that they will generally be working with. All research will be conducted on the Weber State University College campus in Ogden, Utah. Given that the proposed research involves students' selection of majors, coupled with my goal of engaging as a participant observer in my own classes, this setting has been selected to facilitate the research methods of survey distribution and participant observation. Specific sampling data will be captured through the distribution of surveys and participant observation. A survey will be randomly distributed to hard science majors' (which includes math and biology, business etc.), Art majors' (which includes art, music etc.), and integrated science majors' (which includes anthropology, sociology, psychology, etc.) over a one week period. Qualitative and quantitative data will be analyzed together, looking for unifying features and patterns. Confidentiality and anonymity will be respected and maintained throughout the research process.

College of Social & Behavioral Science

The Effects of Perceived Risk and Temperament on Frequency of Casual Sex

Gregorio Coronado (Matthew Schmolesky)

Poster Display 57

Psychology

*WSUSA Undergraduate Research Scholarship
2010 NCUR Participant*

Eighty one female and 60 male Weber State University students' engagement in, and cognitive assessment about, sexual behavior were examined using the Physical Risk Frequency Inventory (PRFI) and Physical Risk Assessment Inventory (PRAI). Participants also completed Cloninger's Temperament and Character Inventory (TCI) to measure personality traits including NS. Overall cognitive assessment (PRAI) was negatively correlated with engagement (PRFI) in casual sex ($r = -.27, p < .05, n = 141$). Engagement in casual sex (PRFI) was positively correlated with NS scores ($r = .27, p < .05, n = 141$) and cognitive assessment (PRAI) was negatively correlated with NS score ($r = -.18, p < .05, n = 141$). In addition, there was a significant gender difference on both PRAI and PRFI measurements. There was no significant gender difference on NS scores. These results suggest that, compared to men, women perceive more risk in engaging in casual sex. Women also engage in less casual sex than men. Additionally, regardless of gender, higher assessments of risk are correlated with lower frequencies of engagement in casual sex and lower NS scores. NS scores have been linked to genetic polymorphisms and we have obtained DNA samples from all subjects for future analysis. However, this study shows that even with similar distributions of NS scores, other factors, such as gender, may mediate differences in crucial physical risk-taking behaviors, such as engaging in casual sex.

Improving Working Memory Capacity in School Children Using Computerized N-Back Training

Paula B. Fiet (Lauren Fowler)

Oral Presentation

Psychology

*Eccles Undergraduate Research Scholarship
2010 NCUR Participant*

Poor working memory capacity has been shown to be related to learning difficulties in math, reading, and other cognitive tasks in school aged children (Gathercole, & Alloway, 2006). Working memory is needed to allow manipulation of cognitive information in order to perform learning tasks. This study was designed to increase the working memory capacity (WMC) of participants (public elementary school children ages 7-9) using n-back task training games. The working memory capacity of each participant was assessed using the Automated Working Memory Assessment (AWMA). The experimental group received the working memory training intervention designed to increase working memory capacity. The other group (control) played low level educational games that did not place demands upon working memory. The experimental group played Brain Workshop, a computerized working memory game based on the n-back task known to elicit demands upon working memory (Jaeggi, Buschkuhl, Jonides, & Perrig, 2008). Participants will be reassessed upon completion of training sessions. A 2 (experimental/ control) x 2 (pre/post) ANOVA design will be used to assess the effects of the training on WMC. Results are expected to show that n-back training increases the WMC in participants. Increasing the WMC of school children could increase their learning abilities overall.

Abstract

A Vehicle for Equality in the Gilded Age: Feminist Perspectives on the Bicycle Era

Karlin Colobella-Hicks (Maria Parilla DeKokal)

*Poster Display 58
Women Studies*

1885 the Rover safety cycle was introduced in America. This evolution in the bicycle ultimately led to the acceptance of women cyclists as part of the cultural norm. The proceeding “bicycle boom” provided women with an opportunity to challenge dress reform and social customs. This study examines the long term effects of the bicycle and how it changed the social landscape for women. Utilizing an interdisciplinary analysis of social and historical changes as documented through turn of the century newspapers, medical journals, clothing patterns and etiquette guides. Secondary sources such as previous studies and texts on the topic provided a refined context for this paper. This study concludes that the bicycle increased public acceptance of women participation in recreation in public spaces, reversed medical opinions regarding women and exercise in addition to the previously mentioned gains in dress reform. This research is important to both gender studies and historians because it identifies the relationship between medical opinion and femininity that is often not explored.

Nutrition and College Student Mental Health

Amanda Kwok, Shannon Tortolano (Theresa Kay, Dianna Abel)

*Oral Presentation
Psychology*

There is a growing body of evidence in the modern literature, in the fields of both nutrition and psychology, indicating a relationship between poor nutritional status and depression. Of particular interest are omega-3 and folate deficiencies (Bodnar, 2005; Alpert & Fava, 1997; Morris, Fava, Jacques, Selhub, & Rosenberg, 2003; Soh, Walter, Baur, & Collins, 2009). The relationship between nutrition and the mental health manifestations of anxiety and depression were examined in our study within the college population. We sampled 160 undergraduate students, including those who attended a “National Depression Screening Day” outreach event, as well as a pool of psychology 1010 students. Preliminary results indicate the presence of a correlation between specific dietary factors and psychological well being. Although there are clearly a number of factors that can contribute to the manifestation of these two types of psychological disturbance within this population, there is the possibility that the use of this modality as an adjunct to treatment, or possibly a primary treatment for those displaying extremely mild symptomatology could be beneficial. Our study supports current literature indicating an interesting relationship between these variables.

College of Social & Behavioral Science

American Icon, African Past: The Origins of Bugs Bunny

Matthew Limb (Susan Matt)

Oral Presentation

History

Denkers Undergraduate Research Scholarship

In 1907, the first African-American characteristic appeared in animated productions when James Stuart Blackton incorporated the word “coon” into a blackface caricature in the animated short *Lightning Sketches*. That same year Metro-Goldwyn-Mayer began producing films that featured a “mammy” character that remained prominent in their productions for several decades. While white entertainers had blacked their faces and poked fun at African American song, dance, and speech on stage since the 1840s, these films marked the incorporation of African American culture, stereotypes, and racial characteristics into the American film industry. In 1938, Tex Avery, a white man from Texas, drew upon the elements of African American expression that had been integrated into American culture for generations when he created a grey hare that appeared in the Leon Schlesinger Production *Porky’s Hare Hunt*. Leon Schlesinger Productions was sold to Warner Brothers Cartoons, Inc. in 1944 and the grey hare was transformed into one of the most recognizable and beloved cartoon characters of all time: Bugs Bunny. The African American origins and roots of Bugs Bunny assist in understanding the multicultural origins of American mass culture and entertainment.

Neuroscience Educational Connections: Teaching and Learning Through Community Outreach

Kimberlee Taylor, David Webb, Noemi Erickson, Seth Peterson, Michael Weitzel, Nathan Hadley, Christopher Malan (Matthew Schmolesky)

Poster Display 59

Psychology

WSUSA Undergraduate Research Travel Fellowship

Weber State University (WSU) offers many unique opportunities to participate in community outreach, one of which is called Brain Awareness Week (BAW). BAW is organized through the WSU Neuroscience Initiative and is sponsored by the Society for Neuroscience; BAW aims to get Psychology and Neuroscience students involved in the community through sharing information about the brain and its incredible functions. WSU participated in BAW in February and March of 2009 and traveled to local schools, after-school programs, and day-care centers, to teach about the brain. BAW participants were given opportunities to dissect different specimens during hands-on activities. Together, the 2009 BAW WSU volunteers were able to reach more than 1,200 students within the Northern Utah public school system. This yielded a three-way benefit to enhance: 1) Education, 2) Volunteerism, and 3) University-Public Relationships. Currently, the 2010 Brain Awareness Week organization is underway. With an increase in student volunteers, students are taking on larger and more diverse organizational roles, and are expanding this outreach program to more students than were reached in 2009. We are also expecting to schedule presentations at additional community partner sites and on the WSU campus. Thus, BAW 2010 hopes to reach more than 1,500+ students.

Abstract

Musical Mood Management: An Exploration of the Efficacy of Music Exposure Upon Perceived Mood States and Physiological Indices

Shannon Tortolano (Lauren Fowler)

*Oral Presentation
Psychology*

According to The World Health Organization (2010), depression is currently ranked as the leading cause of disability, affecting approximately 120 million people worldwide. Current research suggests a link between music listening therapy and improvement of mood states, including those of reward and emotion (Blood & Zatorre, 2001), which may prove effective for assisting with the treatment of mood disorders (Hsu & Lai, 2004; Wu, 2002). The purpose of this study is to examine the relationships between music exposure, mood, and physiological indices. Participants in this study will include undergraduate students aged 18-70. Subjects will be randomly assigned to a half hour music session consisting of either classical or radio music. Both directly before and following the music session, participants will complete a brief version of the Profile of Mood States (POMS) and will have their vital signs (blood pressure, heart & respiratory rate) measured. A 2 x 2 MANOVA will be used to assess the data. It is hypothesized that we will see mood improvement relative to the initial mood, as well as physiological indices that support self-report measures of mood improvement following the music session.

The Effects of Exercise Duration and Intensity on Serum Levels of Brain-Derived Neurotrophic Factor in Healthy Adult Human Males

David Webb (Rodney Hansen, Matthew Schmolesky, Barbara Trask)

*Poster Display 60
Psychology/Health Promotion & Human Performance/Zoology
Eccles Undergraduate Research Scholarship*

Exercise causes an immediate transitory rise in blood serum levels of BDNF, which may reflect or cause increased BDNF levels in the brain, thereby enhancing memory. This study aimed to examine the effect of exercise intensity and duration on serum BDNF levels in young healthy adult males age 18-25. Participants were randomly assigned to exercise regimens consisting of varying intensities (80% or 60% of heart rate reserve, or control) and durations (20 or 40 min). Exercise was carried out on stationary bikes and compliance with regimen assignment was verified. Pre and post-exercise blood draws of 10 milliliters were conducted. Analysis of serum BDNF levels by sensitive enzyme-linked immunosorbent assay (ELISA) (Millipore Corporation, USA) revealed an increased median percent of serum BDNF change post-exercise for the following exercise regimens: 80%/40 min, 80%/20 min, 60%/40 min, 60%/20 min (18.69%, 19.73%, 16.44%, 7.58% respectively). Decreased median percent change was observed among controls (-21.56%).

College of Social & Behavioral Science

The History of the Stormy Mountain Boys a Bluegrass Band from Utah

Benjamin Wheeler (Kathryn MacKay)

Oral Presentation

History

Eccles Undergraduate Research Scholarship

2010 NCUR Participant

My project revealed the history of the Salt Lake City bluegrass band, The Stormy Mountain Boys. This band first formed in 1963 and has consistently played throughout the West since those formative years. The band plays in the style of the founder of Bluegrass, Bill Monroe who combined old-time southern music with the emerging upbeat patterns of Jazz and Blues. Monroe initially made Bluegrass popular within the country music scene during the late 1930s until it faded in popularity in the 1950s. There was a great reemergence of Bluegrass during the 1960s; however, it was not within Country genre. Instead, Folk musicians who were seeking out old-styled American tunes, found Bluegrass to be a valuable part of their repertoire. The Stormy Mountain Boys were a part of this folk movement which had a rich contribution and following in Salt Lake City. The amazing aspect about 1960s bluegrass bands such as the Stormy Mountain Boys, was their ability to keep their music politically neutral despite the potential to become associated with the very conservative country style or the very liberal folk style both of which became increasingly politically charged as the decade unfolded. I conducted 11 interviews.