

**UTAH ACADEMY
of
Sciences, Arts & Letters**

Established 1908

Annual Conference

April 7, 2018

**Southern Utah
University**

UTAH ACADEMY OF SCIENCES, ARTS & LETTERS
Annual Conference, Saturday, April 7, 2018

9:00 a.m. - 10:00 a.m.

Check-in & Registration

Hunter Conference Center (1st floor)

10:00 a.m. - 10:05 a.m.

Southern Utah University Welcome: Scott L. Wyatt, President, Southern Utah University

Great Hall, Hunter Conference Center

10:05 a.m. - 10:15 a.m.

Welcome: H. Laine Berghout, UASAL President

Great Hall, Hunter Conference Center

10:15 a.m. - 10:30 a.m.

John and Olga Gardner Prize Presentation

Dr. Jody Rosenblott, University of Utah

Distinguished Service Award Presentation

Dr. Bonnie Baxter, Westminster College

Great Hall, Hunter Conference Center

10:30 a.m. - 11:15 a.m.

O.C. Tanner Lecture

Salt of the Earth: Interdisciplinary Learning with Great Salt Lake Institute

Dr. Bonnie Baxter, Westminster College

Great Hall, Hunter Conference Center

11:15 a.m. - 11:45 a.m.

Poster Session

Great Hall, Hunter Conference Center

11:45 a.m. - 12:45 p.m.

Lunch

Great Hall, Hunter Conference Center

1:00 p.m. - 2:30 p.m.

Division Breakout Sessions (I)

See "Division Session Room Assignments"

2:30 p.m. - 3:00 p.m.

Refreshment Break

Hunter Conference Center (1st Floor)

3:00 p.m. - 4:30 p.m.

Division Breakout Sessions (II)

See "Division Session Room Assignments"

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

UASAL Board Meeting

Great Hall, Hunter Conference Center

DIVISION SESSIONS

Room Assignments

POSTER SESSION: Great Hall, Hunter Room

ARTS: Red Hills

BIOLOGICAL

SESSIONS A: Yankee Meadows

SESSIONS B: Shooting Star

BUSINESS:

SESSIONS A: Vermillion Cliffs

SESSIONS B: Sage Valley

EDUCATION: Education Building ED 111

ENGINEERING: Education Building ED 204

EXERCISE SCIENCE AND OUTDOOR RECREATION: Education Building ED 202

HUMANITIES/PHILOSOPHY/FOREIGN LANGUAGE

SESSIONS A: Charles Hunter

LETTERS/LANGUAGES/LITERATURE: Whiting Room

PHYSICAL SCIENCES

SESSIONS A: Education Building ED 102

SESSIONS B: Education Building ED 103

SESSIONS C: Education Building ED 104

SOCIAL SCIENCES

SESSIONS A: Education Building ED 203

SESSIONS B: Education Building ED 215

1. To Access Wireless Internet:
2. Please use “eduroam” wireless network to connect to the Internet.
3. Enter your university credentials for the username and password.
4. If your school does not participate in eduroam, please connect as a guest to SUU-Wifi
5. The log on and password will be provided at the conference

Do not miss the Spring Excursion to “Bears Ears National Monument” announcement inside the back cover of this program.

O.C. Tanner Lecture

“Salt of the Earth: Interdisciplinary Learning with Great Salt Lake Institute”

Dr. Bonnie K. Baxter, Ph.D.

Director of the Great Salt Lake Institute and Professor of Biology at
Westminster College

Utah’s immense terminal lake has inspired exploration since humans first inhabited the valley thousands of years ago. Indeed, Great Salt Lake has been the subject of poetry, a site for land art, and a system for scientific investigation. Ten years ago, we established the Great Salt Lake Institute at Westminster College to connect people to the lake through research and education. Our role is supporting creative work on Great Salt Lake and facilitating discovery, and our strength is in the partnerships we build. In this last year alone we have: 1) placed a “PELI-cam” on Gunnison Island, which can bring an off-limits wildlife habitat to the classroom, 2) begun a science/art integrated undergraduate research program, 3) held public meetings to prevent a landfill operation on the shores of Great Salt Lake, 4) collected oral histories of duck hunters, and 5) collaborated with NASA on Great Salt Lake as a Martian analogue. This talk will present a model for building an interdisciplinary center for learning in an undergraduate environment.

John & Olga Gardner Prize

Dr. Jody Rosenblatt

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

Jody Rosenblatt is Professor of Oncological Sciences at the University of Utah and Investigator at the Huntsman Cancer Institute. During her Ph.D. at the University of California, San Francisco with Dr. Timothy Mitchison, she studied actin filament turnover and as a post-doc at the MRC-LMCB at University College London, she discovered epithelial cell extrusion, a process that eliminates dying cells without forming any gaps. Her lab studies how epithelia maintain constant cell numbers through cell death and cell division and have found that mechanical forces control each process; when cells become too crowded, they extrude some cells that later die and when cells are too sparse stretch activates cells to rapidly divide. Surprisingly, both opposing processes require the same stretch-activated calcium channel, Piezo1, depending on the force encountered. Extrusion is critical for regulating epithelial cell number, as they find that aggressive metastatic cancers and asthma can result from defective extrusion signaling. Understanding the basic cell biology of cell death is now revealing new etiologies for diseases that currently lack treatments. We believe that understanding the roots of a disease will better pave the way to finding its cure, rather than merely managing its symptoms.

Distinguished Service Award

Dr. Bonnie K. Baxter, Ph. D.

The Distinguished Services Award is given to an academic professional for exceptional services to the higher education community in Utah.

Dr. Bonnie K. Baxter is Director of the Great Salt Lake Institute and Professor of Biology at Westminster College in Salt Lake City, Utah. Where she has been studying the microbial communities of Great Salt Lake for two decades, applying her background in cellular biochemistry to the physiology of halophilic archaea, which dominate in the lake's saltiest brines. This expertise has led to many discoveries relating to DNA damage and repair mechanisms, carotenoid photobiology, microbial diversity, and the relationship of this lake to Mars. In 2008, Baxter and colleagues created Great Salt Lake Institute, which serves to enhance research, education and stewardship of Great Salt Lake. Through this non-profit organization, the institute pulls together Westminster undergraduates and researchers from all around the world to study this unique ecosystem and share their discoveries. She is also dedicated to integration of research in undergraduate science education and to outreach efforts that inspire learning and stewardship. She obtained her Ph.D. in Genetics at the University of North Carolina, Chapel Hill, and did her post-doctoral research in the Department of Biochemistry and biophysics at Washington State University.

Journal of the Utah Academy Publication Policy

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

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

If you wish your paper to be considered for publication in The Journal, please submit a Microsoft Word document to the chair of the appropriate division by June 1st 2017. Contact information for division chairs is available on the Utah Academy's website (www.utahacademy.org). Editorial responses will be forthcoming after the resumption of school the following fall when referees have returned their comments to the division chairs.

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

Poster Session

Session Chair: Erin O'Brien

Dixie State University

Examining the Ideal Conditions for Crude Oil Bioremediation by Algae Species

Brady Webb, Braden Nickle, Morgan S. Abbott, Utah Valley University

Thigmomorphogenic Response in Arabidopsis thaliana

Brian Williams, Deric Searle, Brandon Peterson, Utah Valley University

Targeted Mutagenesis and Repair via CRISPR/Cas9 and Homology Directed Repair of Melanogenic Genes

Jacob Kirkpatrick, Josh Kirkpatrick, Erika Smith, Eric Domyan, Utah Valley University

A Study of Ringtail (Bassariscus astutus) Genetic Diversity in Southern Utah

Laura Allard, Laurie Mauger, Southern Utah University

Vermicomposting spent brewer's grain (Secale cereale, Triticum aestivum, and Hordeum vulgare) for fertilizer application on Raphanus sativus

Summer Roberts and Whitney Weinberg, Utah Valley University

Effects of Caffeine on Growth and Development of Mustard Seed

Alyssa Baccus, Michael Foster, Brandon Richards, Stephanie Vasquez, Utah Valley University

Occurrence & abundance of milkweed (Asclepias sp.) in irrigation channels adjacent to roadsides and cropland

Daniela Gomez, Ashley Ardon, Denise Rodriguez, Selena Oltehua, Haley Moyes, Breana Ortega, Melissa Robles and Cody Zesiger, Roy Junior High

Ant genera distribution at Three Peaks Recreation Area between sunny and shady locations

Shelby Berryhill, Katelyn Glauser, Keli Kennerly, Justin Mickelson, Aiden Reed, Stephen Navin, Dalton Skidmore, Carrie Jo Bucklin, Southern Utah University

Wolbachia Infection Rates in Southern Utah Ants

Logan Tuttle, Carrie Bucklin, Sam Wells, Laurie Mauger, Southern Utah University

Synergistic activity of clove oil and amphotericin B against Absidia corymbifera Biofilm

Tyson Hillock, Jedediah Orullian, Hutch Rhees, Caeleb Harris, and Olga Kopp, Utah Valley University

Bisphenol's Damaging Effects of Human Reproductive Dysfunction and Chronic Illnesses including Hypothyroidism, Vitamin D deficiency and Alzheimer's-like Neurotoxicity

Dominique Elder, Dr. Heather Wilson-Ashworth, Utah Valley University

Investigation of the synergistic effect of Origanum vulgare (Oregano) Oil and Amphotericin B to inhibit Mucormycosis causing species Absidia corymbifera fungal biofilm

Levi Neely, Caeleb Harris, Olga Kopp, Jedediah Orullian, and Hutch Rhees, Utah Valley University

Mutation in the Rock Pigeon Genome Causes Unique Pigmentation by Altering Gene Expression

Cody Frazer, Jeremy Hardy, Jordan Daniels, Eric Domyan, Utah Valley University

Conservation genetics of black bears (Ursus americanus) in southwestern New Hampshire
Kaetlyn Revels, Benjamin Kilham, Laurie Mauger, Southern Utah University

Correlation Between Education Levels and Use of Essential Oils in a Sample Population
Lindsey Butts, Meagan Griswold, Ammon Allphin, Micheal Litchfield, Utah Valley University

Cancer and heart disease in Utah county: Does diet and use of CAM have an effect in their low incidence in the area?
Sarah Khelfa, Kelly Greener, Andy Geigle, Utah Valley University

Perception of Genetically Modified Organisms for Human Consumption in Utah Valley University Students
Cassandra Witt, Jason Walker, Jacee Horne, Austin Baker, Utah Valley University

Public Perception of the use of Marijuana, Prescription Painkillers, and Opioids at Utah Valley University
Bryce Richards, Rick James, Jesse McHale, Jordan Daniels, Utah Valley University

A Preliminary Study of Genetic Diversity in Ant Populations at the Southern Utah University Mountain Center
Johanna Garavito, Brent Thacker, Michael Tyler, Makayla Oborn, Emily Olsen, Reggie Allen, Carrie Jo Bucklin, Laurie Mauger, Southern Utah University

Analysis of the knowledge of Utah Valley University students and faculty in identifying common poisonous/hazardous plants.
Chad Talbot, Christopher Pope, Wyatt Knechtel, Dallin Ollerton, Olga R. Kopp, Utah Valley University

Impact of locular gel on the formation of callus in tomato tissue cultures
Natalie Blain, Arthur Evensen, Utah Valley University

Lemongrass essential oil and Amphotericin B as antifungal agents against Absidia corymbifera Biofilm
Stephanie Hopkins, Hannah Robb, Jedediah Orullian, Caeleb Harris, Hutch Rhees, Utah Valley University

A new gigantic sea spider in the genus Colossendeis
Jordan Parker, Fredric Govedich, Bonnie Bain, Southern Utah University

Proteins Observed in Honey Through Mass Spectrometry
Tyler J. Thornton, Jeremy D. Bergman, Dac A. Crandall, Rawlings E. Lyle, Austin D. Sherwin, Trient B. Spires, J. Hayden Welch, and Craig D. Thulin, Utah Valley University

Synthesis of segments of the Streptococcus pneumoniae serotype 23F capsular oligosaccharide antigen for pneumococcal vaccine development
Pitambar Khanal, Shenglou Deng, Paul B. Savage, Department of Chemistry and Biochemistry, Brigham Young University

Identifying Possible Correlations Between Seasonal/Pollen and Food Allergies in Utah County
Kyle Medley, Brady Smith, Kyle Swallow, Joseph Cook, Utah Valley University

Effect of salinity on the hatching of Branchinecta lindahli Packard, 1883.
Nayla Rhein, Fredric Govedich, Bonnie Bain, Southern Utah University

Are Humans Just Animals? A Study of the Acceptance of Evolution
Chad Talbot, T. Heath Ogden, Utah Valley University

Methods for the Study of Honey Proteins
Jeremy D. Bergman, Dac A. Crandall, Rawlings E. Lyle, Austin D. Sherwin, Trient B. Spires, Tyler J. Thornton, J. Hayden Welch, and Craig D. Thulin, Utah Valley University

Brian Head Fire: Effects of Fire on Aquatic Ecosystems
Lauren Nickell, Nayla Rhein, Fredric R. Govedich, Carrie-Jo Bucklin, Bonnie Bain, Southern Utah University

Cormorant's: Where are they During and After Fish Stocking in Suburban Ponds in Northern Utah
Nicholas Padilla, Weber State University

Possible Plant Protein Identification within Honey's Proteome
Dac Crandall, Trient B. Spires, Jeremy D. Bergman, Rawlings E. Lyle, Austin D. Sherwin, Tyler J. Thornton, J. Hayden Welch, and Craig D. Thulin, Utah Valley University

The Ruff Life: An Approach to Undergraduate Canine Research
Jared Burton, Peter Williams, Tasha Young, Jessica Hill, Utah Valley University

The Destructive effects of Radio Galaxy Jets on Neighboring Galaxies
Taylor Hammack, Taylor Morgan, Kallin Raymond, Bryan May, Kasen Lisonbee, Jordan Memmott, Southern Utah University

Diffusion-limited Titration Using Microfluidics
Jaxton Barney Dr. Christopher Monson, Southern Utah University

Synthesis and evaluation of chalcone and cinnamate ester derivatives for anti-tumor activity.
Brian Allen, Don Davies, Parker Ferguson, Jordan Lowder, Weber State University

Carbon Pricing in the Private Sector: How the Science, and Politics, of Carbon Pricing and Climate Change Influence Business Strategy
Christopher Cottle, Hayden Hubbard, McKlayne Marshall, Center for Growth and Opportunity- Utah State University

Vermicomposting spent brewers grain (Secale cereale, Triticum aestivum, and Hordeum vulgare) for fertilizer application on Raphanus sativus.
Summer Roberts and Whitney Weinberg, Utah Valley University

Music to the Rescue: Long-Term Music Exposure Improves Anxiety and Depression Without Altering Life Satisfaction in the Elderly Living in Assisted Living Facilities
Lee Wulfenstein Cody Titcomb, Jacob Peterson, Ting-yi Liao, Utah Valley University

Music to the Rescue: Long-Term Music Exposure Improves Anxiety and Depression Without Altering Life Satisfaction in the Elderly Living in Assisted Living Facilities
Lee Wulfenstein, Cody Titcomb, Jacob Peterson, Ting-yi Liao, Utah Valley University

Learn by Team Play: Engaging Youngsters to STEM Fields

Dezhi Wu, Sean Brown, Zach Christensen, Conner Cox, Michael Isom, Mitch Nelson, & Jared Porter, Southern Utah University

Stephen Navin, Dalton Skidmore, Carrie Jo Bucklin

Aiden Reed, Southern Utah University

Bisphenol-A (BPA) Damaging Effects of Human Reproductive Dysfunction and Chronic Illnesses including Hypothyroidism, Vitamin D deficiency and Alzheimer's-like Neurotoxicity

Dominique Elder, Dr. Heather Wilson-Ashworth, Utah Valley University

*Investigation of the synergistic effect of *Origanum vulgare* (Oregano) Oil and Amphotericin B to inhibit *Mucormycosis* causing species *Absidia corymbifera* fungal biofilm*

Levi Neely, Caeleb Harris, Olga Kopp, Jedediah Orullian, and Hutch Rhees, Utah Valley University

Validation of Self Through Dating: Correlation Between Number of Dates Asked Out On and Self-Esteem Among Female BYU Freshman

Sydney Rasmussen, Brigham Young University

Ablation of Materials Under Catalyzed Deuterium Flow

Ben Thrift, Mike Taggett, Southern Utah University

Cognitive and Physiological Outcomes among Female Athletes After Suffering a Sports-Related Concussion

Chase Junge, Brigham Young University

Comparing the Learning Outcomes in Chemistry Outreach Between Elementary Charter Schools and Title One Elementary Schools

Atoosa M. Samani, Prerna Kamath, Mikayla Rosqvist, Rebecca King, Bradford Stockman, Salt Lake Community College

Gender Differences and The Learning Outcomes in Chemistry Outreach

Atoosa M. Samani, Prerna Kamath, Mikayla Rosqvist, Salt Lake Community College

The State of Educator Ethics Laws in the United States

Shirley Dawson, Weber State University

Humanizing the Model Minority: A Literature Review of Current Research Concerning Counseling Asian American College Students

Austin Lynn, Brigham Young University

Why Words Matter: The Use of Language in Conducting Forensic Interviews on Adolescent Victims of Abuse

Mackenzie Quinton, Brigham Young University

Using Robotics to Promote Learning and Engagement I Computer Science

Suzy Cox, Chelsey Beck, Utah Valley University

Arts

Division Chair: Angela Banchemo-Kelleher
Utah Valley University

SESSION I

Session Leader: Angela Banchemo-Kelleher

- 1:00 p.m. *Escape: A Research through Dance on the Symptoms of Addiction*
Francesca DeMartino, Department of Dance/Undergraduate , Utah Valley
University
- 1:20 p.m. *A Critical Analysis of the Rite of Spring by Pina Bausch Through the Feminist
Perspective*
Tara Meredith, Department of Dance/Undergraduate , Utah Valley University
- 1:40 p.m. *Soviets, Socialists, and the ballet, Spartacus*
Arden Laga, Department of Dance/Undergraduate , Utah Valley University
- 2:00 p.m. *Muscle Memory and Dance*
Alexandria Sorenson, Department of Dance/Undergraduate , Utah Valley
University
- 2:30 p.m. Break

Biological Sciences

Division Chair: Laurie Mauger
Southern Utah University

SESSION IA

Session Leader: Laurie Mauger

- 1:00 p.m. *Isolation and Characterization of Bacteria to Degrade Art Waste Solvents*
Gabriel McKay, Craig Oberg, Weber State University
- 1:15 p.m. *Comparison of Frequency, Peak Density, and Attenuation Between Large Transducers and Forceps Transducer using High Frequency Ultrasound on Pigskin Samplers*
Gabriela Lizarbe, Utah Valley University
- 1:30 p.m. *Micropropagation of two Edaphic Species, Eriogonum soredium and Lepidium ostleri*
Alyson DeNittis, Utah Valley University
- 1:45 p.m. *Suppressing Growth of Lactobacillus wasatchensis WDC04 using Organic Acids*
Ireland Green, Michele Culumber, Weber State University
- 2:00 p.m. *Synergistic Antifungal Activity of Amphotericin B, Essential Oils, and Low-Frequency Ultrasound on Rhizopus oryzae Biodfilm*
Tyson Hillock, Utah Valley University
- 2:15 p.m. *Rapid Method for Measuring the Effect of Prebiotics on Probiotic Bacterial Growth*
Dana Hoffman, Craig Oberg, Weber State University
- 2:30 p.m. Break
- 3:00 p.m. *Inhibition of Pathogens by Probiotic Strains of Lactobacillus*
Ammon Smart, Sherie Thorton, Weber State University
- 3:15 p.m. *Isolation of a Lactobacillus wasatchensis-like Isolate from an Aged European Cheddar Cheese*
Issac Martineau, Weber State University
- 3:30 p.m. *The Effects of the Anesthetic Diethyl Ether on Dionaea muscipula (Venus Flytrap)*
Jennifer Locke, Utah Valley University

SESSION IB

Session Leader: Erin O'Brien

- 1:00 p.m. *Separating Organic Material Using Microfluidic Device*
Megan Jensen and Anna Christensen, Southern Utah University
- 1:15 p.m. *Evaluating the Synergistic Treatment of Amp B and Cinnamon Oil on Absidida corymbifera Biofilms*
Alyson DeNitis, Utah Valley University
- 1:30 p.m. *Characterization of the Hemolytic-like Activity of Probiotic Lactobacilli*
Francesco Sechi, Jayson Workman, Weber State University

- 1:45 p.m. *The Degradative Effect of Horeseradish Peroxidase on Microbial Biofilms*
Samuel Kalis, Weber State University
- 2:00 p.m. *Possible Plant Protein Identification with Honey's Proteome*
Dac A. Crandall, Utah Valley University
- 2:15 p.m. *Population Dynamics of Bat Fleas in Great Basin Desert Caves*
Robert L. Bossard, Bossard Consulting
- 2:30 p.m. Break
- 3:00 p.m. *Precision Breast and Skin Cancer Surgery with Ultrasound Instrumented Forceps*
Jedediah Orullian, Utah Valley University
- 3:15 p.m. *Inhibition of Lactobacillus wasatchensis by Bio-Protective Lactic Acid Bacteria*
Craig Oberg, Michele Culumber, Weber State University

Business

Division Chair: Taowen Le
Weber State University

SESSION IA

Session Leader: Taowen Le

- 1:00 p.m. Welcome
- 1:10 p.m. *Investigating Supply Chain Literacy among College Students*
David Benson, James Brau, Derek Phelps, Brigham Young University
- 1:30 p.m. *How Early Profitability Index Can Predict Bank Failure: Evidence from US Bank Failure during 2008-2010*
Abdus Samad, Utah Valley University
- 1:50 p.m. *Diversification through Creating Brand Performance with Social Media, Deliverable*
Chase Christian Jasperson, Jill Jasperson (J.D.), Utah Valley University
- 2:10 p.m. *An Analysis of the Determinants of the Choice of College Major Using Survey Data*
Marshall Ringwood, Jim Brau, Brigham Young University
- 2:30 p.m. Break
- 3:00 p.m. *Predicting Commercial Success of Video Games Based upon Objective Biometric Measures*
Chris L Wasden, Janette Vazquez, Julio Cesar Facelli, University of Utah
- 3:20 p.m. *An Ethical Property Rights Argument for the Shareholder Wealth Maximization Theory of the Firm*
Hanni L. Brau, Andrew Holmes, Brigham Young University
- 3:40 p.m. *Tourism in Utah as an Economic Development Tool*
Jhana Aristondo, Utah Valley University

SESSION IB

Session Leader: Jonathan Westover

- 1:00 p.m. Welcome
- 1:10 p.m. *Accountants, Block Chain, and Bitcoin: Changing the Profession with Advancing Technology*
Chelsea Dye, Ron Mano, Jennifer Harrison, Westminster College
- 1:30 p.m. *A Financial Analysis of Just-in-Time Inventory Controls*
Ana Johnson, Jim Brau, Brigham Young University
- 1:50 p.m. *Perceptions of Corporate Social Responsibility among Millennials*
Brigham Brau, Jim Brau, Brigham Young University
- 2:10 p.m. *Examining Autism in the Workplace: A Focus on Vocational Organizations*
Kathryn Hughes, Jonathan Westover, Utah Valley University
- 2:30 p.m. Break

- 3:00 p.m. *Examining Employing Onboarding Best Practices in a Higher Education Environment*
Kailey Sherman, Ryan Stephenson, Jonathan Westover, Utah Valley University
- 3:20 p.m. *An Analysis of the Number of IPOs and Publicly Traded Firms: Are We in a Crisis?*
Amy Cyr, Jim Brau, Noah Brown, Brigham Young University
- 3:40 p.m. *Teach Me!*
Shandon D. Gubler, Dixie State University
- 4:00 p.m. *Taxation without Representation: Corporate Social Responsibility and Employee Compensation*
Amy Cyr, Jim Brau, Brigham Young University, Bekki Brau, University of Arkansas,

Education

Division Chair: Debora Escalante
Utah Valley University

SESSION I

Session Leader: Debora Escalante

- 1:00 p.m. *Using Robotics to Promote Learning and Engagement in Computer Science*
Suzy Cox, Chelsey Beck, School of Education, Utah Valley University
- 1:20 p.m. *Eureka Moments: Innovative Strategies to Enhance Student Thinking, Insight,
and Ideas*
Prent Klag, Beverley Taylor Sorenson College of Education and Human
Development, Southern Utah University
- 1:40 p.m. *Reading Motivational Principles Fostering the Value of Reading in Young
Readers*
Ann C. Sharp, Douglas S. Gardner, Lorilynn Brandt, and Kristin Wright, School
of Education, Utah Valley University
- 2:00 p.m. *A Historical Approach to Learner-centered Teaching*
Evan Sharp, McKay School of Education, Brigham Young University
- 2:20 p.m. *Examining Autism in the Workplace: What are the Public Schools Doing to
Prepare Future Autistic Workers?*
Kathryn Hughes, Jonathan Westover Woodbury School of Business, Utah Valley
University
- 2:40 p.m. Break

Engineering

Division Chair: Doran Baker
Utah State University

SESSION IA

Session Leader: Ali S Siahpush

- 1:15 p.m. *Airglow Measurements from SABER/TIMED Satellite*
Gene Ware, Utah State University
- 1:30 p.m. *An Experiment to Evaluate the Deflection of a Beamlite*
Jacob Carter, Southern Utah University
- 1:45 p.m. *Thermal Conductivity of Solids*
Jacob Carter and Justin Christensen, Southern Utah University
- 2:00 p.m. The Diathermometer and the Thermal Conductivity of Air
Casey Cooper, Southern Utah University
- 2:15 p.m. *Heat Transfer of a Phase Change Material Thermal Energy System*
Daniel Ulrich, Harley Glad, Ben Thrift, Southern Utah University
- 2:30 p.m. Measuring Solar Flux and Absorptivity
Logan Evans, David Armijo, Southern Utah University
- 2:40 p.m. Break

Exercise Science and Outdoor Recreation

Division Chair: L. Nathan Thomas

Salt Lake Community College

SESSION IA

Session Leader: L. Nathan Thomas

- 1:00 p.m. *Unique rituals, Pre-Performance routines and Superstitious Behavior used by Elite Senior Athletes*
M. Vinson Miner, Ph. D., T. Cole Parkinson, BS., Department of Exercise Science
Utah Valley University
- 1:20 p.m. *Does 14 Weeks Individual Programming Lead to Short and Long Term Changes and Quality of Life, 2 year Follow-Up*
L. Nathan Thomas MS, Joli Johansen MS, Department of Health and Lifetime Activities
Salt Lake Community College
- 1:40 p.m. *Sex Difference in Concussions. Female Athletes May Show Increased Symptoms*
Chase Junge, Department of Exercise Science, Brigham Young University
- 2:00 p.m. *Gender Differences in the Role of Acculturation, Self-Regulation, and Self-Esteem in Alcohol Consumption among Asian American Adults*
Yan Huang, PhD, Department Health Promotion and Human Performance, Weber State University

Humanities, Philosophy, & Foreign Language

Division Chair: Jason Goltz

Weber State University

SESSION IA

Session Leader: Jason Goltz

- 1:00 p.m. *Two Wrongs Don't Make a Right: Monumental Foolishness in Southern Utah*
Kevin Holdsworth - Snow College; Jennifer Sorensen – Southern Utah University
- 1:20 p.m. *The Impact of the Policies of the U.S. Presidents George W. Bush, Barack Obama and Donald Trump on the Cuban*
Greg Briscoe, Utah Valley University
- 1:40 p.m. *The Art of Letter Writing: A Reappraisal*
Aymee DeLaPaz, Dixie State University
- 2:00 p.m. Q & A
- 2:30 p.m. Break
- 3:00 p.m. *Translation of Culture-Loaded Tourist Attractions from an Intercultural Communication Perspective*
Tinging Gu, Southern Utah University
- 3:20 p.m. *The Critical Vocabulary for Narration in Colloquial Arabic: A Corpus Study*
Seth McCombie, Brigham Young University

Letters, Language, & Literature

Division Chair: Keith Lawrence

Brigham Young University

SESSION IA: Reformed Readings of Contemporary American Texts

Session Leader: Todd Goddard

- 1:00 p.m. *From Rebellion to Commodification: Jazz as a Colonizing Force in Jean Rhys's "Let Them Call it Jazz" and Philip Larkin's "For Sidney Bechet"*
Randy Jasmine, Dixie State University
- 1:20 p.m. *The Territory We Have Left Behind: J. M. Coetzee's Elizabeth Costello and Neo-Materialism*
Sean Jenkins, Weber State University
- 1:40 p.m. *Weird Is Good: Poetry, Evolution, and Architecture*
Rob Carney, Utah Valley University
- 2:00 p.m. Q&A/Discussion
- 2:30 p.m. Break

SESSION IIA: Travel, Change, and Redemption in Melville and Twain

Session Leader: Rob Carney

- 3:00 p.m. *Queequeg: Cannibal and Savior of the Pequod World*
Megan Naihe, Weber State University
- 3:20 p.m. *Mark Twain's Geographic Imagination in Life on the Mississippi*
Todd Goddard, Utah Valley University

Physical Sciences

Division Chair: Chris Monson
Southern Utah University

SESSION IA: Physics and Astronomy

Session Leader: Brandon Wiggins

- 1:00 p.m. *a-Si as a Protective Layer to Block the Oxidation of Al mirrors*
Yhoshua Wug, David D. Allred, R. Steven Turley, UCLA/Brigham Young University
- 1:20 p.m. *Using Exoplanet Transits to Calibrate the Great Basin Observatory.*
Katherine Wilcox, Rhett, Zollinger, Southern Utah University
- 1:40 p.m *CCD Measurements of AB and AC Components of WDS 20420+2452*
Dallas Anselmo, Alan Nelson, Kevin Andrews, Ethan Brown, and Bryan May,
Southern Utah University
- 2:00 p.m. *Optical constants and oxidation of niobium thin films*
Himkala Paudyal Khanal, David D. Allred, Brigham Young University
- 2:30 p.m. Break
- 3:00 p.m. *Tidal Disruption Events Around Massive Black Holes*
Payton Christensen, Kyle Christiansen, Brandon Wiggins, Southern Utah University
- 3:20 p.m. *What a genetic-algorithm based, optical-design program teaches us about dual-function (Extreme ultraviolet + broadband UV-optical-IR) multilayer mirrors*
David D. Allred, R. Steven Turley, Brigham Young University
- 3:40 p.m. *The Effects of Surface Roughness on Reflectance*
Michael Greenburg. Brigham Young University
- 4:00 p.m. *Sun Fire on Earth: The Hydrodynamics of Kiloton Explosions*
Tanner Gamble, Brandon Wiggins, Southern Utah University

SESSION IB: Math and Physics

Session Leader: Andrew Misseldine

- 1:00 p.m. *The Mathematics of Mario Party 10*
Andrew Misseldine, Southern Utah University
- 1:20 p.m. *How Rational Functions Shape the World - Through Phase Transitions among Physical States.* Chin-yah Yeh, Salt Lake Community College
- 1:40 p.m. *Classifying the Schur Rings Over the Integers.*
Nic Bastian, Jaden Brewer, Andrew Misseldine, Southern Utah University
- 2:00 p.m. *Helping Students Overcome Difficulties in Math With Physics*
Jacob Siebach, Brigham Young University

SESSION IC: Chemistry

Session Leader: Chris Monson

- 1:00 p.m. *A Neural Network for the Non-Invasive Differentiation of Cancer Cells Using Near-Infrared Laser Scattering Data*
Vern Hart, Ryan Bevan, Mason Acree, Daniel Blumel, Christopher Berneau, James Graham, Diana Turcios, Utah Valley University
- 1:20 p.m. *Silver Nanoparticle Synthesis with Microfluidic Devices*
Kyler Radmall, Rachel Radmall, Max Brown, Christopher Monson, Southern Utah University
- 1:40 p.m. *Quantum Erasure with the Stern-Gerlach Effect*
Richard Barney, Jean-François Van Huele, Brigham Young University
- 2:00 p.m. *Measuring Oxygen Levels in Anoxic Environments Using a Microfluidic Device*
Mariah Clayson, Brian Anderson, Southern Utah University
- 2:30 p.m. Break
- 3:00 p.m. *Spectroscopic and Quantum Chemical Investigation of Nature's Most Adaptive Photosynthetic Pigments*
Jacob Dean, Clayton Staheli, Kelsey Rico, Southern Utah University
- 3:20 p.m. *Soil analysis of molybdenum metal near Milford, UT.*
Matthew Harmon, Kim Weaver, Elizabeth Pierce, Southern Utah University
- 3:40 p.m. *Reconstitution of Supported Lipid Bilayers into Lipid Vesicles*
Stephen Smith, Mike Ornstead, Ruth Hunter, Southern Utah University
- 4:00 p.m. *Using the Chemical Composition of Coal Creek to Better Understand the Lack of Biodiversity*
Steve Ipsen, Porter Edwards, Kim Weaver, Southern Utah University

Social Sciences

Division Chair: Daniel Poole
Salt Lake Community College

SESSION IA

Session Leader: Daniel Poole

- 1:00 p.m. *Empire Builders: Why Critical Race Theory Instigated an Unnecessary Break from Critical Legal Studies*
W. Scott Jackson, Snow College
- 1:20 p.m. *The Matlock Effect: Psychological and Legal Implications of Media Consumption on the Presumption of Innocence*
Nathan G. Caplin, Nick Marsing, Snow College
- 1:40 p.m. *How does Political Uncertainty Affect Stock Prices? New Evidence from Prediction Markets*
Raymond Bertheaud, Sheng Xiao, Westminster College Rick Phillips, University of North Florida
- 2:00 p.m. *Cosmologies and Laws in Contemporary Conflicts*
Shadman Bashir, Dixie State University
- 2:20 p.m. Q & A
- 2:40 p.m. Break
- 3:00 p.m. *Adjunct Faculty: The Theory Behind Inclusion.*
Lesia Landrith, Kerry Kennedy, Weber State University
- 3:20 p.m. *When a Mind Wanders: A Replication of Feng, D'Mello, and Graesser (2013)*
Bryan Dalley, Sandra Cameron, Jessica Huffaker, Cloe Johnson, Dallin Ball, Utah Valley University
- 3:40 p.m. *The Intersection of Marital Problems, Unhealthy Lifestyles, and ADHD Challenges*
Chris Anderson, Ron Hammond, Devin Gilbert, Justin Wilbert, Utah Valley University
- 4:00 p.m. *The Process of Sanctification: A Bourdieusian Approach to the Declension of Power in New England Purity Clegy*
W. Scott Jackson, Snow College
- 4:20 p.m. Q & A
- 4:40 p.m. Conclude

SESSION IB

Session Leader: TBA

- 1:00 p.m. *United Way of Salt Lake 2-1-1: Evaluating the Effectiveness of Housing Referrals*
Denise Whitney, Kerry Kennedy, Weber State University
- 1:20 p.m. *Spatial Patterns and Determinants of Housing Prices in Salt Lake County: Amenities, Transportation and Submarkets*
Dennis Wei, Han Li, Yangyi Wu, University of Utah

- 1:40 p.m. *Understanding Us: Student Research to Support a Community Partner Working on Homelessness*
Nikole Bench, Patricia Bernabe-Alonso, Israel Cervantes, Bianca Dellapenta, Marie Ellis, Whitney Hancock, Mackenzie Hughes, Tyler Jamieson, Ryan Johnson, Kaitlyn Keil, Kristen Kessler, Grace Lee, Zach Naylor, Carrie Parry, Dan Poole, Jennifer Salazar, Kymberly Simons, Celeste Suite, Aaron Wadley, Salt Lake Community College
- 2:00 p.m. *Archaeology, Fireworks, and How to Carve a Pumpkin: Social Scientists Have All the Fun*
Rob Carney, Utah Valley University
- 2:20 p.m. Q & A
- 2:40 p.m. Break
- 3:00 p.m. *Environmental Bias and Belief in the 2017 Utah Valley University Student Population: New Ecological Paradigm Survey Results and Conclusions*
Victor Barraza, Erin Call, Mikaela Watson, Utah Valley University
- 3:20 p.m. *Dark Sky Compliance: Measuring the Effectiveness of Outdoor Lighting Ordinances in Ogden Valley*
Jeremy Bryson, Amanda Cooley, Weber State University
- 3:40 p.m. *Demography and Information Technology Impact Religious Commitment among Latter-day Saints in the Intermountain West*
Rick Phillips, University of North Florida
- 4:00 p.m. *Marriage in the latter days: The Mormon policy on same-sex marriage*
Elijah Nielson, Utah Valley University
- 4:20 p.m. *Thereby Throw Sand Presidential Media Respect through Honorific References in White House Press Briefings, 2001-20017*
Thomas Terry, Utah State University
- 4:40 p.m. Conclude

Abstracts
POSTER

Presenter: Brady Webb

Title: Examining the Ideal Conditions for Crude Oil Bioremediation by Algae Species

Authors: Brady Webb, Braden Nickle, Morgan S. Abbott

Affiliation: Utah Valley University

Abstract: Oil spills are highly volatile to aquatic ecosystems. According to the EPA, there are a variety of approaches to address oil cleanup including controlled burning, dredging or dispersing detergent that has a higher density than water, solidifying (which helps change oil from a liquid to a solid), and finally bioremediation by microorganisms. Bioremediation is an effective way to clean up oil spills in sensitive areas such as shorelines. To accelerate bioremediation, additional chemicals are added such as Nitrogen and Phosphorus. We plan to examine what conditions are optimal for bioremediation. We will use three species of algae: *Anabaena oryzae*, *Chlorella kessleri*, and *Chlorella vulgaris* under different nitrogen treatments. Humidity, salinity, heat, light, and oil concentration will be constant in all treatments. Our principle variable will be the different concentrations of nitrogen. We will also be testing the efficiency of combinations of the species. For each treatment we will also measure the change in viscosity of crude oil three times a week. Measuring viscosity will help us measure oil remediation (degradation) because when algae break down hydrocarbons there is a change in viscosity. This research has a wide variety of environmental applications in different ecological environments contaminated by oil spills.

Presenter: Brian Williams

Title: Thigmomorphogenic Response In *Arabidopsis thaliana*

Authors: Brian Williams, Deric Searle, Brandon Peterson

Affiliation: Utah Valley University

Abstract: Researchers attempt to induce irregular growth in *Arabidopsis thaliana* with variable speeds of vibration and verify changes in growth by measurement of growth parameters such as length, dry weight, chromophore density to verify the thigmomorphogenetic response of this plant to mechanical stress at such frequencies. Three groups of *A. thaliana* treated with low, medium and high intensity RPM settings in order to induce thigmomorphogenesis and document any differences in robustness between groups. Statistical analysis will be performed and the results will be presented.

Presenter: Jacob Kirkpatrick

Title: Targeted Mutagenesis and Repair via CRISPR/Cas9 and Homology Directed Repair of Melanogenic Genes

Authors: Jacob Kirkpatrick, Josh Kirkpatrick, Erika Smith, Eric Domyan

Affiliation: Utah Valley University

Abstract: Pigmentation is a phenotype that often impacts an organism's fitness through natural (i.e. camouflage) and sexual (i.e. ornamentation) selection. In mammals and many birds, pigmentation is due primarily to the amount and type of melanin produced by melanocytes. The *Tyrp1* gene codes for the tyrosinase related protein (TYRP1) and is involved in the melanin production in melanocytes. A mutation found in the *Tyrp1* gene in pigeons causes an ash-red feather color as opposed to the black, wild-type color. While the function of *Tyrp1* in melanin synthesis is not well understood, it is thought to be responsible for the ash-red phenotype when mutated (Domyan and Shapiro, 2014). The broad objective of our research is to study the effect of the pigeon ash-red mutation on *Tyrp1* function, through targeted mutagenesis in mouse melanocytes. We will utilize the CRISPR/Cas9 system to make a gene edit in the *Tyrp1* DNA sequence of mouse melanocytes to characterize the effects of the mutation found in pigeons. The CRISPR/Cas9 system uses the Cas9 enzyme to create cuts in the DNA at specific locations of interest designated by a guide RNA (gRNA) which matches the desired target sequence (Cong et al, 2013). The CRISPR/Cas9 enzymes also allow for gene insertions at gRNA directed sites. We will do this by using CRISPR to cause a Homology Directed Repair (HDR) of the DNA strand where we will provide a template containing the desired amino acid change (alanine to proline) to better understand its effect in pigment production. Our hypothesis is that upon successful introduction of the ash-red pigeon mutation into mouse cells, we will be able to observe the same ash-red pigment production in mouse melanocytes as what is observed in ash-red pigeon feathers.

Presenter: Laura Allard

Title: A Study of Ringtail (*Bassariscus astutus*) Genetic Diversity in Southern Utah

Authors: Laura Allard, Dr. Laurie Mauger

Affiliation: Southern Utah University

Abstract: Genetic Diversity in populations of organisms is important information for conservationists because it can give indication about the overall health of the population and their future viability in their current habitats. Low genetic diversity can be very dangerous for populations, especially those populations with lower numbers of individuals. The lower the genetic diversity in a population, the greater the risk they face when dealing with environmental changes and introduction to pathogens. Ringtails (*Bassariscus astutus*) are small, nocturnal carnivores that are found from southern Mexico to southern Oregon, and on 3 islands in the Sea of Cortez. They are part of the raccoon family and somewhat resemble a weasel with a black and white ringed tail much like the ring-tailed lemur of Madagascar. Ringtails are considered to be mesocarnivores, diets consisting of 50-70% meat and the rest consisting of plant matter. Many mesocarnivores are now rare and even critically endangered. This study focused on conservation genetics for the ringtail with an emphasis in their biodiversity. Microsatellite DNA was used from the ringtail to determine population diversities of the ringtail in the Zion and Bryce national parks and to determine how many individuals frequent these areas. The overall aim of the study is to use DNA analyses to determine the viability of the ringtail in southern Utah, and possibly use this information to make further conclusions about ringtail range, ringtail relatedness, and ringtail impact in the ecosystem they reside within.

Presenter: Summer Roberts and Whitney Weinberg

Title: Vermicomposting spent brewer's grain (*Secale cereale*, *Triticum aestivum*, and *Hordium vulgare*) for fertilizer application on *Raphinus sativus*

Authors: Summer Roberts and Whitney Weinberg

Affiliation: Utah Valley University

Abstract: Vermicomposting is the practice of using worms to consume organic waste and leave behind castings (worm excrement) that are enriched with nutrients and moisture. This compost can be utilized directly as castings, or liquefied into compost tea for fertilizing crops, household plants, or just general enhancement of the land. Spent brewer's grain is the leftover germinated grains used in the production of beer and other malt products. Spent grain makes up a total of 85% of the bio-waste during production. This research project involved spending malt rye, barley, and wheat mimicking the brewers process. Four different vermicomposting bins were differentiated for these three grains and an equal portion of them. In addition, two trials for chemical fertilizer and no fertilizer were done. Two trials were done administering the different compost tea to *Raphinus sativus*, four replicates were done totaling 24 plants. The results of these experiments will be discussed. This research provides important information on the production of vermicompost for different horticultural applications, including organic growth of plants.

Presenter: Alyssa Baccus, Michael Foster, Brandon Richards, Stephanie Vasquez

Title: Effects of Caffeine on Growth and Development of Mustard Seed

Authors: Alyssa Baccus, Michael Foster, Brandon Richards, Stephanie Vasquez

Affiliation: Utah Valley University

Abstract: Yellow mustard seed plant, or *Brassica alba*, is used as a major spice worldwide and can also be ground into the widely popular yellow mustard. An increase in plant mass could benefit the quantity of spice and mustard being made, increasing profits. There are many chemicals which can affect overall plant mass, but one that has not been explored in depth is the effect of different concentrations of caffeine on plant growth and mass of *B. alba*. The purpose of our experiment is determine whether caffeine can increase plant mass growth of *B. alba* (mustard seeds) which could be beneficial for commercial crop growth. During our experiment, we will use the following concentrations of caffeine solution: 0M (control), 0.01M, 0.001M, 0.0001M. Each concentration will be applied to five separate replicate *B. alba* plants. We will monitor the *B. alba* growth over two months, watering twice weekly, and measuring the height weekly with other relevant plant health observations. At the end of the two month period, we will measure dry mass by removing the plant from the soil, rinsing it off, and measuring. Following our experiment, we will summarize all required data and evaluate if caffeine concentrations in the water affect the overall plant mass and development of *B. alba*.

Presenter: Ashley Ardon and Daniella Gomez

Title: Occurrence & abundance of milkweed (*Asclepias* L.) in irrigation channels adjacent to roadsides and cropland

Authors: Ashley Ardon, Daniela Gomez, Denise Rodriguez, Hayley Moyes, Selena Oltehua, Melissa Robles, Cody Zesiger

Affiliation: Roy Jr High- (Weber State for Consultation)

Abstract: It has been well documented that urbanization, expansion of croplands, and widespread usage of glyphosate is responsible for a significant reduction in milkweed (*Asclepias sp.*) and monarch butterfly (*Danaus plexippus plexippus*) populations. What has not been studied is whether some land practices may benefit milkweed and likewise monarchs. In the intermountain west, roadsides next to cropland are often used for irrigation and contain many non-cultivated plants. In 2017 counts of milkweed basal stems were performed at randomly selected roadside channels adjacent to cropland (n=10). Randomly selected stems were collected from 3 of the sites for analysis. The stems dried for 60< days indoors above a radiator. Desiccated stems were manually defoliated. The leaves were counted, crushed, and weighed individually if the whole leaf was undamaged. Leaves were weighed collectively if they were damaged during drying. Milkweed occurred in 10 of 10 randomly selected sites in Weber County. The parameters for site selection were that the site must be an irrigation channel, be adjacent to roadsides, and/or cropland. The mean of milkweed basal stems per meter squared was determined to be $0.15/m^2 \pm 0.103$ (95% confidence limits). The mean of leaves per stem (n=10), was 17.3 ± 5.6 (95% confidence limits). The total dry matter per leaf (n= 82), $0.74g \pm 0.114g$ (95% confidence limits). Results indicate a generous quantity of milkweed in irrigation channels adjacent to roadsides and croplands. Whether monarchs utilize these spaces as breeding grounds has yet to be determined. However, if it is established that these sites are selected by monarchs as breeding grounds, similar sites to these may be of significant importance to the management of the western monarch population in rural areas.

Presenter: Shelby Berryhill

Title: Ant genera distribution at Three Peaks Recreation Area between sunny and shady locations

Authors: Shelby Berryhill, Katelyn Glauser, Keli Kennerly, Justin Mickelson, Aiden Reed, Stephen Navin, Dalton Skidmore, Carrie Jo Bucklin

Affiliation: Southern Utah University

Abstract: The purpose of this study was to find ant diversity in different environments and use the compared populations to explore biodiversity and the health of an ecosystem. We analyzed the diversity of ants in the Three Peaks area based on distribution between sunny and shady areas. We hypothesized that there would be a difference between the distribution of ants in sunny and shady areas, and expected sunny areas to have the most ants. We collected and identified ants at multiple locations in each site. We then calculated the chi-square between locations to determine if there was a patten in our data, and then completed a t-test. We found a significant difference between sunny and shady ($p=0.05$, $X^2= 17.499$).

Presenter: Logan Tuttle

Title: Wolbachia Infection Rates in Southern Utah Ants

Authors: Logan Tuttle, Laurie Mauger, Carrie Bucklin, Sam Wells

Affiliation: Southern Utah University

Abstract: The study of endosymbionts has become an important field of study because it allows us to better understand the effects these bacteria have on their eukaryotic hosts. Once such endosymbiont, bacteria from the genus *Wolbachia*, has piqued the interest of scientists when it comes to the role they play in arthropod populations. *Wolbachia* are a group of maternally inherited, intracellular bacteria that infect many species of arthropods and some other invertebrates. They are exclusively found in the reproductive tissues and can cause reproductive alterations in infected hosts. These alterations can potentially have many effects on arthropod population structure. Understanding the function of *Wolbachia* provides important knowledge about reproductive trends, population structure, and genetic diversity. Studying the effects of *Wolbachia* on reproduction can provide information for population manipulation, pest control, and disease prevention. Various studies have been performed around the world to determine infections rates but little is published about the presence of *Wolbachia* in Southern Utah and the surrounding region. Therefore, this research is designed to determine *Wolbachia* infection rates in Southern Utah ants and to determine if infection rates are similar to other locations which have been studied. Ants will be collected and characterized down to the genus level. Individuals will be isolated and diagnostic PCR will be used to verify the presence of *Wolbachia* in extracted DNA using *Wolbachia* specific primers at the wsp gene. Infection rates will then be determined and compared between ant genera and locations.

Presenter: Tyson Hillock

Title: Synergistic activity of clove oil and amphotericin B against *Absidia corymbifera* Biofilm

Authors: Jedediah Orullian, Hutch Rhees, Caeleb Harris, and Olga Kopp

Affiliation: Utah Valley University

Abstract: This study investigates the synergistic antifungal activity of Amphotericin B (Amp B) and *Eugenia caryophyllus* (Clove) oil on *Absidia corymbifera* by comparing the formation of biofilms after treatment. Mucormycosis is a life-threatening disease caused most commonly by species *Rhizopus*, *Mucor*, and *Absidia*. The disease occurs most often in immunocompromised individuals such as burn, cancer, and diabetic patients. Amp B is the current line of treatment for the disease, however it is known to have many adverse side effects and toxicity in doses too low to manage infection. Due to the high mortality and morbidity associated with the disease even when treated with Amp B, it is vital that new combination therapeutic techniques be investigated to more effectively treat the disease. Previous work on *Rhizopus oryzae* suggests the synergistic effect of Clove oil and Amp B to successfully breakdown biofilm and cause cell death. Because *A. corymbifera* is the second most common cause of Mucormycosis infection behind *R. oryzae*, it is important to find the synergistic effects of Clove oil and Amp B on the pathogen.

Presenter:

Title: Bisphenol's Damaging Effects of Human Reproductive Dysfunction and Chronic Illnesses including Hypothyroidism, Vitamin D deficiency and Alzheimer's-like Neurotoxicity

Authors: Dominique Elder, Dr. Heather Wilson-Ashworth

Affiliation: Utah Valley University

Abstract: Bisphenol-A (BPA) is an endocrine disrupting chemical (EDC) present in polycarbonate plastics, paint, glue and epoxy resins as well as many other household products. Due to the pervasiveness of BPA, the likelihood of individuals encountering BPA in their day-to-day lives is very high. Since this chemical does not degrade easily, it is found in abundance on the surface of water, landfills, sewage runoff and sludge. This results in an accumulation of BPA, and may reach levels that have adverse effects on humans. Due to the structure of BPA, this molecule binds to steroidal binding sites, including estrogenic hormone receptors and vitamin D receptors preventing estrogens and vitamin D from rendering their physiological effects. Such effects include two broad categories. First, BPA interferes with normal reproductive functions. This would include fertility and implantation. Gestational abnormalities and ambiguous sexual development are also observed. Second, BPA contributes to prevalent, chronic illnesses affecting the adult population, such as thyroid and vitamin D deficiencies, renal failure, hypocalcemia, insulin resistance, obesity and insulin-induced Alzheimer's-like neurotoxicity.

Presenter: Levi Neely

Title: Investigation of the synergistic effect of *Origanum vulgare* (Oregano) Oil and Amphotericin B to inhibit Mucormycosis causing species *Absidia corymbifera* fungal biofilm

Authors: Levi Neely, Caeleb Harris, Olga Kopp, Jedediah Orullian, and Hutch Rhees

Affiliation: Utah Valley University

Abstract: Mucormycosis is a life-threatening disease that occurs in immunocompromised individuals, such as burn, cancer, and diabetic patients. Amphotericin B is the current line of treatment for the disease, however it is known to have many adverse side effects including cell toxicity. Due to the high mortality and morbidity rate associated with the disease even when treated with Amphotericin B, it is vital that new combination therapeutic techniques be investigated in order to more effectively treat the disease. Mucormycosis can be caused by a fungus called *Absidia corymbifera*. This species causes up to 5% of infections and is a species isolated from confirmed Mucormycosis sites. *Origanum vulgare* (oregano) oil has been shown to have broad anti-microbial properties in various studies. This study investigates the ability of oregano oil to lower the concentration of Amphotericin B needed to successfully inhibit *Absidia corymbifera* biofilms. Various concentrations of oregano oil and Amphotericin B are tested to determine the optimal concentration ratio that maximizes biofilm inhibition. Synergistic activity of oregano oil and Amphotericin B could be used to decrease the amount of Amphotericin B needed to treat Mucormycosis infections while still utilizing the antifungal properties of Oregano oil.

Presenter: Cody Frazer

Title: Mutation in the Rock Pigeon Genome Causes Unique Pigmentation by Altering Gene Expression

Authors: Jeremy Hardy, Jordan Daniels, Eric Domyan

Affiliation: Utah Valley University

Abstract: The domesticated rock pigeon has been the subject of selective breeding for over a hundred years and so displays an immense variety of phenotypes. This variety provides opportunities to further understand the genetic basis of phenotypic evolution. Pigmentation of pigeon feathers is controlled by multiple alleles at different loci, which influences the type and amount of melanin deposited in the feathers. A specific phenotype, known as “recessive red”, consists of distinctly red plumage and is caused by a mutation that greatly reduces the expression of the gene *Sox10* (*Sry-box 10*) (Domyan et al. 2014). This gene encodes a transcription factor, known to play a key role in melanocyte maturation and proliferation (Harris et al. 2010). *SOX10* likely regulates the transcription of multiple downstream genes but the identities of these genes are largely unknown. To identify which genes are downstream targets of *SOX10*, we compared the transcriptomes of regenerating feathers from wild-type and recessive red birds, to identify genes that had different expression levels between the two groups. We identified 46 genes that are expressed at different levels between wild-type and recessive red birds; and thus are potential targets of *SOX10*. While several of the target genes have known roles in pigmentation, the role that many of the targets play in pigmentation has not been studied, making them interesting candidates for further investigation. To validate the transcriptome data, we are conducting qRT-PCR to see if an independent approach yields similar results. Through analysis of the recessive red phenotype, we can better understand the dramatic effect that mutations play in the evolution of new phenotypes.

Presenter: Kaetlyn Revels

Title: Conservation genetics of black bears (*Ursus americanus*) in southwestern New Hampshire

Author: Kaetlyn Revels

Affiliation: Southern Utah University

Abstract: Large mammalian species face many challenges including habitat fragmentation and destruction, human population growth, and loss of genetic variability. It is important to describe the genetic structure and mating systems of these species to ensure their survival. American black bears, *Ursus americanus*, range widely throughout Canada and the United States. There is a relatively large bear population in southwestern New Hampshire, however little is published about the genetic structure in this area. Extensive research has been conducted on the black bear population in Lyme, New Hampshire by wildlife biologist Ben Kilham, Ph.D. Preliminary kinship analysis confirmed known mother-offspring relationships and suggested that multiple paternity exists. However, relatedness amongst the males and effective population size in the study area is not known. It is also suspected that twins are prevalent in the population as well, but there is no genetic evidence to support this hypothesis. A more comprehensive study is needed to further elucidate the genetic relationships of the bears residing in the study area. The main objectives of our study are to (1) estimate the rate of multiple paternity in black bear litters in southwestern New Hampshire, (2) estimate the relatedness of the male population in the study area, (3) describe the population genetic structure of the black bear population in the study area, and (4) provide evidence for twinning in the black bear. Bear samples will be provided by Dr. Kilham. This study will provide important information about the genetic structure and mating systems of the bear population surround Lyme, New Hampshire.

Presenter: Lindsey Butts

Title: Correlation Between Education Levels and Use of Essential Oils in a Sample Population

Authors: Meagan Griswold, Ammon Allphin, Micheal Litchfield

Affiliation: Utah Valley University

Abstract: Essential oils are naturally occurring compounds that are found in various parts of plants, including: leaves, stems, roots, bark, flowers, etc. These oils have a great diversity of uses when applying an essence, topically and/or internally. The main focus of this study is to examine whether there is a correlation between education levels, and the use of essential oils. This study is valuable because it will provide insight into what drives the use of essential oils over modern medicinal techniques. The study uses a semi-structured interview design in Qualtrics, which will facilitate data gathering with recruitment of informants using social media. Essential oils are becoming widely popular and users of Essential Oils use them to impact emotions through the limbic system, to support health and wellness, for natural cleaning and deodorizing, and as a natural alternative to perfume among other uses. Given the wide use of essential oils in the area, we expect a great diversity of responses related to their use, allowing for the evaluation of the correlation between levels of education and use of essential oils.

Presenter: Sarah Khelfa, Kelly Greener, Andy Geigle

Title: Cancer and heart disease in Utah county: Does diet and use of CAM have an effect in their low incidence in the area?

Authors: Sarah Khelfa, Kelly Greener, Andy Geigle

Affiliation: Utah Valley University

Abstract: Heart disease and its related conditions are the leading causes of death in America with Utah having a lower incidence, ranking 35th in the country for heart disease and 50th for cancer. This research will help shed light on what could be responsible for the lower rates in Utah, and what individuals can do to reduce their own risk of heart disease and/or cancer in other states. Utah County has a high demographic of religious individuals, in particular members of the LDS church who have traditional beliefs regarding the use and consumption of plant-derived stimulants such as caffeinated coffee/soda/tea, alcohol, tobacco, fruits, and vegetables. We plan to analyze the correlation between religion, the use of plant-derived substances, complementary and alternative medicines, and their family medical history. Our research will be conducted through random sampling across various locations on the Utah Valley University campus. Analysis of the data on individuals (biological attributes, educational level, family medical history, consumption of caffeine, fruits and vegetables, and religious affiliations) will allow us to determine if any of these variables relate to Utah's low rate of heart disease and cancer. This research provides valuable information for the community at large.

Presenter: Cassandra Witt

Title: Perception of Genetically Modified Organisms for Human Consumption in Utah Valley University Students

Authors: Jason Walker, Jacee Horne, Austin Baker

Affiliation: Utah Valley University

Abstract: The scientific consensus on the use of Genetically Modified Organisms (GMOs) in food is that they are safe and can provide a range of benefits over unmodified products. However, public opinion is often at odds with scientific consensus, and news and social media often propagate incorrect and conflicting information. We intend to find out how Utah Valley University students perceive the utilization of GMOs, and from what sources they get their information. In order to perform this study, we will survey UVU Students about their level of knowledge and perception of GMOs. We hypothesize that based on the amount of misinformation in the media, UVU students will have a generally negative view of GMOs. The statistical analysis of the data will be presented. This research aims to understand the awareness and attitudes about GMOs in our area.

Presenter: Bryce Richards

Title: Public Perception of the use of Marijuana, Prescription Painkillers, and Opioids at Utah Valley University

Authors: Rick James, Jesse McHale, Jordan Daniels

Affiliation: Utah Valley University

Abstract: Cannabis is widely used in the world recreationally and medically, whereas opioids are commonly used as prescription painkillers often associated with chronic pain, terminal illness and imminent death. These drugs tend to have negative side effects, such as nausea, vomiting, diarrhea, tiredness, among others. Abuse of non-medical prescription drugs is a continually growing problem for young adults. Our study aims to analyze the perception that the general public has toward the use of Cannabis, compared to the use of Opioids and Prescription Painkillers. Our demographics include people from the age of 18-30 at Utah Valley University in Orem, Utah. The selection of informants will be done at random and after informed consent, the data will be gathered. No identifiers will be collected to allow for a candid and more truthful responses. The results will be analyzed and the correlated between the public's view on Marijuana versus Prescription Painkillers and Opioids.

Presenter: Johanna Garavito

Title: A Preliminary Study of Genetic Diversity in Ant Populations at the Southern Utah University Mountain Center

Authors: Brent Thacker, Michael Tyler, Makayla Oborn, Emily Olsen, Reggie Allen, Carrie Jo Bucklin, Samuel Wells

Affiliation: Southern Utah University

Abstract: Ants are a crucial part of a variety of ecosystems. They help to aerate the soil which allows for water and oxygen transport to plants and other microorganisms. By studying their genetic diversity, we can better understand what is going on in a population. We studied the genetic diversity of ants collected at the Southern Utah University Mountain Center. Collected ants were from genera of *Camponotus* (n=5), *Formica* (n=219), *Lasius* (n=38) and *Pheidole* (n=42). We extracted the DNA with a DNeasy kit. We then used PCR to amplify ten microsatellite loci. Allele calls were made using PeakScanner 2.0 and then analyzed using GenePop and FSTAT 2.913. It was found that the ant populations were not in Hardy Weinberg Equilibrium (HWE) and that the populations were genetically diverse.

Presenter: Chad Talbot, Christopher Pope, Wyatt Knechtel, Dallin Ollerton

Title: Analysis of the knowledge of Utah Valley University students and faculty in identifying common poisonous/hazardous plants.

Authors: Olga R. Kopp

Affiliation: Utah Valley University

Abstract: Utah Valley has a rich culture of recreation and cultivation, both of which involve varying possibilities to come in contact with poisonous or hazardous plants. Many activities that residents frequently participate in such as hiking, biking, walking, etc. along with locations where these activities are performed are associated with diverse populations of plants. Many of these plants are not easily recognized, including those that may be poisonous, hazardous, or not safe for consumption. The objective of this research is to evaluate how many of the commonly found poisonous plants can be identified by Utah Valley University students and faculty. This will be important because individuals who have household plants, gardens, or enjoy the outdoors may be unaware of common plants that are hazardous to their health. We will be collecting data by administering a short questionnaire followed by a survey with pictures of various plants to determine the knowledge of each participant regarding poisonous plants. We will correlate the findings with demographics such as gender, family, activity level, and other parameters and the results of this research will be presented. The participants will be given valuable information about the dangers of the plants studied so they can be better informed of the potentially hazardous plants that can affect their families.

Presenter: Natalie Blain

Title: Impact of locular gel on the formation of callus in tomato tissue cultures

Author: Arthur Evensen

Affiliation: Utah Valley University

Abstract: Locular gel encapsulates seeds in developing fruit. It is composed of water, sugars, carotenoids, vitamin C, lectins, and growth regulating hormones such as ABA and gibberellins. In mature seeds, cell expansion causes the locule capsule to burst and release the locular gel. Previous studies have shown locular gel to inhibit seed germination. We hypothesized that the presence of locular gel on tomato explants would have an inhibitory effect on callus formation. In our study, two tomato fruits were sterilized and segmented into sixty explants that were cultured on MS media with NAA and kinetin. Thirty explants were taken from areas in direct contact with locular gel in the tomato fruit and were cultured with locular gel residue intact. The remaining thirty explants served as a control, having no locular gel contact. All explants were incubated and evaluated biweekly for callus formation. After the eighth week of the incubation period, we found no difference in callus formation between explants with locular gel contact and the control group. Our findings led us to conclude that the presence of locular gel has no discernable impact on callus formation in tomato fruit tissue culture.

Presenter: Samuel Kalis

Title: Lemongrass essential oil and Amphotericin B as antifungal agents against *Absidia corymbifera* Biofilm

Authors: Stephanie Hopkins, Hannah Robb, Jedediah Orullian, Caeleb Harris, Hutch Rhees

Affiliation: Utah Valley University

Abstract: The purpose of this experiment is to investigate the antifungal activity of lemongrass oil and Amphotericin B on *Absidia corymbifera* biofilm in an attempt to demonstrate that the minimum inhibitory concentration of Amp B can be reduced and antifungal activity maintained or increased when supplementing with the oil. *A. corymbifera* is the second most common fungal species found in *Mucormycosis* infections, a serious disease typically affecting individuals with weakened immune systems. Amphotericin B (Amp B) is the most common treatment for this disease, however due to documented adverse side effects including cell toxicity and high morbidity rate, there is a need for alternative treatment techniques. Essential oils derived from aromatic plants with antimicrobial properties are being explored and modified to substitute chemically based treatment options. Lemongrass oil has shown potent antimicrobial capabilities against bacteria and yeast and as such is a good candidate for this study. Each cycle of the experiment will involve *A. corymbifera* biofilms being generated in 96- well plates. Various concentrations of lemongrass oil and Amp B will be tested to identify the optimal concentration ratio required to maximize biofilm inhibition. Following antifungal treatment, biofilms are washed and treated with XTT/menadione solution. After being transferred, absorbency of each plate is analyzed, and compared. We expect the synergistic use of lemongrass oil and Amp B to decrease the concentration of Amp B needed for effective treatment of opportunistic fungal diseases like *Mucormycosis*. This reduction could decrease the side effects caused by high doses of Amp B while still maintaining antifungal activity with Lemongrass oil.

Presenter: Fredric Govedich

Title: A new gigantic sea spider in the genus *Colossendeis*

Authors: Jordan Parker, Bonnie Bain

Affiliation: Southern Utah University

Abstract: Pycnogonids or sea spiders are a small group of marine chelicerate arthropods (90 genera, 2,000 species). The genus *Colossendeis* contains the largest pycnogonids (leg spans up to 70 cm) which are found in very deep water and also near shore in shallower water in the polar regions. We have a number of specimen lots of *Colossendeis sp.* borrowed from the Smithsonian Institution, National Museum of Natural History and are in the process of determining whether or not any of them are new species. All are labeled as *C. colossea*, but after an examination of the type specimens for this species, it is apparent that many of these could be new species. Currently, we are examining USNM 69522, a specimen lot which contains two adults and a number of juveniles of different sizes. The project includes examining the specimens under a microscope, photographing them, documenting their morphology, measuring the trunk and appendages, and then comparing the results with the type species. Morphological structures to be examined include proboscis and mouth, eyes and eye tubercle, pedipalps, ovigerous legs, ovigerous leg spines, and walking legs.

Presenter: Tyler J. Thornton

Title: Proteins Observed in Honey Through Mass Spectrometry

Authors: Jeremy D. Bergman, Dac A. Crandall, Rawlings E. Lyle, Austin D. Sherwin, Trient B. Spires, J. Hayden Welch, and Craig D. Thulin

Affiliation: Utah Valley University

Abstract: The identification of proteins found in honey can provide an increased knowledge of its properties and possibly lead to a more comprehensive understanding of pollination and other aspects of honey production. Using proteomic methods including liquid chromatography coupled with mass spectrometry (LCMS) and data-dependent acquisition (DDA), proteins can be identified by inherent properties of peptide fragmentation. Proteins which we identified with high statistical confidence included many of the major royal jelly proteins which are known products of the bee. Our results confirm observations previously published (see Di Girolamo et al J Proteomics 2012, 75 (12), 3688-3693). There were lower statistical possibilities corresponding to peptide fragments of proteins which did not belong to the bee itself. These proteins identified with low statistical confidence include some plant proteins. The possibility of being able to identify the nectar source for the honey is intriguing and will be pursued. Importantly, coverage of peptides across identified proteins is modest; and many spectra that show high-quality fragmentation and would seem to be excellent candidates for identification were not in fact identified. This may indicate the possibility of extensive post-translational modification of proteins in honey. Analysis of the data from these experiments is complex and ongoing.

Presenter: Pitambar Khanal

Title: Synthesis of segments of the *Streptococcus pneumoniae* serotype 23F capsular oligosaccharide antigen for pneumococcal vaccine development

Authors: Shenglou Deng, Paul B. Savage

Affiliation: Department of Chemistry and Biochemistry, Brigham Young University

Abstract: Deadly infectious diseases such as pneumonia, meningitis, and septicemia can be caused by Gram-positive bacterium pathogen *Streptococcus pneumoniae*. Out of nearly 100 pneumococcal serotypes, serotype 23F is one of the most prevalent, responsible for 9-18% of the pneumococcal invasive diseases among children under the age of five. Although serotype 23F is included in all current pneumococcal vaccines, these vaccines often do not provide long-lasting protection against infection in young children and in elderly populations. Here we report a new pneumococcal vaccine design strategy and synthesis of serotype F23-based oligosaccharide antigen for vaccine development.

Presenter: Kyle Medley

Title: Identifying Possible Correlations Between Seasonal/Pollen and Food Allergies in Utah County

Authors: Brady Smith, Kyle Swallow, Joseph Cook

Affiliation: Utah Valley University

Abstract: Pollen, and other allergens that are produced from plants have been linked to several food allergies. Fruits and vegetables that are grown near allergen producing plants, or harvested during different allergy seasons can cause people to misinterpret their seasonal allergies for food allergies. If an individual is allergic to pollen, for example birch tree pollen, they may experience itching of the throat or mouth when eating an apple or cherry due to similar protein allergens present in those fruits. Our objective is to find out what food and seasonal allergies affect Utah county residents and if there is a direct correlation and trend between the two types of allergies. We will also ask whether the participants use and Complementary and Alternative Medicine (CAM) to treat their allergies. This research is designed to help Utah County residents understand the sources of allergies, and to present suggestions to help them find alternate sources of fruits and vegetables that may not induce an allergic response. In this study we will conduct structured interviews with students at Utah Valley University, and other residents of Utah County. We will obtain qualitative and quantitative data using random sampling methods. We will compare the amount of people with allergies to the severity or mildness of the allergy. We will compile the data from the interviews and compare the types of food allergies people list to their experience to seasonal pollen allergens. These findings will provide a correlation between seasonal/pollen and food allergies and provide further insight to preventative care, the use of alternative medicine, and other conventional treatments. The data also provides trends across certain ethnic groups and possible susceptibility to certain allergens.

Presenter: Nayla Rhein

Title: Effect of salinity on the hatching of *Branchinecta lindahli* Packard, 1883.

Authors: Fredric Govedich, Bonnie Bain.

Affiliation: Southern Utah University

Abstract: Utah is located in an arid desert environment, with many small isolated ephemeral or seasonal wetlands. As part of a multi-year study of a series of temporary rock pools in Three Peaks, UT, we studied the lifecycle and biology of *Branchinecta lindahli* Packard, 1883. These pools fill with rain or snow and then slowly evaporate until the next storm. Fairy shrimp only hatch when there is sufficient water. In this study, we looked at salinity as a hatching trigger. The effect of salinity on hatching rates of *Branchinecta lindahli* was examined using five salt (NaCl) concentrations ranging from 0 g/L to 4 g/L (N = 18). A significant negative relationship ($p=7.03 \times 10^{-3}$, $R^2 = 0.522$) was found between salt concentration and the number of fairy shrimp hatched. This supports other studies looking at hatching cues as a survival mechanism of fairy shrimp in ephemeral habitats. The avoidance of abortive hatching suggests that fairy shrimp do use a bet-hedging strategy that allows them to survive and persist in temporary wetlands. Salinity is most likely a hatching trigger used in that strategy.

Presenter: Chad Talbot

Title: Are Humans Just Animals? A Study of the Acceptance of Evolution

Authors: T. Heath Ogden

Affiliation: Utah Valley University

Abstract: Evolution is central to understanding Biology and Health. Nevertheless, many people still don't accept evolution as a well founded principle and mechanism of change (Pew 2016). The central research of this project is to examine the acceptance of evolution among Biology majors at the beginning and end of their undergraduate experience, the reasons as to why they accept or reject evolution, and if applicable, why they changed their minds during their undergraduate experience. Previous studies examined students' observations and knowledge of evolutionary theory and found that the degree of conflicts perceived between religion and science was negatively correlated with their knowledge of evolution.

Main Objective: The objective of this research is to better understand the acceptance of evolution among students majoring in Biology.

Methods: We will administer a short survey and conduct interviews with students majoring in Biology in order to better understand the reasons why they accept or reject evolution and why they change or don't change their minds throughout their undergraduate experience. The questions are designed to investigate the opinions of evolution and how the students changed throughout their undergraduate experience and over the course of the semester. Given the high % of students that are LDS, we will ask a few additional questions concerning religion and the student's knowledge of their religion's position concerning evolution.

Hypotheses: We proposed that as students knowledge of the evidence for evolution increased over their college years that acceptance would increase. We further hypothesized that religious students would have to reconcile their religion's position on science and evolution with their growing knowledge of evolutionary theory.

Presenter: Jeremy Bergman

Title: Methods for the Study of Honey Proteins

Authors: Jeremy D. Bergman, Dac A. Crandall, Rawlings E. Lyle, Austin D. Sherwin, Trient B. Spires, Tyler J. Thornton, J. Hayden Welch, and Craig D. Thulin

Affiliation: Utah Valley University

Abstract: Honey, an important natural food, has been shown to have small amounts of protein, though studies of honey proteins to date have been somewhat limited. Di Girolamo et al (J Proteomics 2012, 75 (12), 3688-3693) attempted analyzing honey for plant proteins using solid-phase extraction with ProtoMiner beads followed by SDS gel electrophoresis, in-gel trypsinization, and LCMS of tryptic peptides; which resulted in the identification of a handful of proteins of insect origin. We sought to complement this method using TCA precipitation, trypsin digestion, and LCMS detection and identification of proteins based on peptide fragmentation. Total honey protein was carefully quantified to assure better downstream analyses. Results from the new method show promising potential. The particular TCA precipitation protocol yielded sufficient amounts of protein for analysis. Separation of tryptic peptides by automated HPLC and detection and fragmentation of these peptides through electrospray ionization quadrupole ion trap mass spectrometry using data-dependent collision-induced dissociation generated a fair number of identified peptides, many of which compare similarly to the results of the Di Girolamo group. Our methods portend opportunities to extend our understanding of the proteome of honey.

Presenter: Lauren Nickell

Title: Brian Head Fire: Effects of Fire on Aquatic Ecosystems.

Authors: Nayla Rhein, Fredric Govedich, Carrie-Jo Bucklin, Bonnie Bain

Affiliation: Southern Utah University

Abstract: The Brian Head fire, which began due to human action in June 2017, quickly wrecked havoc in the western corner of the Dixie National forest. It covered roughly 72,000 acres of land. The full impact of the fire have yet to be discovered, but there is an urgent necessity to evaluate the drastic changes to the ecosystem. In this study, we aim to look into variations in water chemistry of two streams crossing the Brian Head burn scar. We will conduct weekly monitoring of the pH, dissolved oxygen, water velocity, temperature, and turbidity. Our two sites are located on along the Second Left Hand Road, in Middle Creek and Parowan Creek. Our goal is to evaluate how the fire affects these streams not only through ash deposits but flooding and erosion as well. Water velocity and turbidity will be more reflective of punctual episodes of flash flooding that have occurred on multiple occasions in the Parowan area since the fire. We can see that the road and the stream banks have already been significantly altered, our study will allow us to have a deeper understanding of how the fire affected the area and its ecosystem. Future studies will include and biological assessment through the invertebrate community of the streams.

Presenter: Nicholas Padilla

Title: Cormorant's: Where are they During and After Fish Stocking in Suburban Ponds in Northern Utah

Author: Nicholas Padilla

Affiliated: Weber State University

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

Presenter: Dac Crandall

Title: Possible Plant Protein Identification within Honey's Proteome

Authors: Trient B. Spire, Jeremy D. Bergman, Rawlings E. Lyle, Austin D. Sherwin, Tyler J. Thornton, J. Hayden Welch, and Craig D. Thulin

Affiliation: Utah Valley University

Abstract: Bees are of tremendous biological importance, as they are the primary pollinators of wildflowers and most agricultural crops. Currently not much is known about the selectivity of bee flower preferences, which would provide novel insights for agricultural beekeeping practices as well as potential biological understanding of these important and fascinating insects and their symbiotic interactions with plants. In our proteomic analysis of honey, 4 plant proteins were tentatively identified when protein extraction methods were employed that increased the LC/MS signal-to-noise ratio for peptides from the individual proteins within honey. These plant proteins were all from the mustard family, species *Arabidopsis thaliana*, or mouse-ear cress. A *thaliana* is notable because it contains one the smallest diploid genomes of all flowering plants, at about 135 megabasepairs in length; and as a result, A *thaliana* was the first flowering plant to have its genome sequenced. It is possible that proteins from other homologous plants might be reported as A *thaliana* proteins during a proteomic database analysis because of the prominence of A *thaliana* in the databases. Alternatively, the proteins might indeed be from A *thaliana* itself, considering that this weed grows wild over many parts of the world. Continued research into honey's plant proteome constitutes a new frontier of meaningful investigation that has both agricultural and biological significance.

Presenter: Jared Burton

Title: The Ruff Life: An Approach to Undergraduate Canine Research

Authors: Peter Williams, Tasha Young, Jessica Hill

Affiliation: Utah Valley University

Abstract: Undergraduate research exposure is associated with improved academic performance (Ishiyama, 2002), critical thinking capacity (Landrum & Nelson, 2002), skills in data interpretation (Kardash, 2000), and student-faculty mentor relationships (citation?). These effects are most pronounced in a high risk individuals, such as first-generation, female, and minority students (Nagda, Gregerman, Jonides, Hippel, & Lerner, 1998), who tend to participate less in undergraduate research. This is likely due to a lack of understanding on what research is, how one can participate in research, and the importance of research experience in future endeavors.

In efforts to combat these problems pervasive in undergraduate research, we created a group for undergraduate research focused on canine cognition. We believe that this encourages meaningful research participation, due to interest and familiarity of the subject matter. Students are able to extend psychological concepts and theories learned through their coursework and apply it to something both relevant and recognizable. Through doing so, students learn important research skills that can benefit them in any facet of life. Students practice analyzing research designs, thinking conceptually, and applying the scientific method toward everyday things. In this poster, we share our experiences with establishing a line of canine cognition research at a primarily undergraduate teaching institution. We will explain how to overcome common challenges, avoid potential mistakes, as well as review the various benefits of conducting this style of research.

Presenter: Taylor Hammack

Title: The Destructive effects of Radio Galaxy Jets on Neighboring Galaxies

Authors: Taylor Morgan, Kallin Raymond, Bryan May, Kasen Lisonbee, Jordan Memmott

Affiliation: Southern Utah University

Abstract: A small portion (<2%) of galaxies host black holes that are actively growing and produce energetic jets that may extend for millions of light-years beyond the host galaxy. These jets are large enough to impact nearby satellite galaxies, which may affect star formation in these satellites. This research examines the effects of the jets of a sample of 58 radio galaxies on nearby galaxies within range of the jets. The relation of neighboring galaxies to the jets is checked by visual inspection such that two samples are produced: neighbors inside the path of the jet and those outside. We compare the colors and thus the star formation rates of these samples and find an excess of blue galaxies outside the jets and red galaxies inside the jets, which suggests that the jets quench star formation in neighboring galaxies. We then evaluate the color of galaxies within the jets with respect to distance from the host galaxy. We find that there is no correlation between the star formation, or lack thereof, in a satellite galaxy and its proximity to the source of the jets. This suggests that the quenching of star formation is not influenced by distance from the jet source.

Presenter: Jaxon Barney

Title: Diffusion-limited Titration Using Microfluidics

Authors: Dr. Christopher Monson

Affiliation: Southern Utah University

Abstract: We have developed a method to make microfluidic devices using a sacrificial magnesium ribbon as a template. The magnesium ribbon is shaped into the desired channel, embedded into PDMS, and then dissolved using a hydrochloric acid bath in a sonicator. We have done some characterization of this fabrication method and the microfluidic devices obtained with it, and have found that the devices exhibit laminar flow as expected. Turbulent flow (and thus mixing) can be induced by twisting the channel. Using this fabrication method, we have created microfluidic devices to perform a diffusion-limited titration. In this titration, acidic and basic solutions are introduced into either side of a single channel and allowed to flow next to each other. As the channel is straight, ideally no mixing occurs other than diffusion between the two solutions. The reaction is monitored using a pH-sensitive fluorescent dye (morpholine-fluorescein), so the diffusion of ions (largely H⁺ into the basic solution) can be monitored using a fluorescence microscope. With this method, we hope to be able to calculate both concentrations and, to some extent, identities (at least strong vs weak acid) of unknown solutions. We will present our research results.

Presenter: Brian Allen

Title: Synthesis and evaluation of chalcone and cinnamate ester derivatives for anti-tumor activity.

Authors: Don Davies, Parker Ferguson, Jordan Lowder

Affiliation: Weber State University

Abstract: Chalcone compounds have been found effective at inhibiting the growth of cancer cell lines. In an attempt to discover structure-activity relationships, mechanism of action and create substrates with increased anti-tumor activity, portions of the original chalcone structure have been modified and tested for anti-cancer activity. So far it has been discovered that substituting the 1-phenyl group with hydrogen, to produce cinnamaldehyde, or with an ester or nitro group, yielded a substrate with greater anti-tumor activity than chalcone itself. The lack of activity of substrates without the alkene group, suggests the mechanism of action involves a Michael reaction. Additionally, the lack of activity of cinnamic acid, which would convert to a carboxylate salt in a basic medium, and low molecular weight substrates suggests the need for substrates to be neutral and lipophilic. Substrates were generally formed using an aldol condensation or esterification of cinnamic acid, using DCC and a suitable alcohol.

Presenter: Christopher Cottle

Title: Carbon Pricing in the Private Sector: How the Science, and Politics, of Carbon Pricing and Climate Change Influence Business Strategy

Authors: Hayden Hubbard, McKlayne Marshall

Affiliation: Center for Growth and Opportunity- Utah State University

Abstract: Economist Michael Greenstone called the Social Cost of Carbon (SCC) “the most important figure you’ve never heard of”. The EPA defines the SCC as “an estimate of the economic damages associated with a small increase in carbon dioxide (CO₂) emissions, conventionally one metric ton, in a given year.” The dollar figure assigned therefore represents “the value of damages avoided for a small emission reduction (i.e. the benefit of a CO₂ reduction).” The current dollar value of a metric ton of carbon has different estimates within each company, country, and interest group. The process of calculating the SCC is immensely complex and relies on numerous variables that are highly disputed by scientists, private interest groups and policy makers. Our purpose is to examine motives, trends, and methodology behind public and private companies in the United States using SCC estimates.

Presenter: Summer Roberts and Whitney Weinberg

Title: Vermicomposting spent brewer’s grain (*Secale cereale*, *Triticum aestivum*, and *Hordium vulgare*) for fertilizer application on *Raphinus sativus*.

Authors: Summer Roberts and Whitney Weinberg

Affiliation: Utah Valley University

Abstract: Vermicomposting is the practice of using worms to consume organic waste and leave behind castings (worm excrement) that are enriched with nutrients and moisture. This compost can be utilized directly as castings, or liquefied into compost tea for fertilizing crops, household plants, or just general enhancement of the land. Spent brewer’s grain is the leftover germinated grains used in the production of beer and other malt products. Spent grain makes up a total of 85% of the bio-waste during production. This research project involved spending malt rye, barley, and wheat mimicking the brewers process. Four different vermicomposting bins were differentiated for these three grains and an equal portion of them. In addition, two trials for chemical fertilizer and no fertilizer were done. Two trials were done administering the different compost tea to *Raphinus sativus*, four replicates were done totaling 24 plants. The results of these experiments will be discussed. This research provides important information on the production of vermicompost for different horticultural applications, including organic growth of plants.

Presenter: Lee Wulfenstein

Title: Music to the Rescue: Long-Term Music Exposure Improves Anxiety and Depression Without Altering Life Satisfaction in the Elderly Living in Assisted Living Facilities

Authors: Cody Titcomb, Jacob Peterson, Ting-yi Liao

Affiliation: Utah Valley University

Abstract: Mental and physical health decline rapidly in people over the age of 65. Due to the projected growth in the population of elderly people, there is an increased need for effective care of these individuals. Many elderly people will be living in long-term care facilities, which increases the risk for depression and anxiety. Therefore, assisted living facilities will need to provide an environment that promotes the psychological well-being of their residents. In recent years, research has shown that music exposure can promote psychological well-being by improving cognitive functioning, anxiety, depression, and irritability in residents of assisted living facilities. The current project assessed short- and long-term effects of passive music exposure via listening to self-selected songs on a personal iPod music player as well as active music exposure via participating in weekly music jam sessions on participant depression, anxiety, and life satisfaction levels. Depression, anxiety, and life satisfaction were assessed using the Hamilton Rating Scale for Depression, the Hamilton Anxiety Rating Scale, and Diener's Satisfaction with Life Scale. To evaluate short- and long-term effects of music exposure, the anxiety, depression, and life-satisfaction levels were reassessed 72 hours and nine months after the baseline assessments. The weekly jam sessions occurred throughout the experiment and the playlists on the iPods were updated as needed. Repeated measures ANOVA indicated that long-term, but not short-term, active and passive music exposure reduced anxiety and depression levels without altering life satisfaction levels in the elderly living in assisted living facilities. Correlation analysis using the Pearson product correlation showed that these effects were independent of education levels and the duration in long-term care. Together, our data suggests that music exposure might be a useful strategy for long-term care facilities to promote well-being of their residents.

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Presenter: Dezhi Wu

Title: Learn by Team Play: Engaging Youngsters to STEM Fields

Authors: Sean Brown, Zach Christensen, Conner Cox, Michael Isom, Mitch Nelson, & Jared Porter

Affiliation: Southern Utah University

Abstract: Research in child development has indicated that children's playful behavior has a positive impact on their brain development and their ability to learn. Moreover, children pay more attention to academic tasks when they play, in that cognitive scientists have found that play improves memory and stimulates the growth of the cerebral cortex. In addition, preparing them to work in teams facilitates active participation and engagement in any learning environment, but also it provides a strong foundation to challenges in a professional workplace in a long run. Therefore, play in teams can possibly stimulate an enjoyable and immersive opportunity to engage children to challenging Science, Technology, Engineering and Mathematics (STEM) fields. Through a six-month longitudinal study at an elementary school in UT, this research project aims to explore whether children teams, especially working on divergent problems that foster creativity and critical thinking, can be inspired and interested in the STEM fields. We explore how such innovative team play activities can be effectively designed with a goal to improve children's STEM knowledge and enhance their team performance. Accordingly, we adopted a popular LEGO MINDSTORMS technology to our STEM activities at a local elementary school's STEM Club, where the students ranging from the first grade to the fifth grade formed up six teams with 4-7 people/team to learn and build their own robots. Build upon the well-known technology acceptance model (TAM), we examine the students learning effectiveness, enjoyment, and their team performance through their team play with LEGO robots. At the current stage, our data collection is still ongoing, and we should be able to report our findings when the Utah Academy of Sciences, Arts & Letters conference is held in April.

Presenter: Aiden Reed

Title: Stephen Navin, Dalton Skidmore, Carrie Jo Bucklin

Author: Aiden Reed

Affiliation: Southern Utah University

Abstract: The purpose of this study was to find ant diversity in different environments and use the compared populations to explore biodiversity and the health of an ecosystem. We analyzed the diversity of ants in the Three Peaks area based on distribution between sunny and shady areas. We hypothesized that there would be a difference between the distribution of ants in sunny and shady areas, and expected sunny areas to have the most ants. We collected and identified ants at multiple locations in each site. We then calculated the chi-square between locations to determine if there was a patten in our data, and then completed a t-test. We found a significant difference between sunny and shady ($p=0.05$, $X^2= 17.499$).

Presenter: Dominique Elder

Title: Bisphenol-A's Damaging Effects of Human Reproductive Dysfunction and Chronic Illnesses including Hypothyroidism, Vitamin D deficiency and Alzheimer's-like Neurotoxicity

Authors: Dr. Heather Wilson-Ashworth

Affiliation: Utah Valley University

Abstract: Bisphenol-A (BPA) is an endocrine disrupting chemical (EDC) present in polycarbonate plastics, paint, glue and epoxy resins as well as many other household products. Due to the pervasiveness of BPA, the likelihood of individuals encountering BPA in their day-to-day lives is very high. Since this chemical does not degrade easily, it is found in abundance on the surface of water, landfills, sewage runoff and sludge. This results in an accumulation of BPA, and may reach levels that have adverse effects on humans. Due the structure of BPA, this molecule binds to steroidal binding sites, including estrogenic hormone receptors and vitamin D receptors preventing estrogens and vitamin D from rendering their physiological effects. Such effects include two broad categories. First, BPA interferes with normal reproductive functions. This would include fertility and implantation. Gestational abnormalities and ambiguous sexual development are also observed. Second, BPA contributes to prevalent, chronic illnesses affecting the adult population, such as thyroid and vitamin D deficiencies, renal failure, hypocalcemia, insulin resistance, obesity and insulin-induced Alzheimer's-like neurotoxicity.

Presenter: Levi Neely

Title: Investigation of the synergistic effect of Origanum vulgare (Oregano) Oil and Amphotericin B to inhibit Mucormycosis causing species Absidia corymbifera fungal biofilm

Authors: Caeleb Harris, Olga Kopp, Jedediah Orullian, and Hutch Rhees

Affiliation: Utah Valley University

Abstract: Mucormycosis is a life-threatening disease that occurs in immunocompromised individuals, such as burn, cancer, and diabetic patients. Amphotericin B is the current line of treatment for the disease, however it is known to have many adverse side effects including cell toxicity. Due to the high mortality and morbidity rate associated with the disease even when treated with Amphotericin B, it is vital that new combination therapeutic techniques be investigated in order to more effectively treat the disease. Mucormycosis can be caused by a fungus called Absidia corymbifera. This species causes up to 5% of infections and is a species isolated from confirmed Mucormycosis sites. Origanum vulgare (oregano) oil has been shown to have broad anti-microbial properties in various studies. This study investigates the ability of oregano oil to lower the concentration of Amphotericin B needed to successfully inhibit Absidia corymbifera biofilms. Various concentrations of oregano oil and Amphotericin B are tested to determine the optimal concentration ratio that maximizes biofilm inhibition. Synergistic activity of oregano oil and Amphotericin B could be used to decrease the amount of Amphotericin B needed to treat Mucormycosis infections while still utilizing the antifungal properties of Oregano oil.

Presenter: Sydney Rasmussen

Title: Validation of Self Through Dating: Correlation Between Number of Dates Asked Out On and Self-Esteem Among Female BYU Freshman

Author: Sydney Rasmussen

Affiliation: Brigham Young University

Abstract: This study examined the relationship between self-esteem and number of dates asked out on over the past year among female BYU freshmen. A total of 14 participants were involved in the study, with a mean age of 18.71 (SD = .47). They were administered a survey through Qualtrics consisting of two parts; part one consisted of various questions pertaining to experiences and attitudes around dating, including how many dates participants had been asked out on within the past year, while part two consisted of the Rosenberg Self-Esteem scale. A Pearson Product-Moment Correlation Coefficient used to analyze the data. Results revealed that there was a positive correlation between number of dates asked out on and self-esteem, $r(14) = .55, p < .05$. The results of this study suggest that a BYU freshman female's self-esteem may not be independent of the number of dates she is asked out on, supporting the initial hypothesis that the number of dates a young woman at BYU is asked out on affects a young woman's self-esteem. An unexpected finding from this study was that 100% of participants agreed they expect to be married sometime during their undergraduate experience at BYU; it is interesting to note, however, that only 27% of BYU students are married by the time they graduate with a bachelor's degree (Hollingshead, 2016). The main limitations of this study include a very small sample size, lack of control for mental health influences, and the forcing of participants to choose between "agree or disagree" on some items rather than offering a Likert scale spectrum. Further studies should examine the relationship between dating and self-esteem through quantitative methods, or examine the prevalence and extent of unrealistic expectations single female BYU students have pertaining to marriage.

Presenter: Ben Thrift
Title: Ablation of Materials Under Catalyzed Deuterium Flow
Authors: Mike Taggett
Affiliation: Southern Utah University

Abstract: The presence of catalyzed deuterium on the surface of metals has been shown to cause changes in how the metal responds to pulsed laser ablation. Most of the previous research into the subject has focused on the ejecta from the catalyzed deuterium treated materials under laser ablation, but very little research has been conducted into the changes in the ablation rate of materials with catalyzed deuterium present on the surface. The effect of catalyzed deuterium on the rate at which materials ablate was studied. The change in ablation rate was studied by comparing the depth of ablation pits after being subjected to laser fire for a specified amount of time, and by observing the decay time of the capacitive sensor signal during longer firings. The difference in the length of signal decay time on the capacitive sensor, and the depth of the ablation pits in the metal samples showed a marked difference between before and after catalyzed deuterium accumulation. Tests of ablation without the catalyzed deuterium, but instead under low to medium vacuum or normal deuterium flow, do not show the same changes. Similarly, subjecting materials that are not known to accumulate the catalyzed deuterium yielded no change in signal decay or pit depth. The change in ablation rate of materials following the deposition of catalyzed deuterium is an interesting expansion on current research into this phenomenon, and can serve as a method of examining the catalyzed deuterium accumulation characteristics of materials.

Presenter: Chase Junge
Title: Cognitive and Physiological Outcomes among Female Athletes After Suffering a Sports-Related Concussion
Authors:
Affiliation: Brigham Young University

Abstract: In accordance with the literature examined, it is believed that adolescent and young adult female athletes suffer from more severe outcomes after suffering a sports-related concussion. Women in several studies were found to suffer a greater severity of symptoms, especially at the initial clinical visit. In addition to more severe symptoms, females reported suffering from a higher number of symptoms, including unique symptoms to the female sex such as an irregular menstrual cycle. Evidence was found by several groups suggesting that females have a significantly longer time to full concussion recovery than do males. The increased recovery time and symptoms may also be connected to a more significant decline in neurocognitive function seen in female athletes, as compared to males, after suffering a concussion. Several of the focuses of the study gave unified results though more testing is needed before firm conclusions are drawn. Additional research is recommended in the area of understanding the underlying physiological basis for sex differences in sports-related concussions.

Presenter: Atoosa M. Samani
Title: Comparing the Learning Outcomes in Chemistry Outreach Between Elementary Charter Schools and Title One Elementary Schools
Authors: Prerna Kamath, Mikayla Rosqvist, Rebecca King, Bradford Stockman
Affiliation: Salt Lake Community College

Abstract: For the past 15 years our outreach program Elemental Expeditions (EE), has built strong ties throughout the local community by promoting Science, Technology, Engineering, and Math education (STEM) to disadvantaged youth attending resource-limited schools. Through hands-on chemistry experiments, interactive lesson plans, EE has made great strides towards broadening the educational opportunities available to local title one elementary schools. For the past two years our EE outreach program has incorporated pre and post quizzes to measure the learning outcomes. This project is an expansion of our outreach program to compare results of charter elementary school outreach with the results of title one elementary schools within the same geographic area.

Presenter: Atoosa M. Samani

Title: Gender Differences and The Learning Outcomes in Chemistry Outreach

Authors: Prerna Kamath, Mikayla Rosqvist

Affiliation: Salt Lake Community College

Abstract: For the past 15 years our outreach program Elemental Expedition (EE), has built strong ties throughout the local community by promoting Science, Technology, Engineering, and Math education (STEM) to disadvantaged youth attending resource-limited schools through hands-on chemistry experiments and interactive lesson plans. For the past two years our EE outreach program has incorporated pre and post quizzes to measure the learning outcomes. This study analyzes gender differences in the outcomes of our EE outreach program.

Presenter: Shirley Dawson

Title: The State of Educator Ethics Laws in the United States

Author: Shirley Dawson

Affiliation: Weber State University

Abstract: This study provides a singular compilation and examination of educator ethic laws from all 50 states and the District of Columbia. Many professions have a single governing body that grants licensure and prescribes professional standards for its members. In the United States, individual states confer license and determine parameters of ethical behavior for those who teach. Thus, the education profession has multiple ethical codes which exist through numerous state laws. The purpose of the study was to survey state laws to determine the existence and substance of educator ethical codes. All states and the District of Columbia have at least one educator ethics law in statute, rule, or policy, or combination of source. Collected ethics laws were examined for similarities and differences in source, construction, and content. Through coding and structure analysis, three taxonomies were identified and labeled as the Troika, Teaching Standards, and Limited Models. A geographical clustering of similar state laws was discovered. An accounting of existing state laws is provided with implications. The degree of variability and compatibility was noted and quantified in source, structure, content of state laws and geographical location.

Presenter: Austin Lynn

Title: Humanizing the Model Minority: A Literature Review of Current Research Concerning Counseling Asian American College Students

Author: Austin Lynn

Affiliation: Brigham Young University

Abstract: A detailed examination of the past 10 years of literature regarding the counseling of college-age Asian Americans is undertaken, with emphasis on counselor and client perspective. The applicability of Western counseling to individuals steeped in Asian culture is examined, and suggestions geared to increase counselor competency provided. Counselors self-perceived competency and Asian American client experience are reviewed. The effects of acculturation and enculturation are discussed; with a special focus on the impact of Asian cultural values and their potential negative relationships with help-seeking attitudes. The nature, implementation, and efficacy of multicultural counseling is explored. Data comparing college-age Asian Americans to other groups is analyzed. Practical advice for counselors is given to help increase multicultural competence, and ameliorate Asian American client's counseling experience. Directions for future researchers based on current limitations are also enclosed, with a special focus on practice-based research and a directive to examine specific subsets of Asian cultural values individually, rather than holistically. Counselors are encouraged to utilize unique aspects of Asian culture in counseling, instead of trying to force acculturation to occur.

This review indicates that counselors who intentionally practice multicultural counseling can ameliorate the counseling process for college-age Asian American clients. It also urges researchers to conceptualize Asian culture not as a single value, but as multiple values (such as respect for authority, filial piety, etc.) in one domain.

Presenter: Mackenzie Quinton

Title: Why Words Matter: The Use of Language in Conducting Forensic Interviews on Adolescent Victims of Abuse

Author: Mackenzie Quinton

Affiliation: Brigham Young University

Abstract: The development of abuse protocol and the facilities designated to solve and prevent such abuse has expanded in recent years to accommodate the millions of children affected each year by both physical and sexual abuse. As forensic interview protocols have been developed to aid in the interview process, there has been a stronger focus on what that protocol should consist of. The outcome of forensic interviews conducted on adolescents are often dependent on the ability of the interviewer to extract a free-narrative response from the victim. There are two main interview protocols that are utilized in the United States and they have very different main guidelines. The NICHHD protocol focuses on language use in interviews while the Cornerhouse protocol focuses on flexibility and the individuality of the children. A child's ability to understand, or not understand, or know how to appropriately respond to questions asked will affect the course of a forensic interview. This is an issue because narrative accounts from victims are statistically the most important evidence in abuse cases. Research has been proven to show that interview success increases with a stronger focus on extracting a free narrative account of abuse, language use, the child first doctrine and overall feelings of empathy and support extended to the child from the interviewer.

Key Words: language, linguistics, forensic interviews, adolescent, abuse

Presenter: Suzy Cox, Chelsey Beck

Title: Using Robotics to Promote Learning and Engagement I Computer Science

Author: Suzy Cox, Chelsey Beck

Affiliation: Utah Valley University

Abstract: The UVU School of Education CREATE Lab invites participants to explore hands-on interactive robotics applications that invite students to engage with computer science concepts in concrete ways as well as express their knowledge, identities, and concerns across content areas, bringing more cultural relevance to computer science and the assessment of other subjects. Using Birdbrain Technologies Hummingbird platform as an example, we will explore how robotics can be employed to engage students in service, storytelling, exploration of social and environmental issues, and personal expression.

ART ORAL PRESENTATIONS

Presenter: Francesca DeMartino

Title: Escape: A Research through Dance on the Symptoms of Addiction

Author: Francesca DeMartino

Affiliated: Department of Dance/Undergraduate, Utah Valley University

Abstract: According to results from the 2014 National Survey and Health from the Substance Abuse and Mental Health Association, 21.5 million people over the age of twelve had a Substance Use Disorder. This statistic of 21.5 million people represents the 8.1% of the American Population who is struggling with a drug addiction. I, as an intellectual choreographer, questioned if the physical and psychological problems that an addict experiences can be translated into the formative properties of dance.

In this research project, several criteria that contribute to the Substance Use Disorder are explored through dance by working with the properties of time, space, and focus. The symptoms that are explored are withdrawal reactions, cravings, inability to cut down or control the substance use, and continued usage despite having persistent physical or psychological problems that are correlated with substance use. In this piece, I played with levels to create the up and downs that happen physically and emotionally to the users. I experimented with circle and spiral patterns to show that it is a repeated problem that also brings the person down. I also utilized two groups of dancers to further my intent. In one group were the dancers who were experiencing the symptoms of the addiction i.e. the users. The second group of dancers were the physical manifestation of the drugs control over the individuals, i.e. the addiction. In contrast, the individuals who represent the addiction have linear and direct movement pattern. In order to create a sense of uncertainty, the dancers also work with irregular accents while playing with very slow to very fast timing. It is my intention for the outcome of this piece to illuminate the struggles of an individual who is dealing with the Substance Use Disorder through dance by playing with properties of time, space, and focus.

Presenter: Tara Meredith

Title: A Critical Analysis of the Rite of Spring by Pina Bausch Through the Feminist Perspective

Author: Tara Meredith

Affiliated: Department of Dance/Undergraduate, Utah Valley University

Abstract: Females have been the target of incessant objectification at the hand of males throughout history and spanning the world. This objectification is the means in which males oppress women to benefit and maintain patriarchy within society. Feminist critical theory is an emerging frame of analysis that seeks to expose gender roles and the existence of patriarchy, oppression, and objectification within society. It provides clear definitions of patriarchy, oppression, and objectification, and how each of them effect the welfare of women. In 1975, German choreographer, Pina Bausch, produced an evening length modern dance piece titled The Rite of Spring. Objectification of the female body and patriarchal influence are among the many themes of the piece. Patriarchy is the male operated institution in society that focuses on the modus operandi of the man, leading to the deliberate oppression of women. By definition, oppression is the unjust exercise of authority or power. Patriarchy operates to express power, therefore leading to oppression of those not in power: women. Pina Bausch made the leap of awareness regarding objectification of females, and particularly the female body, through her work, The Rite of Spring. With the feminist perspective, one is able to observe aspects of the piece that contribute to the exposure and modes of objectification, and how the establishment of patriarchy is the direct cause of objectification. By interpreting the piece with the feminist perspective, one is also able to determine how dance reflects culture, and more specifically the cultural view on patriarchy, oppression, and objectification. Knowing that dance reflects the culture and certain cultural values allows for dance to be a valid and worthy discipline of study and critique. A critical analysis of The Rite of Spring by Pina Bausch through the Feminist Perspective reveals Bausch' disapproval of male objectification of the female anatomy.

Presenter: Arden Laga

Title: Soviets, Socialists, and the ballet, Spartacus

Author: Arden Laga

Affiliated: Department of Dance/Undergraduate, Utah Valley University

Abstract: Russian choreographer Yuri Grigorovich in 1968 created a ballet in Soviet Russia that reflected and praised its communistic governmental leadership for the 50th anniversary of the October Revolution by telling a Greek story about power, war, and victory. Critically analyzing this ballet titled Spartacus, will show that this choreographic version was a form of propoganda to promote the Soviet political ideology and therefore Soviet culture during 1968. The post-modern critical theory of New Historicism will allow the ability to analyze the surrounding Russian culture and aid in understanding its influence of the production and movement choices found in the ballet. Analyzing Spartacus in this way will help see that this dance was used by the Soviet government to teach their belief to their people that Russia was the most powerful political force in the world during the Cold War. The methodology for this research paper will include a rigorous investigation of peer reviewed written source material as well as a focused critical analysis using Laban Movement Analysis, a system to analyze, interpret, and notate dance and movement, of a performance of Yuri Grigorovich' Spartacus This research concludes that the ballet Spartacus through the story line and the movement, directly reflect the political culture and the political ideology of Soviet Russia in 1968.

Presenter: Alexandria Sorenson

Title: Muscle Memory and Dance

Author: Alexandria Sorenson

Affiliated: Department of Dance/Undergraduate, Utah Valley University

Abstract: A fascinating characteristic of dancers is their ability to perform complex steps with specific technical requirements tied to each step. Remembering lengthy choreographic phrases with attached unique details is an ability dancers possess. Dancing requires full engagement of the brain. While dance has its own specified, complex technique it also demands expression of emotions and connection to the world, other individuals, and the through line of dance movements. This level of multitasking is uniquely human. The incredible brain accomplishes this complex task by establishing muscle memory to remember the order of steps in choreography and the technique underlying each step. Muscle memory is organized neural pathways that achieve specific, practiced motor tasks. It leads to complex coordinated movement patterns while paying little or no attention, perhaps even thinking of something else entirely. (Muscolino 105). My research will discuss the facets of muscle memory, its relationship to dance, and how it could be developed. Within this, I have also explored how to apply this to teaching dance as well as performing as a dancer.

BIOLOGY ORAL PRESENTATIONS

Presenter: Craig Oberg

Title: Isolation and Characterization of Bacteria to Degrade Art Waste Solvents

Authors: Craig Oberg, Gabriel McKay, Michele Culumber, Edward Walker

Affiliated: Weber State University

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

Presenter: Gabriela Lizarbe

Title: Comparison of Frequency, Peak Density, and Attenuation Between Large Transducers and Forceps Transducer using High Frequency Ultrasound on Pigskin Samples

Authors: Gabriela Lizarbe, Mariel Hatch, Casey Hardy, Morgan Clawson, Timothy Doyle, Michael Salisbury, Garrett Wagner

Affiliated: Utah Valley University

Abstract: Receiving negative margins during tumor resection surgery is incredibly important in avoiding recurrence of malignant cells. Our team has worked alongside surgeons at the Huntsman cancer institute to engineer and program a pair of ultrasound instrumented forceps for the diagnostic detection of malignant tissue. The goal of the forceps transducers is to provide a tool for surgeons to instantaneously detect and remove malignant tissues during tumor resection surgery. During initial analysis, phantoms were used to determine the success of the forceps compared to large transducers on breast tissue. The phantoms demonstrated to be a suitable alternative for the breast tissue, providing similar frequency, attenuation, and peak density. When analyzing the testing parameters against skin samples and phantoms, comparable signals for testing were insufficient. For this reason, it was non-feasible to perform analytics between the two transducers in a laboratory setting because it required human skin samples in order to perform the data analysis. The purpose of this study is to test pigskin with high frequency ultrasound using forceps transducers and large transducers, analyzing similarities in frequency, attenuation, and peak density between the two testing methods. Pigskin was chosen because of the similar anatomic and physiologic characteristics that is shared with humans. In addition to testing the three parameters, differences of the pig skin storage methods using Dulbecco's Modified Eagle's Medium (DMEM) and formaldehyde are being determined.

Presenter: Alyson DeNittis

Title: Micropropagation of two Edaphic Species, *Eriogonum soredium* and *Lepidium ostleri*

Authors: Alyson DeNittis, Olga Kopp

Affiliated: Utah Valley University

Abstract: *Lepidium ostleri* (Ostler's peppergrass) and *Eriogonum soredium* (Frisco buckwheat) are edaphic endemics restricted to Ordovician limestone outcrops associated with the San Francisco Mountain Range in western Utah. All known major populations primarily occur on private lands, with populations having historically sustained concentrated mining activity. Due to restricted population distribution and potential impact from modern mining operations, *L. ostleri* and *E. soredium* are currently candidate species for federal listing as threatened by The U.S. Fish and Wildlife Service. This study focuses on establishing micropropagation protocols for both species. Methods for organogenesis or embryogenesis have not been published for *L. ostleri* or *E. soredium*. Organogenetic and embryogenetic responses to different plant growth

regulators were evaluated. Callus and shoot formation have been induced in *L. ostleri* on MS media supplemented with different concentrations of IAA (indole-3-acetic acid), BAP (6-Benzylaminopurine), and Kinetin (N⁶-furfuryladenine). Callus formation has been induced in *E. soledium* on MS media supplemented with different concentrations of Kinetin, 2,4-D (2,4-Dichlorophenoxyacetic acid), and NAA (1-Naphthaleneacetic acid). Further results of the effects of different plant growth regulators, media, and growth conditions will be described. Establishing micropropagation protocol for *L. ostleri* and *E. soledium* will provide valuable information for potential restoration or relocation efforts of both species.

Presenter: Michele Culumber

Title: Suppressing Growth of *Lactobacillus wasatchensis* WDC04 using Organic Acids

Authors: Ireland Green, Craig Author: Oberg, Matthew Domek, Donald McMahon

Affiliated: Weber State University

Abstract: *Lactobacillus wasatchensis* is a slow growing, non-starter lactic acid bacterium (NSLAB) that causes late gas defect in aging cheese and results in significant economic losses to producers. During cheese aging, organic acids can be produced by other NSLAB cultures or purposefully added to cheese during manufacture. Organic acids are often used as food preservatives, can occur naturally in foods, and generally don't affect flavor or product quality. Selected organic acids, in their naturally occurring concentration ranges in Cheddar cheese, were investigated for their ability to inhibit *Lb. wasatchensis* WDC04. Five organic acids (lactic, formic, propionic, citric, and acetic) produced by NSLAB organisms were tested. They were each added at their minimum, median, and maximum concentrations, as found naturally in aged Cheddar cheese, to individual wells of a 48 well plate containing MRS broth with 1% ribose (MRS + R) inoculated with *Lb. wasatchensis* WDC04. Growth rates were determined on a Tecan Infinite 200 PRO spectrophotometer over 40 hours. Initially, tests were done at pH 7.0 with several organic acids exhibiting some inhibition. Tests were then run at pH 5.0 to determine if the organic acids were more effective at a pH of aged cheese. Both formic and citric acid showed significant inhibition of *Lb. wasatchensis* WDC04, especially at pH 5.0. Formic acid was the most inhibitory of all five organic acids with the maximum concentration (100 mM) showing the greatest inhibition. Addition of citric acid at the minimum (12 mM) and median (13.5 mM) concentrations also produced inhibition. Use of selected organic acids at concentrations normally found in Cheddar cheese could be a potential antimicrobial measure to prevent or reduce late gas defect in aging cheese.

Presenter: Tyson Hillock

Title: Synergistic Antifungal Activity of Amphotericin B, Essential Oils, and Low-Frequency Ultrasound on *Rhizopus oryzae* Bio film

Authors: Tyson Hillock, Karaleen Anderson, Mariel Hatch, Olga Kopp, Timothy Doyle

Affiliation: Utah Valley University

Abstract: Fungal infections have gained clinical importance in the last decade. These serious and sometimes fatal infections are often associated with biofilm formation, which can increase resistance to antifungal agents when compared to free living colonies. This increased resistance makes it vital to test antifungal susceptibility using biofilms and not planktonic cells. Amphotericin B has been used as the first line of treatment for mucormycosis since the 1950's. However, it can have many adverse side effects including chills, fever, headaches, and muscle pain as well as the fatal syndromes of hepato and nephrotoxicity. These side effects, in conjunction with mortality rates of 97% (untreated) and 39% (treated with amphotericin B) demonstrate the need for alternative treatment options. This study investigates fungal biofilm disruption in species known to cause mucormycosis using low frequency ultrasound, amphotericin B and essential oils. The goal of the project is to determine if low frequency ultrasound and essential oils can be used in combination with current treatments to increase or maintain antifungal activity while avoiding the toxicity caused by high doses of synthetic drugs. The antifungal activity in essential oils originate from plant secondary metabolites, which can be classified by their phytochemical constituents. Low-frequency ultrasound treatment in combination with antibiotics has proven to be promising for biofilm removal and treatment of chronic rhinosinusitis. Ultrasound facilitates transport of antibiotics across biofilms, increases sensitivity of biofilm-growing bacteria to antibiotics, and could conceivably be used in tandem with any one or more anti-biofilm agents. We expect fungal biofilms to respond to both the disruption via the ultrasound and the antifungal properties of essential oils, thus allowing us to achieve fungal biofilm inhibition with a lower dose of Amp B.

Presenter: Craig Oberg

Title: Rapid Method for Measuring the Effect of Prebiotics on Probiotic Bacterial Growth

Authors: Dana Hoffman, Craig Oberg, Matthew Domek

Affiliated: Weber State University

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

Presenter: Ammon Smart and Sherie Thorton

Title: Inhibition of Pathogens by Probiotic Strains of Lactobacillus

Authors: Ammon Smart, Sherie Thorton, Amber Smith, Michele Culumber, Karen Cakaoka

Affiliated: Weber State University

Abstract: Many studies have characterized lactic acid bacteria (LABs), noting their potential health promoting features and encouraging their use as probiotics. This study's purpose was to identify five strains of LABs, isolated from probiotic products, by DNA analysis and to test their ability to inhibit bacterial pathogens. LABs were identified by 16S rRNA gene analysis that indicated three isolates are Lactobacillus rhamnosus and two are Lactobacillus plantarum. Two assays, the flip agar and the agar overlay assay, were used to compare the ability of LAB colonies to inhibit 5 pathogens (Escherichia coli, Salmonella typhimurium, Shigella sonnei, Enterococcus faecalis and methicillin resistant Staphylococcus aureus (MRSA), an important pathogen that infects wounds. The agar overlay assay indicated that all five LABs inhibited all five pathogens. In contrast, the flip agar assay showed only minimal inhibition of MRSA by 3 of the LAB cultures. To determine if the inhibitory activity was present in the LAB culture supernatants (CSs), LABs were grown in MRS broth for up to 6 days of incubation (pH 3.5). The CSs were centrifuged, filter sterilized and tested for their ability to inhibit the 5 pathogens using a well diffusion assay. All 5 LABs inhibited all 5 pathogens as shown by zones of inhibition around the wells containing CSs. However, when these same supernatants were adjusted to pH 6.0, they lost all inhibitory activity. Importantly, non-inoculated MRS broths at pH 6 and pH 3.5 were not inhibitory to the pathogens, indicating that the inhibitory activity was due to LAB metabolites. Further studies are underway to determine if the inhibitory activity is due to organic acids or some other LAB metabolite.

Presenter: Issac Martineau

Title: Isolation of a Lactobacillus wasatchensis-like Isolate from an Aged European Cheddar Cheese

Authors: Issac Martineau, Michele Culumber, Craig Oberg

Affiliated: Weber State University

Abstract: Lactobacillus wasatchensis WDC04, a non-starter lactic acid bacterium (NSLAB), was isolated from aged Cheddar cheese that had late gas formation. Subsequent studies have demonstrated Lb. wasatchensis can produce gas in culture and in experimental cheeses. Lactobacillus wasatchensis has been identified in cheeses with late gas defects from geographically dispersed locations within the United States. Recently, a sample of a European Cheddar cheese with late gas defects was examined. NSLABs from the cheese were isolated on de Man, Rogosa and Sharpe agar supplemented with 1% ribose (MRS-R) anaerobically for 7 days at 30°C. Colonies with similar morphology to Lb. wasatchensis were selected for 16S rRNA gene sequencing, API 50

carbohydrate panels, and were observed for gas production in MRS-R broth with Durham tubes. All of the isolates selected had identical 16S rRNA gene sequences. The 16S rRNA gene had 99% sequence identity to *Lb. hokkaidonensis* strain LOOC260 and 97% sequence identity with *Lb. wasatchensis* WDC04. Unlike *Lb. wasatchensis*, the new isolate showed acid production with several carbohydrates in addition to ribose, including D-Xylose at 24 h, and methyl-D-xylopyranoside, glucose, and maltose at 48 h. This carbohydrate profile also distinguishes this organism from *Lb. hokkaidonensis* and other related species including, *Lb. suebicus*, *Lb. vaccinostercus*, and *Lb. oligofermentans*. This isolate also produced gas in MRS-R broth. This isolate appears to be another member of this closely related group of lactobacilli and, like *Lb. wasatchensis*, may cause late gas defects in aged cheeses. Further genetic and physiologic characterization will provide more evidence for the geographical distribution, diversity, and environmental reservoirs for this group of organisms.

Presenter: Jennifer Locke

Title: The Effects of the Anesthetic Diethyl Ether on *Dionaea muscipula* (Venus Flytrap)

Authors: Jennifer Locke, Gabriella Lizarbe, Corey McCabe, Jihoon Kim

Affiliation: Utah Valley University

Abstract: The effects of anesthetics such as diethyl ether, chloroform, halothane, isoflurane, and xenon on humans have been well known for over 150 years, however, the mechanism of these effects is unclear. This has been especially controversial when anesthetics were shown to affect plants in a similar way. Anesthetics have been shown to affect various physiological processes in plants including motility, seed germination, and chlorophyll accumulation. Specifically, anesthetics block action potentials and endocytic vesicle recycling while also inducing an exaggerated production of reactive oxygen species (ROS). At high concentration and/or long duration, anesthetics can be detrimental and sometimes fatal to mammals. In yeasts, diethyl ether can be used to selectively kill vegetative cells. The purpose of this study is to determine the effects on motility, photosynthesis rate, and respiration rate at differing concentrations of the anesthetic diethyl ether, and to determine if high concentrations of the anesthetic are also detrimental to *Dionaea muscipula* (Venus fly trap). This research will shed some light on the physiological effects of an anesthetic on plants.

Presenter: Jedediah Orullian

Title: Precision Breast and Skin Cancer Surgery with Ultrasound Instrumented Forceps

Authors: Jedediah Orullian, Tyson Hillock, Karaleen Anderson, Mariel Hatch, Timothy Doyle

Affiliation: Utah Valley University

Abstract: The purpose of this study is to test the accuracy, sensitivity, and specificity of high-frequency (HF) ultrasound (20-80 MHz) forceps for the ex vivo assessment of margin specimens on normal and cancerous breast and skin tissue obtained from the National Disease Research Exchange (NDRE). The hypothesis for the study is that HF ultrasonic signals are capable of differentiating malignant from normal and atypical tissue in breast and skin cancer specimens. A prior feasibility study at the Huntsman Cancer Institute indicated that HF ultrasound can differentiate between normal, atypical, and malignant pathologies in breast and skin cancer surgery margins. Our goal is to further test and validate this technique for the intraoperative assessment of margins during breast cancer surgery. The specific aims of this study include the following: 1. Determine the sensitivity, specificity, and accuracy of HF ultrasound for distinguishing malignant from nonmalignant tissue in breast cancer and skin cancer biospecimens. 2. Determine the spatial resolution of HF ultrasound for measuring the proximity of malignant tissue to the margin edge. 3. Collect ultrasonic data from a total of 80 breast biospecimens to establish statistically significant results.

Presenter: Michele Culumber

Title: Inhibition of *Lactobacillus wasatchensis* by Bio-Protective Lactic Acid Bacteria

Authors: Craig Oberg, Sophie Overbeck, Michele Culumber, Donald McMahon

Affiliated: Weber State University

Abstract: Late gas defects in aging cheese result in significant losses to the manufacturer. *Lactobacillus wasatchensis*, a non-starter lactic acid bacterium (NSLAB), is an important cause of late gas defect. Controlling growth of this unwanted NSLAB may be possible by incorporating bio-protective lactic acid bacteria (BP-LAB) cultures into the cheese during manufacture, which would inhibit *Lb. wasatchensis* growth during cheese aging. Previous research has shown several BP-LAB cultures inhibit *Lb. wasatchensis* to varying degrees but the extent and mode of inhibition were not determined. In addition, other potential BP-LAB strains were tested for their inhibitory capacity. Quantification of inhibition between BP-LAB cultures and *Lb. wasatchensis* was done using the spot test with the agar-flip method then measuring inhibition zones over time. MRS agar with 1% ribose (MRS-R) was inoculated with each BP-LAB and incubated anaerobically at 35°C for 48 h to form a spot colony. Inoculated agar was flipped over and a *Lb. wasatchensis* strain swabbed on the exposed surface, then plates were incubated anaerobically at 25°C for 72 h. The five most inhibitory BP-LAB cultures were *Lactobacillus rhamnosus* LB3, *Lactobacillus paracasei* P-210, *Lactobacillus brevis* ATCC 13648, *Lactobacillus casei* F19, and *Lb. paracasei* LILA. Quantification of possible synergistic inhibition by co-BP-LAB strains was tested by mixing 1 mL each of two different BP-LAB strains, and then repeating the agar-flip protocol. Four co-cultures were tested LB3/ P-210, LB3/P-220, P-200/P-210, and P-200/P-220. No significant increases in inhibition zones were observed when BP-LAB cultures were paired versus individual strains. Results confirm selected BP-LAB strains can inhibit growth of *Lb. wasatchensis*. Initial results also suggest some BP-LAB cultures may be producing bacteriocins that inhibit *Lb. wasatchensis*. Addition of selected BP-LAB cultures during cheesemaking could control late gas defect during cheese aging.

Presenter: Megan Jensen and Anna Christensen

Title: Separating Organic Material Using Microfluidic Device

Authors: Megan Jensen, Anna Christensen, Christopher Monson, Ty Redd

Affiliation: Southern Utah University

Abstract: This project uses microfluidic devices in order to separate organic material. A microfluidic device is a tube which can prevent the mixing of liquids as they pass through. The goal of this project is to use electric currents in order to separate organic material within a microfluidic device. There will be a negative current on one side, and a positive current on the other. DNA, which is negatively charged, will be pulled towards the positive electrode. Proteins can vary in charge depending on type, but will also be separated and pulled towards their respective electrodes. The goal of this project is to be able to use the device to separate DNA and proteins for analysis. Our hope is to use this device to analyze prehistoric animal bones, but this project could also help in the fields of forensics, medicine, and phylogenetic research. This device would be inexpensive, easy to use, and could quickly separate organic materials. With this device we would be able to make DNA analysis more accessible to Universities, small businesses, etc. Six microfluidic device prototypes have already been made. With each prototype, we fix old problems and run into new ones. In order to make these microfluidic devices we create the pathway with magnesium wire, which is then surrounded by PDMS. After the PDMS hardens, the device is placed in a sonicator, which dissolves the Magnesium. This leaves a thin, hollow, tube for the liquid to travel. The device uses flow cell electrophoresis which is perpendicular to flow direction. As the liquid passes through the device, the electric currents pull the materials to different sides. They are then separated through different tubes at the end of the device. Presenter: Adriana Christensen

Presenter: Alyson DeNitis

Title: Evaluating the Synergistic Treatment of Amp B and Cinnamon Oil on *Absidia corymbifera* Biofilms

Authors: Alissa Humes, Caleb Harris, Jedediah Orullian, Hutch Rhees, Jememiah Ferrin, Olga Kopp

Affiliated: Utah Valley University

Abstract: This study will evaluate the effectiveness of the synergistic antifungal activity of Amphotericin B (amp B) and cinnamon oil on *Absidia corymbifera*, a fungus known to cause mucormycosis. Fungal biofilms will be grown in 96-well plates and then treated with the antifungal agents. Mucormycosis is a fungal disease affecting immunocompromised individuals, such as newborn, cancer, or HIV patients. The disease causes headaches, coughing blood, facial swelling, scabbing, pain and a variety of other symptoms. Amp B proves highly effective in treating fungal diseases and is the preferred treatment for mucormycosis. However, amp B treatment includes the risk of severe side effects. On the other hand, the risks of cinnamon oil treatment are fewer and less severe.

Cinnamon oil contains eight identified phenolic compounds and shows antifungal and antimicrobial properties. Because of cinnamon oil's phytochemicals and lack of complications, identifying a ratio effective in treatment may prevent serious complications, or even save lives. The independent variable will be a concentration range of the two treatments, high to low. Each experiment round will use three synergism plates, one amp B dilution plate and one cinnamon oil dilution plate. Amp B and Oil plates will consist of three rows for duplication purposes. All biofilms will be treated with an XTT/menadione solution and absorbance measurements will evaluate cell density, which has been shown to correlate with cell activity. We hypothesize that the combination of cinnamon oil with amp B will lower the dose of amp B required to inhibit biofilm growths in *Absidia corymbifera*.

Presenter: Francesco Sechi and Jayson Workman

Title: Characterization of the Hemolytic-like Activity of Probiotic Lactobacilli

Authors: Francesco Sechi, Jayson Workman, Jesse Kupfer, Karen Nakaoka

Affiliated: Weber State University

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

Presenter: Samuel Kalis

Title: The Degradative Effect of Horseradish Peroxidase on Microbial Biofilms

Author: Samuel Kalis

Affiliated: Weber State University

Abstract: Bacteria in nature do not grow in suspension in liquid culture as they do in the lab, but rather they grow attached to surfaces, often forming biofilms. These biofilms are typically matrices of polysaccharides, proteins, and lipids hosting a consortium of bacteria living together in a community safe from the environment at large. Biofilms not only grow in what is often thought of as nature: rocks, streams, ponds, etc, but also in places or on objects where their presence is less than desirable e.g. indwelling intravenous catheters, endoscopes, hulls of ships, and oil or gas pipelines. In this investigation the enzyme horseradish peroxidase was tested at a method of degrading and even eliminating biofilms formed by *Staphylococcus aureus* and *Pseudomonas aeruginosa*, species often implicated in medical contexts. Cultures of *S. aureus* and *P. aeruginosa* were grown in microwell plates to allow biofilms to form in the wells, the culture was removed, and the biofilms was subsequently treated with solutions of horseradish peroxidase and hydrogen peroxide, the substrate for horseradish peroxidase. Afterwards the biofilms were washed and stained with crystal violet. Staining solution was washed away and the crystal violet bound to biofilm was dissolved in ethanol. Absorbance of the freed crystal violet was read in a plate reader. A range of concentrations and conditions were tested: time, temperature, concentrations of horseradish peroxidase, and concentrations of hydrogen peroxide. Also, the feasibility of reuse of the enzyme solution was tested. Currently, no conditions generated results suggestive of clearance of biofilms superior to the positive control solution. Some combinations of enzyme and hydrogen peroxide concentrations yielded clearance, but no greater than the positive control. As of now, the results from this investigation suggest that under the conditions examined horseradish peroxidase was not effective for degrading microbial biofilms.

Presenter: Dac A. Crandall

Title: Possible Plant Protein Identification with Honey's Proteome

Authors: Dac A. Crandall, Trient B. Spires, Jeremy D. Bergman, Rawlings E. Lyle, Austin D. Sherwin, Tyler J. Thorton, J. Hayden Welch, Craig D. Thulin

Affiliated: Utah Valley University

Abstract: Bees are of tremendous biological importance, as they are the primary pollinators of wildflowers and most agricultural crops. Currently not much is known about the selectivity of bee flower preferences, which would provide novel insights for agricultural beekeeping practices as well as potential biological understanding

of these important and fascinating insects and their symbiotic interactions with plants. In our proteomic analysis of honey, 4 plant proteins were tentatively identified when protein extraction methods were employed that increased the LC/MS signal-to-noise ratio for peptides from the individual proteins within honey. These plant proteins were all from the mustard family, species *Arabidopsis thaliana*, or mouse-ear cress. *A. thaliana* is notable because it contains one of the smallest diploid genomes of all flowering plants, at about 135 megabasepairs in length; and as a result, *A. thaliana* was the first flowering plant to have its genome sequenced. It is possible that proteins from other homologous plants might be reported as *A. thaliana* proteins during a proteomic database analysis because of the prominence of *A. thaliana* in the databases. Alternatively, the proteins might indeed be from *A. thaliana* itself, considering that this weed grows wild over many parts of the world. Continued research into honey's plant proteome constitutes a new frontier of meaningful investigation that has both agricultural and biological significance.

BUSINESS ORAL PRESENTATIONS

Presenter: Brigham Brau

Title: Investigating Supply Chain Literacy among College Students

Authors: Brigham Brau, Jim Brau

Affiliated: Brigham Young University

Abstract: We extend the work of Brau, Holmes, and Israelsen (2017), which tests financial literacy, to the topic of supply chain management literacy. This paper examines the efficacy of learning sources associated with supply chain literacy in young adults. We survey nearly 1,300 college undergraduate students. The survey consists of a supply chain literacy quiz to determine the state of the participants' existing supply chain knowledge. Additionally, we gather socio-demographic data in three areas: 1) family and background, 2) formal learning activities, and 3) experiential learning activities. Our model examines supply chain literacy as a function of these three sources of learning.

Supply Chain Management (SCM) literacy, the realization of SCM learning, is a poorly understood phenomenon. Unlike financial literacy which has a fairly established literature, SCM literacy has not been covered in the academic literature as far as we have been able to find. In this paper we follow Brau, Holmes, and Israelsen (2017) who study financial literacy by using a similar instrument to collect independent variable data and a new SCM literacy quiz. The goal of this article is to directly address the issue of how young adults acquire SCM literacy.

Presenter: Abdus Samad

Title: How Early Profitability Index Can Predict Bank Failure: Evidence from US Bank Failure during 2008-2010

Author: Abdus Samad

Affiliated: Utah Valley University

Abstract: The study of the early bank failure prediction is important for several reasons. Bank regulatory authorities are very interested in developing early warning systems (EWSs) in order to help predict impending bank failures. By doing so, regulatory authorities may prevent a bank from its failure or reduce the costs of failures. Preventing a bank from its failure, it can save billions of tax payers' dollars.

Public confidence on banking system is shaken or deteriorated when there are large bank failures. Preventing bank failure through early warnings/predictions, it does not only save billions of tax payers' dollars, but it also helps restoring public confidence on the banking system. Thus, preventing failure, the early bank failure prediction/warning can provide stability in the functioning of financial institutions.

There are several indices that bank management should look seriously before it is too late. The return on assets (ROA) is one of them. Bank management should regularly scrutinize the movement of the ROA before it is too late.

This paper firstly examined bank profitability index, return on asset (ROA) in particular, and then profitability index of eight quarters, quarter 1 through quarter 8 was regressed in the Probit model on bank failure, Y_i , $Y_i=1$ is failure and $Y_i=0$ is non-failure, in determining the significant early quarter (s) in predicting the bank was declared failure. The quarterly mean ROA showed that mean the ROA successively decreased during the immediate quarters of the bank failure. The statistical significance of the 5th quarter ROA, estimated in Probit,

suggests that the bank failure can be warned or predicted as early as one-year and three month before the failure. The estimated model correctly predicts 98.74 percent of the U.S. banks that failed and 93.56 percent of the U.S. banks that survived.

Presenter: Chase Christian Jaspersen

Title: Diversification through Creating Brand Performance with Social Media, Deliverable

Authors: Chase Christian Jaspersen, Jill Jaspersen (J.D.)

Affiliated: Utah Valley University

Abstract: This study focuses on Social Media and the positive causation effect that comes from use of social media within business entities. I have had that opportunity to run a small marketing agency over the past several months. From this experience I have seen how social media has overarching positive effects on consumers, customers and business organizations. Thanks to social media businesses have been able to reach every corner of the globe, with the chance to advertise and produce content to everyone with an internet connection. From services such as Amazon, Etsy, eBay and more people from the most rural areas in the world are able to sell hand made goods to those who may not know otherwise of such offerings. Such social organizations exist and have for some time. The primary groups available are Twitter, Facebook, Instagram and WhatsApp. These platforms have put the power in the hands of the creator to help connect others from around the world.

Presenter: Marshall Ringwood

Title: An Analysis of the Determinants of the Choice of College Major Using Survey Data

Authors: Marshall Ringwood, Jim Brau

Affiliation: Brigham Young University

Abstract: The principle focus of this study is to identify statistically significant factors associated with university students choosing various business majors. Specifically, we consider the choice of management, accounting, finance, and information systems. We also consider the choice between STEM and non-STEM degrees not part of the business school. We make use of a 512 observation survey taken from students at a large private university, in which students report on dozens of demographic variables. We then use Logit regressions to test the impact of these demographic factors on the probability of a student choosing to major in one of the four previously mentioned business degrees, business degrees altogether, non-business STEM, and non-business non-STEM.

Our study extends the work of Al-Rfou (2013) who examines the impact of variables that proxy for personal background factors and future job factors, along with other demographic control variables and how they relate with the choice of business major. Al-Rfou shows that the strongest personal correlates of major choice are parents, siblings, and friends. For future job factors, she provides evidence that prestige, money, and job opportunity are the most significant factors.

We extend Al-Rfou's work by using US students (as opposed to students from Jordan), by including a more-carefully constructed demographic control panel, and by including non-business majors. Our results provide a rich description of the factors that US students consider when choosing their majors and allows us to compare US and Jordanian students.

Presenter: Chris L Wasden

Title: Predicting Commercial Success of Video Games Based upon Objective Biometric Measures

Authors: Chris L Wasden, Janette Vazquez, Julio Cesar Facelli

Affiliated: University of Utah

Abstract: Technological progress in hardware and software has powered the growth of the global video game market to over \$100 billion dollars, making it the largest segment of the entertainment industry. At the same time, innovations in wearables and biometrics have enabled an unprecedented level of measurement and data collection of object data on human emotions, behavior and thoughts. Increasingly, the entertainment industry has begun exploring how to use objective biometric data to measure the engagement of consumers with their media products to improve their design, performance, outcomes and engagement. Also, given the growing cost for developing digital entertainment, producers are interested in using these biometric measures to better predict the success of their products and improve their engagement. The purpose of this study is to use biometric data, in the form of heart rate, galvanic skin response, and facial expression, to objectively measure the engagement of video game players and to see if objectively gathered biometric measures of engagement can more accurately predict the commercial success of a video game than traditional paper surveys given at the time of game play. To test our hypothesis, we recruited 38 students to play 10 minutes of each of three different video games within the same genre that have published three different levels of known commercial success. We then compared a traditional and validated paper survey measure of video game engagement with biometric measures of engagement to the known commercial success of each game to measure correlations and regressions. Our findings indicate that biometric measures of engagement are significantly more accurate than paper surveys in measuring engagement and in predicting the relative commercial success of a video game. These findings could lead to improved game design and decreased commercial failures of new video games.

Presenter: H. L. Brau

Title: An Ethical Property Rights Argument for the Shareholder Wealth Maximization Theory of the Firm

Authors: Hanni L. Brau, Andrew Holmes

Affiliated: Brigham Young University

The conversation of shareholder wealth maximization vis-À-vis stakeholder utility maximization has a different ethical implication based on which school of thought is being used to analyze the dilemma. From a financial standpoint, shareholder wealth maximization is almost always the goal of the firm (Hawley, 1991). However, to many others, shareholder wealth maximization is unethical in that it seems to help only the shareholders.

While these points of view are widely accepted by their respective camps (Friedman, 1970; Jensen 2001, 2002), there is little work done evidencing the ethicality of shareholder wealth maximization outside of a business scope. In this paper, I will use philosophical ideology from property rights based logic to support the business side claim that shareholder wealth maximization is ethical (Hegel, 1967, Locke, 1976). First, I will offer a literature review, including work at the forefront of this controversy. I will then analyze work by prominent philosophers. I will use both historical and contemporary thinking to explain why shareholder wealth maximization should be the goal of the firm because it is ethical.

Presenter: Jhana Aristondo
Title: Tourism in Utah as an Economic Development Tool
Author: Jhana Aristondo
Affiliation: Utah Valley University

Abstract: Tourism in Utah is largely driven by seasonal recreation at its variety of natural-heritage resources through all its seasons. This study uses empirical evidence to test different variables to examine if there is a relationship between economic development and tourism in the state of Utah.

Based on recent reports published by the Office of Tourism in Utah, there is an average of 4 million visitors per year which supports an estimated of 18,000 jobs across the entire state. In recent years, tourists' expenditures set high records of \$8.17 billion in Utah, which has generated over \$1.15 billion in total state and local tax revenues. This study will use the non-Income Human Development Index to construct two indexes that will measure education and health to test economic development without economic growth, which is normally included in the Human Development Index (HDI). The methodology of this research uses VAR - a bivariate vector auto regression - to examine the relationship between tourism, which will be explained by taxable accommodation sales, leisure and hospitality sales, employment, real GDP and the non-Income Human Development Index between years 1990 and 2016 to determine if tourism is an economic development tool and applies the Granger Causality test to determine the causal nature of the relationship. We find evidence of tourism as an economic development tool, which does not only accounts for economic growth in revenues, but the improvement of lives among Utah residents- seen through the increase in output highly dependent on human development and improvement in social wellbeing. The results of this study can be used by the Utah State Government to assist on budget resources on specific areas of tourism.

Presenter: Chelsea Dye
Title: Accountants, Block Chain, and Bitcoin: Changing the Profession with Advancing Technology
Authors: Chelsea Dye, Ron Mano, Jennifer Harrison
Affiliated: Westminster College

Abstract: Emerging technologies have impacted most professions in the business world in significant ways. However, the structure of accounting has remained largely consistent since Luca Pacioli published his work codifying the double-entry accounting system in 1494. In the last decade, the concept of cryptocurrency and leader Bitcoin has brought with it Block Chain technology and the possibility of drastically changing the role of accountants. Block Chain is essentially a ledger that continually updates a record of economic transactions on a peer-to-peer network. The decentralized data storage makes Block Chain a very secure technology and is thus difficult to manipulate. With the very transparent, nearly immediate, and secure record of easily trackable data, the role of accountants is rapidly changing. A permanent record with linked transactions is changing the focus of accountants to more transaction based and the role of audit is drastically changing with a high possibility of a reduced need for audit services. Accounting and financial information is developing into a real-time functionality rather than historical data, which will drastically alter the financial and accounting landscape across the globe. This article looks at the development of Bitcoin, the details of the functionality of Block Chain technology, and examines the changes and opportunities for accountants with the emerging technologies.

Presenter: Ana Johnson

Title: A Financial Analysis of Just-in-Time Inventory Controls

Authors: Ana Johnson, Jim Brau

Affiliated: Brigham Young University

Abstract: Brau, Fawcett, and Morgan (2007) demonstrate that supply chain management (SCM) practices add value to small firms as manifested in asset utilization, revenue generation, and competitive performance. They rely on survey results from 570 US managers to draw these conclusions. I extend the work of Brau, et al. (2007) by examining a specific segment of SCM, namely, just-in-time (JIT) inventory controls in accordance with the work of Mitra, Sundaram, and PS (2012). The data sample comes from the Standard and Poor's Compustat database and provides a rich laboratory with thousands of firms and audited financial data.

I begin the methods by providing summary statistics that go into great detail on the various segments of inventory control, such as raw goods, material in progress, and finished goods. I then estimate regressions by four-digit SIC code to create industry-product-specific benchmarks for inventory levels and then compute the difference between the actual inventory held by small firms and the regression-based benchmark. I use the variance on inventory as an independent variable and test to see how it correlates with the same three dependent variables of Brau et al. (2007) as well as stock returns over various horizons.

This study will contribute to the lean manufacturing academic literature (e.g., Nasab, Bioki, and Zare (2012)). Lean manufacturing is multi-dimensional and generally consists of management activities, just-in-time inventory management, supplier management, work teams, and quality systems. By focusing on just one of these segments of lean manufacturing, I should be able to speak directly to the impact of realized JIT on a portfolio of performance measures.

Presenter: Brigham Brau

Title: Perceptions of Corporate Social Responsibility among Millennials

Authors: Brigham Brau, Jim Brau

Affiliated: Brigham Young University

Abstract: Corporate Social Responsibility (CSR) literacy and perspective, the realization of CSR learning, is a poorly understood phenomenon. Unlike financial literacy which has a fairly established literature CSR literacy has not been covered in the academic literacy as far as we have been able to find. In this paper we extend Brau, Holmes, and Israelsen (2017) who study financial literacy by using a similar instrument to collect independent variable data and a new CSR questionnaire. Little is known about how individuals actually acquire CSR literacy and perspectives as the topic has not been studied yet. The goal of this article is to directly address the issue of how young adults acquire CSR literacy and perspective.

Friedman (1970) argues that CSR may be seen as a tax on employees and argues this tax is unethical because employees typically do not get to vote on whether they want to lower their income to support CSR. The school of Berle (1931), Manne (1959), and Friedman (1970) strongly feel that shareholder wealth maximization is the appropriate social norm for the goal of the firm, not CSR. However, the school of thought of Dodd (1932) and more modern-day CSR advocates support a stakeholder social norm.

DeLoughy, Jin, and Drozdenko (2011) survey professionals about organizational ethics. One of their sections deals with what professionals know and feel about CSR. Our survey will survey millennials who are students instead of professionals to see the similarities and differences between the two samples.

Presenter: Jonathan Westover

Title: Examining Autism in the Workplace: A Focus on Vocational Organizations

Authors: Kathryn Hughes, Jonathan Westover

Affiliated: Utah Valley University

Abstract: The UVU Autism in the Workplace project is an ongoing project which aims to find what, if any, programs and training are being used by companies in tandem with vocational organizations to better employ individuals with autism spectrum disorder (ASD). Utah has the third highest incidence of Autism Spectrum Disorder (ASD) in the country (1 in 58), with Utah County having the highest rate in Utah (1 in 40). There is said to be a tsunami of adults leaving the educational system heading into higher education and the workforce. Businesses specifically, in our community need to critically analyze how they are currently addressing ASD in the workplace and how they will include this unique population in the future. Individuals with ASD have many talents and skills they can bring to the workforce (i.e., attention to detail, specialized focus in technology, programming, etc.), but thus far this group of individuals is grossly underemployed or unemployed. We examined the characteristics of successful ASD employment programs from companies around the United States. We found that a key characteristic every program shared was that the business had partnered with a local vocational-employment organization to assist in the creation of the program; as they have experience working with and knowing the needs of individuals with disabilities in the workplace. We then assessed the vocational resources available to Utah companies, and compared those groups to the two more well-known vocational groups (PROVAIL, Ken's Krew) partnered with Microsoft and The Home Depot.

Presenter: Kailey Sherman

Title: Examining Employing Onboarding Best Practices in a Higher Education Environment

Authors: Kailey Sherman, Ryan Stephenson, Jonathan Westover

Affiliated: Utah Valley University

Abstract: Specific onboarding practices vary across organizations dependent on industry type; however, similar methods and patterns of onboarding are shared. While vast amounts of information exist regarding how organizations carry out their own onboarding processes, little research has been conducted to evaluate the effectiveness of them. Organizations would be wise to invest their resources and time in creating and executing proven effective onboarding practices for new hires on their team in order to improve employee effectiveness and firm profitability, as well as increase job satisfaction for their employees. This paper will focus on the higher education industry, which has scarcely been assessed by scholars. In efforts to do so, four focus groups will be conducted composed of recently hired faculty members and their supervisors at a local regional teaching university. The current program is to be evaluated and modified based on previous research and focus group data. Recommendations will be provided to the university to better understanding what makes their onboarding program successful or poor, and in effect provide applicable information for the entire higher education industry.

Presenter: Amy Cyr

Title: An Analysis of the Number of IPOs and Publicly Traded Firms: Are We in a Crisis?

Authors: Amy Cyr, Jim Brau, Noah Brown

Affiliated: Brigham Young University

Abstract: In December of 1996, the United States had 8,025 publicly listed firms, which is the greatest number of US public firms in history (Ibrahim, 2016). Now, there are less than 4,000 publicly traded firms, less than the US capital markets had in 1976 (Rasmussen, 2017). In a recent Securities and Exchange Commission meeting, the topic was capital formation and small business, and it was argued that having 8,000 firms was better than having the 4,000 firms we have today. One of the coauthors was a panelist at this SEC meeting and he argued that fewer firms is not necessarily a bad thing.

In this paper we test this hypothesis by examining the performance of the 4,000 firms that are no longer publicly traded versus those that are. If the portfolio of firms that no longer trades were poor investments, then in theory it is better that they delist. We use CRSP and Compustat to compute financial returns, volatility measures, and financial data metrics to examine the delisting versus remaining firms.

In addition, we examine the number of IPOs today, versus the peak of the late 1990s (Ewens and Farre-Mensa). Many media outlets claim the US is currently in an "IPO Crises" (Doidge, Karolyi, and Stulz). We make similar arguments that we use for the number of publicly traded firms to support the hypothesis that fewer IPOs may actually be better for both investors and the economy. We use SDC New Issues data to test this hypothesis.

Presenter: Shandon D. Gubler

Title: Teach Me!

Author: Shandon D. Gubler

Affiliated: Dixie State University

Abstract: This workshop presentation addresses how a millennial pedagogy is being used to effectively motivate our college/university students to master content by teaching it, and while teaching it to real-world practitioners, develop skills and abilities they will carry with them after taking courses and beyond graduation? This "Teach Me" presentation will specifically address a pedagogical practice that enables teachers to effectively create a sense of belonging, encourage risk-taking, and inspire creativity in their classrooms, and on-line.

An emerging mindset for employers in hiring millennial students is: "Teach Me" so I can observe your technical and soft skills, enabling me to make an informed decision whether to "Hire You." An emerging mindset for students in evaluating millennial employers is: Let me "Teach You" so I can show you my technical and soft skills, and experience your corporate culture, enabling me to make an informed decision whether I want your company to "Hire Me."

Presenter: Amy Cyr

Title: Taxation without Representation: Corporate Social Responsibility and Employee Compensation

Authors: Amy Cyr, Jim Brau, Brigham Young University, Bekki Brau, University of Arkansas

Affiliated: Brigham Young University

Abstract: Corporate Social Responsibility (CSR), defined by the UN Industrial Development Organization as initiatives by firms to integrate social and environmental concerns in their business operations and interactions with their stakeholders is a controversial topic in the management literature. Although CSR is widely discussed, unfortunately some of the potential externalities of CSR have not been studied. The goal of this project is to determine if one of these externalities, a potential decrease in employee compensation, results from increased CSR.

Although motivated through agency and contracting theories, our research is mostly empirical in nature. The data comes from two main databases. Employee wages and control variables are taken from Standard and Poor's Compustat database. Overall wage figures and numbers of employees are used to compute an average wage per employee at the firm and year level. We condition these numbers on industry, as different industries have different wage rates. The CSR data are taken from the Kinder, Lydenberg, and Domini's (KLD) database. The KLD data includes 159 CSR variables such as Product Safety, Climate Change, Energy Efficiency, Diversity, Corporate Governance Strength, and so forth. We follow Hillman and Keim (2001) and Baron, Harjoto, and Jo (2011) to construct a CSR composite index that serves as a proxy for the degree of each firm's CSR.

The results of the Ordinary Least Squares (OLS) regression show that CSR (csrcidx) does significantly impact the employee compensation above a 91 percent level of significance. In other words, firms that practice CSR more aggressively also have a lower average employee wage compared to firms that did not practice CSR in the same industry and of similar size.

EDUCATION ORAL PRESENTATIONS

Presenter: Suzy Cox

Title: Using Robotics to Promote Learning and Engagement in Computer Science

Authors: Suzy Cox, Chelsey Beck

Affiliation: School of Education, Utah Valley University

Abstract: Computer Science is essential in our digital world. Yet the vast majority of students either choose not to study it or do not continue in the field. In many cases, this is because students do not "see themselves" as computer scientists or neglect to see how computer science can help them achieve their goals or make a difference in the world. This is particularly true for upper-elementary through high school students. Many current coding programs are too simple and detached from real-world contexts, resulting in students who see coding as a fun but useless game. Meanwhile, high school computer science courses often use complex syntax to "solve" problems from the business world (though they often reproduce existing solutions). In this session, we will explore how robotics and service-learning can be used to more effectively help students learn computer science concepts and find a place and a purpose in the field. These robotics applications invite students to explore computer science concepts in concrete ways as well as express their knowledge, identities, and concerns across content areas, bringing more cultural relevance to computer science and the assessment of other subjects. Using Birdbrain Technologies Hummingbird platform as an example, we will explore how robotics can be employed to engage students in service, storytelling, exploration of social and environmental issues, and personal expression.

Presenter: Dr. Prent Klag

Title: Eureka Moments: Innovative Strategies to Enhance Student Thinking, Insight, and Ideas

Author: Prent Klag

Affiliation: Beverley Taylor Sorenson College of Education and Human Development, Southern Utah University

Abstract: This presentation will explore how promoting and providing eureka moments for students, at all educational levels, can enhance thinking processes, generate new understandings in learning, and encourage idea development. Examples will be provided of famous “Eureka Moments” in history and the steps and processes that led up to moments of insight. Research findings on generating eureka moments, as well as, the components that make up memorable learning, will also be shared. Through a hands-on, interactive approach, participants will engage in seven strategies that can enhance the development of eureka moments. All participants will receive a packet of information.

Presenter: Ann C. Sharp, Douglas S. Gardner, Lorilynn Brandt, and Kristin Wright

Title: Reading Motivational Principles Fostering the Value of Reading in Young Readers

Authors: Ann C. Sharp, Douglas S. Gardner, Lorilynn Brandt, and Kristin Wright

Affiliation: School of Education, Utah Valley University

Abstract: The UVU’s School of Education Faculty have met with elementary teachers in UVU’s service area who express feelings of burn-out in teaching literacy. Moreover, many students themselves lose interest in reading over time (Wigfield & Guthrie, 2000) and teachers are unsure of how to address motivational issues (or unaware that they need to be addressed). An administrator from a local school district stated the problem this way: We need professional development that addresses teaching reading motivation to students, who may not struggle with technical aspects of reading, but do not choose to read and do not appear to be engaged readers.

To address the dual issue of motivating teachers in teaching reading and motivating students to read, faculty from the UVU School of Education and UVU University College designed and implemented the Read-A-Difference program in two elementary schools in their local school districts. Designed to address articulated needs from our local districts, professional development assists elementary school teachers in connecting essential literacy skills with a love for reading without distracting fidelity to their required literacy interventions.

Using methods based on scientific research, from Guthrie and Wigfield, 2000; Marinak and Gambrell, 2008; Turner and Paris, 1995; and Fox, 2014, Read-a-Difference professional development provides training in choice, challenge, control, authenticity, collaboration, technology, and proximate rewards. Our research produced qualitative data showing all teacher participants being influenced by a heightened positive awareness of motivational principles and practices, along with an “awe struck” realization of the power of motivational strategies being used. Struggling readers gained a new sense of accomplishment, students engaged in voluntary reading activities in and out of the classroom, and students and teachers engaged in goal setting that inspired increased reading and a sense of greater accomplishment. Our presentation will share some of the highlights of our qualitative findings.

Presenter: Evan Sharp

Title: A Historical Approach to Learner-centered Teaching

Author: Evan Sharp

Affiliation: McKay School of Education, Brigham Young University

Abstract: This paper intends to deepen the current research on Learner-centered Teaching (LCT), a pedagogy seeking to shift the focus of educators from their own teaching to the learning of the students. The research regarding LCT, however, focuses mainly on modern contexts. No one has looked to the past for examples of LCT in the methods of ancient educators. This paper begins the research on historical examples of LCT and opens a discussion on the comparisons that can be made between historical teaching methods and the methods included in LCT.

One learning theory that plays a significant role in LCT is Constructivism. This paper illustrates the presence of constructivist learning in historical education settings through a case study analyzing some of the teaching methods of Jesus Christ. Regardless of one's belief in his historical authenticity, Jesus is an excellent example because his teachings are well-known and widely available. This paper analyzes interactions that Jesus had with others in the New Testament Gospels and makes connections between Jesus's teaching methods and those related to constructivism in LCT.

The purpose of these connections is not to suggest that Jesus taught exactly as is outlined in LCT; rather, it is to show the usefulness of studying historical examples of LCT and to encourage such research. Although Jesus does not fit the modern definition of a learner-centered teacher, certain aspects of Jesus's teaching closely resemble the methods of LCT. The goal is to expand its area of research, which will undoubtedly lead to better implementation. It will also strengthen the argument for its use in modern education. Other historical teachers should be researched in this way, and connections with learning theories other than just Constructivism should be explored. This paper intends to point out this gap in current literature and call for additional research.

Presenter: Jonathan Westover

Title: Examining Autism in the Workplace: What are the Public Schools Doing to Prepare Future Autistic Workers?

Authors: Kathryn Hughes, Jonathan Westover

Affiliation: Woodbury School of Business, Utah Valley University

Abstract: The UVU Autism in the Workplace project is an ongoing project which aims to find what, if any, programs and training are being used by companies in tandem with vocational organizations to better employ individuals with autism spectrum disorder (ASD). Utah has the third highest incidence of Autism Spectrum Disorder (ASD) in the country (1 in 58), with Utah County having the highest rate in Utah (1 in 40). There is said to be a "tsunami" of adults leaving the educational system heading into higher education and the workforce. Businesses in our community need to critically analyze how they are currently addressing ASD in the workplace and how they will include this unique population in the future. Individuals with ASD have many talents and skills they can bring to the workforce (i.e., attention to detail, specialized focus in technology, programming, etc.), but thus far this group of individuals is grossly underemployed or unemployed. We examine the weight this issue places on businesses native to Utah, rather than Utah public school systems on the basis of: available funding, ASD programs already in place, and legal obligations. This project is an initial step in determining how to better support employers and employees who are looking to tap into the talents associated with ASD.

ENGINEERING ORAL PRESENTATIONS

Presenter: Gene Ware

Title: Airglow Measurements from SABER/TIMED Satellite

Authors: Gene Ware, Brian Simons and Doran Baker

Affiliation: Utah State University

Abstract: Emission data as provided by LaRC, GATS, Inc., and Hampton University from the SABER instrument on the SABER Satellite will be validated and analyzed. Students will participate for career training experiences. Professional reports, presentations and papers will be generated. Validations and analysis will be made of the hydroxyl and molecular oxygen radiations using global and temporal correlations among each species and with observations of atmospheric buoyancy (internal gravity) waves (IDW). Particular attention will be paid to the dynamics of altitude profiles of volume emission rates in the mesosphere. Participation and reporting will be accomplished at the annual SABER Science Team meetings.

Recent attention in the validation and analysis has addressed the appearance of multi-peak and bifurcation features in the profiles of limb emissions, and the derived volume emission rates (VER). These profiles have been analyzed meticulously for the two SABER channels dedicated to infrared hydroxyl airglow emissions. Correlations have been made with the one SABER channel which measures infrared atmospheric molecular oxygen airglow. The purpose is to establish the cause or causes of observed anomalies in the observed altitude airglow profiles from SABER/TIMED.

Presenter: Jacob Carter

Title: An Experiment to Evaluate the Deflection of a Beam

Authors: Jacob Carter, Ali S Siahpush

Affiliation: Southern Utah University

Abstract: In engineering applications, when different components such as beams, columns or foundations have been used, they are typically designed within certain limits. Limits are placed on the amount of elastic beam deflection when it is subjected to a load. The design of such beams can be complex but is to ensure the beam can safely carry the required load. In our previous paper, a device was designed and constructed to evaluate the elastic deflection of a beam. The paper discussed the fundamentals of beam deflection and a simple, cost effective method (integration method) to evaluate the amount of deflection and the slope at the free end of a beam. The purpose of this paper is to examine, both analytically and experimentally, the fundamentals associated with four beams made from the following materials: copper, steel, bronze, and aluminum. The analytical results from this experiment were compared to SolidWorks simulation data. SolidWorks uses the Finite Element Analysis method to determine the deflection along a beam. All characteristics of the experiment were considered in the simulation, such as gravity, length, width, thickness, and material properties. Upon successful completion of this exercise, participants understood the concept of elastic beam deflection and evaluated the deflection of a beam under different vertical loads. This exercise demonstrated the experimental values and published values match within 95%.

Presenter: Jacob Carter and Justin Christensen

Title: Thermal Conductivity of Solids

Authors: Jacob Carter and Justin Christensen, Ali S Siahpush

Affiliation: Southern Utah University

Abstract: This paper discusses the fundamentals of conduction heat transfer and gives greater insight into an experiment to measure the thermal conductivity of solids. Conduction heat transfer occurs when energy transfers from highly energized particles to less energetic particles through a solid material. A simple, inexpensive system can experimentally evaluate the thermal conduction of a solid body. The French mathematician Jean-Baptiste Joseph Fourier derived an equation for steady state, one-dimensional heat transfer through a plane wall, which became known as Fourier Law of Heat Conduction. This experiment uses Fourier conduction equation to determine the thermal conductivity of a material, which is the ability of a material to conduct heat. In engineering applications, it is essential to know how a material will handle heating and cooling. An expanded knowledge of thermal conductivity will make the heating and cooling of things like homes and electronics more efficient.

Presenter: Casey Cooper

Title: The Diathermometer and the Thermal Conductivity of Air

Authors: Casey Cooper, Christian Hamilton, Ali Siahpush

Affiliation: Southern Utah University

Abstract: Thermal conductivity is a measurement of the ability of a material to conduct heat. The thermal conductivity can easily be measured for solid materials. However, it is much more difficult to measure the thermal conductivity of gases. This is due to convection heat transfer in gases making up the majority of how heat is transferred. In 1860, the thermal conductivity of air was thought to be too difficult to measure and nearly impossible to calculate. In the mid-1800's Josef Stefan set out to build a device capable of measuring the thermal conductivity of ideal gases (including air). Around this era, there have been attempts to measure the thermal properties of gases with minimal success. The problem was finding a way to change the temperature of ideal gases without causing natural convection currents. This issue was solved when Josef Stefan developed the Diathermometer. The goal of this experiment is to build a diathermometer, measure, and predict the thermal conductivity of air.

Presenter: Daniel Ulrich, Harley Glad, Ben Thrift

Title: Heat Transfer of a Phase Change Material Thermal Energy System

Authors: Daniel Ulrich, Harley Glad, Ben Thrift, Ali Siahpush

Affiliation: Southern Utah University

Abstract: Interest is growing in the utilization of passive thermal energy stored or released during the phase change of a substance. A variety of applications exist for the use of latent heat energy such as building HVAC systems, electronics cooling, and passive heating and cooling of instruments in satellites. More than 40 years of work has been conducted in this field; however, there are still many possibilities for undergraduate engineering research to lead to new advancements. The objective of this project is to design and construct a test system to be used for experimentation and research in the thermal behavior of phase change materials. The system will consist of a vertical test cylinder which will be heated and cooled inwardly by using copper tubing wrapped in a counterflow arrangement around the outside of the test vessel. The copper tubing will be connected to a constant temperature bath that can provide fluid to heat or cool the copper tank in the range of -20 °C to 100 °C. Progress of the phase change will be monitored using more than a 100 thermocouples. Once the test system is complete, water will be utilized as the phase change material and validate the test system. Future work will consist of testing 99% pure eicosane (C₂₀H₄₂), and investigating the use of porous copper foam in conjunction with eicosane to improve heat transfer performance and measuring the thermal conductivity of the substance. Future users of the test system will be able to gain a better understanding of how this phase change energy is stored and released in different materials.

Presenter: Logan Evans and David Armijo

Title: MEASURING SOLAR FLUX AND ABSORPTIVITY

Authors: Logan Evans and David Armijo, Ali Siahpush, Ph.D.

Affiliation: Southern Utah University

The goal of this research was to determine the Solar Irradiance in Cedar City, UT and the absorptivity of an aluminum plate. This task was performed by first measuring the change in temperature with respect to time for an 8"x10"x1/8" aluminum plate. Matlab and Microsoft Excel software was utilized to analyze the data collected and determine the solar irradiance and absorptivity of aluminum 6061-T6. Solar irradiance measurements were compared to the solar irradiance measured by the Utah Red Hills Renewable Park solar plant in Parowan, UT at the same time and date. The absorptivity of the aluminum plate, determined from the measurements taken, was compared to published values. The solar irradiance measured was determined to have a discrepancy of 16.9% and absorptivity of an unpolished aluminum face was determined to have an approximate error of 5.1%. Uncertainty and error analysis were performed and using these results, it has been determined that the methods used to measure solar irradiance and absorptivity, while fairly simple and accurate, can be improved to reduce the discrepancies with published data.

EXERCISE SCIENCE & OUTDOOR EDUCATION

Presenter: M. Vinson Miner, Ph. D., T. Cole Parkinson, BS.

Title: Unique rituals, Pre-Performance routines and Superstitious Behavior used by Elite Senior Athletes

Authors: M. Vinson Miner, Ph. D., T. Cole Parkinson, BS

Affiliation: Department of Exercise Science, Utah Valley University

Abstract: Qualitative research methods were employed to analyze and gain insight into how elite senior athletes experience or engage in, unique rituals, pre-performance routines and superstitious behavior. The investigation and information calculated will assist in providing better understanding of how these personal elements are exhibited by elite senior athletes, participating in a range of athletic events. A nine point survey/questionnaire was designed and personally administered to illuminate the variety of unique characteristics and commonalities associated with this fascinating behavior. A mixture of questioning techniques were employed including a likert scale, yes/no responses and open ended questions. In conclusion, a majority of the responses indicated that both before and during athletic competition such rituals, routines and superstitious behaviors were practiced.

Presenter: L. Nathan Thomas MS, Joli Johansen MS

Title: Does Individual Exercise Intervention Lead to Long Term Behavior and Quality of Life Change?

Authors: L. Nathan Thomas, MS. Joli Johansen, MS.

Affiliation: Department of Health & Lifetime Activities, Salt Lake Community College

Abstract: The Salt Lake Community College received permission to run a Pilot exercise and lifestyle intervention program for faculty and staff. The Pilot lasted 14 week and entailed individualized exercise programming and at least one visit per week for 14 weeks. The pilot included 79 participants, 60 female and 19 male, average age of 48. I will review the results pre/post treatment and provide data after 2 years for behavior and current patterns of exercise.

Presenter: Chase Junge

Title: Sex Difference in Concussions. Female Athletes May Show Increased Symptoms

Author: Chase Junge

Affiliation: Department of Exercise Science, Brigham Young University

Abstract: In accordance with the literature examined, it is believed that adolescent and young adult female athletes suffer from more severe outcomes after suffering a sports-related concussion. Women in several studies were found to suffer a greater severity of symptoms, especially at the initial clinical visit. In addition to more severe symptoms, females reported suffering from a higher number of symptoms, including unique symptoms to the female sex such as an irregular menstrual cycle. Evidence was found by several groups suggesting that females have a significantly longer time to full concussion recovery than do males. The increased recovery time and symptoms may also be connected to a more significant decline in neurocognitive function seen in female athletes, as compared to males, after suffering a concussion. Several of the focuses of the study gave unified results though more testing is needed before firm conclusions are drawn. Additional research is recommended in the area of understanding the underlying physiological basis for sex differences in sports-related concussions.

Presenter: Yan Huang, PhD

Title: Gender Differences in the Role of Acculturation, Self-Regulation, and Self-Esteem in Alcohol Consumption among Asian American Adults

Author: Yan Huang, PhD

Affiliation: Department Health Promotion and Human Performance, Weber State University

Abstract: This study uses multigroup structural equation modeling procedures to examine gender differences in the role of acculturation, self-regulation, and self-esteem in alcohol consumption among Asian American adults.

Methods: Data were collected using online survey. A total of 3,493 surveyed Asian Americans aged 21 years or older were invited to participate. 891 Asian American adults who had consumed at least one alcoholic drink in the past 30 days participated in the survey (response rate: 25.5%). Multigroup structural equation procedures were used to examine the role of acculturation, self-regulation, and self-esteem in alcohol

consumption.

Results: For men, self-regulation positively predicted alcohol consumption ($\hat{I}^2 = .49, p < .001$), but for women, self-regulation did not significantly predict alcohol consumption ($\hat{I}^2 = .02, p = .835$). In the male sample, acculturation negatively predicted alcohol consumption ($\hat{I}^2 = .54, p < .001$), but in the female sample, acculturation positively predicted alcohol consumption ($\hat{I}^2 = .31, p < .001$). Self-esteem positively predicted alcohol consumption in men ($\hat{I}^2 = .67, p < .001$), but it negatively predicted alcohol consumption in women ($\hat{I}^2 = .13, p < .001$).

Conclusion: Relationships between self-regulation, self-esteem, acculturation, and alcohol consumption in Asian Americans differ by gender. The current analysis would be enhanced by a longitudinal design able to strengthen causal explanations. Future research should also take into account immigrants generation.

Keywords: alcohol consumption; Asian Americans; self-esteem; self-regulation; acculturation.

HUMANITIES ORAL PRESENTATIONS

Presenter: Kevin Holdsworth

Title: Two Wrongs Don't Make a Right: Monumental Foolishness in Southern Utah

Authors: Kevin Holdsworth & Jennifer Sorensen

Affiliation: Snow College; Jennifer Sorensen – Southern Utah University

Abstract: Professors Holdsworth and Sorensen will examine and analyze the rhetoric, justification, and process for the establishment of Grand Staircase Escalante National Monument by President Clinton and Bears Ears National Monument by President Obama, as well as the subsequent reduction and dismemberment of the monuments by President Trump. Specifically, the nature and quality of claims will be evaluated for rhetorical and factual basis. The debate over the future of the monuments invites scrutiny since issues related to the nature and purpose of governmental power, the best uses of public land, and what comprises good faith and due diligence in federal agencies are central to the examination of this topic. Also relevant is the participation of Native-Americans in the Bears Ears establishment process. Educators and activists, Holdsworth and Sorensen have been involved in public lands issues in the West for over thirty years.

Presenter: Greg Briscoe

Title: The Impact of the Policies of the U.S. Presidents George W. Bush, Barack Obama and Donald Trump on the Cuban

Author: Greg Briscoe

Affiliation: Utah Valley University

Abstract: With the stroke of a pen, President Donald Trump's rollback of policy changes in U.S. relations with Cuba, forced the citizens of Cuba to face a new reality dramatically different from the thaw that had been initiated by President Trump's predecessor, Barack Obama, and Raul Castro, the Cuban president. The reversal of course instituted by President Trump underscores the pivotal role American presidents can have on the daily reality of the 11 million residents of Cuba. President Trump's action changes the direction of U.S./Cuban relations from one of rapprochement to one where the Straits of Florida seem to constitute a newly restored iron curtain. This study examines the role of the U.S. president in U.S./Cuban relations by comparing the actions of the current occupant of the U.S. White House with those of his two immediate predecessors, Barack Obama and George W. Bush. The modus operandi of all three will be discussed vis-à-vis the interests of the Cuban state, the effect on the Cuban populace, and popular opinion on U.S./Cuba relations in the United States.

Presenter: Tingting Gu

Title: Translation of Culture-Loaded Tourist Attractions from an Intercultural Communication Perspective

Author: Tingting Gu

Affiliation: Southern Utah University

Abstract: Translating one language into another one is a process of intercultural communication. A good translation can not only reduce misunderstanding of a foreign culture, but can also help people appreciate the uniqueness of that culture. In China, names of tourist attractions are usually translated into English in order to tell foreign tourists the unique Chinese culture embedded in those names. However, the data I have collected through structured questionnaire in China show that even translations given by professional Chinese translators are not accepted well by foreign tourists. That means the intercultural communication is not achieved through those "professional" translations. If we want to improve Chinese - English translations of tourist attractions,

we can refer to intercultural communication theory, which can help us better understand the miscommunications in translation and come up with solutions to provide better translation. This project explores how intercultural communication theory can guide translators in producing better translations, and improve communication among different cultures.

Presenter: Aymee DeLaPaz
Title: The Art of Letter Writing: A Reappraisal
Author: Aymee DeLaPaz
Affiliation: Dixie State University

Abstract: For over two millennia, the art of letter writing has been the primary link between cultures and nations worldwide. Formerly regarded as the fundamental source for education, this art has inspired the lives of numerous influential figures throughout history. Icons such as Aristotle, Leonardo da Vinci, William Shakespeare, Flannery O'Connor, Mahatma Gandhi, and Martin Luther King have altered the course of humanity drastically through their letters. Records show that this form of communication has not only been a means of conversing but also the basis for a revolution promoting self-expression, individual reasoning, amity, and equality. In recent times, the epistolary mode faces obsolescence as a result of technological advances and societal transition. As the years have progressed, the basic knowledge associated with letter writing has diminished. Penmanship, grammar, and the ability to convey one's thoughts and ideas in written prose have likewise declined, with children, in particular, experiencing the most serious effects. And now society faces the possibility that our current generation will be the first to leave a record of itself that is electronic or digital rather than paperbound. For the sake of preserving verbal artifacts of our current and future generations, and preserving a cultural art that has encouraged self-expression, reflection, and rhetorical thinking throughout time, the art of letter writing must be revived. In this presentation, using examples and arguments drawn from activists, scholars, and teachers, I address with great specificity reasons why the letter still matters and what we can do to preserve and foster this essential literary form.

Presenter: Seth McCombie
Title: The Critical Vocabulary for Narration in Colloquial Arabic: A Corpus Study
Author: Seth McCombie
Affiliation: Brigham Young University

Abstract: For L2 students, the ability to narrate a story and understand an interlocutor's stories is critical to Advanced-level speech on the ACTFL scale and to making meaningful connections with native speakers. This paper investigates the relationship between an L2 student's Arabic vocabulary size and the percent of known words in Jordanian colloquial narratives. I attempt to answer two questions. First, using a small corpus (200,000 words) of personal stories told in colloquial, Jordanian Arabic, I investigate what percent of these stories a student should be able to read after studying parts one and two of the popular Arabic textbook series, Al-Kitaab, assuming mastery of the textbooks' vocabulary lists. Second, I use computational methods to generate a frequency list and discover which words and N-grams are most critical for third-year students to increase their comprehension of personal narratives. The texts in this corpus come from two sources. I first collected text from the Facebook page, "Naas Amman", a Jordanian version of "Humans of New York", which posts transcripts of personal interviews conducted on the streets of Amman, Jordan. I also included the transcripts of personal stories told at BYU by 3 native Arabic speakers.

LANGUAGE AND LITERATURE ORAL PRESENTATIONS

Presenter: Randy Jasmine
Title: From Rebellion to Commodification: Jazz as a Colonizing Force in Jean Rhys's "Let Them Call it Jazz" and Philip Larkin's "For Sidney Bechet"
Author: Randy Jasmine
Affiliation: Dixie State University

Abstract: In Jean Rhys's short story, "Let Them Call it Jazz," the main character, Selina, experiences various forms of robbery while living in London. Perhaps the most egregious of these crimes against her is the appropriation of a song she sings that she first heard while in prison. This song is stolen from Selina when someone hears her sing it at a party. The tune is "jazzed up" and eventually becomes a mainstream hit. The poet Philip Larkin was a well-known aficionado of jazz, and this passion spilled out in his literary career.

Larkin and his colleagues at Oxford in the 1940s, saw jazz as a way to rebel against the stuffy establishment of dons and scholars at that venerable institution. In the poem named after one of his favorite jazz artists, “For Sidney Bechet,” published in 1954, Larkin admiringly proclaims, “On me your voice falls and they say love should, / . . . My Crescent City / Is where your speech alone is understood” (13-15). Larkin’s reverie is clear and his admiration touches on the euphoric as he ascribes to jazz a power that goes even beyond his own power as a poet. There is another way, however, to read Larkin’s words in this poem: Larkin sets himself up as the ultimate arbiter of both value and meaning in relation to Bechet’s music. His proclamations represent the same type of intercession and white male hegemonic appropriation that Rhys so strenuously objects to in her story.

In the last decades of his life, Larkin wrote far more jazz criticism than he did poetry, and he began to use jazz to reinforce established class and racial distinctions rather than as a weapon to defy such inequities. Much like the unnamed man in Rhys’s story who appropriates Selina’s song and attempts to silence her West Indian voice, Larkin in his later life, as a recognized authority on jazz, pronounced sentence on a wide variety of jazz artists, many of whom were positioned on the margins of society. Selina ultimately rejects the annexation of her song and at the very end of the story, choosing to maintain her independence, she declares: “So let them call it jazz, I think, and let them play it wrong. That won’t make no difference to the song I heard.” Music for her remains the means of defiance that it never really was for Larkin.

Presenter: Sean Jenkins

Title: The Territory We Have Left Behind: J. M. Coetzee’s *Elizabeth Costello* and Neo-Materialism

Author: Sean Jenkins

Affiliation: Weber State University

Abstract: J. M. Coetzee’s postmodern novel *Elizabeth Costello* should be read against the grain of its polemic in order to appreciate it as a complete work of literary art. Its persuasive powers, insofar as they exist, are realized as such in their stylistic execution. The novel can be “unstitched,” its controversy cut apart from its artistry, but I argue against such a fragmented reading or interpretation or analysis of the novel. The power of the novel’s polemic *is*, in large part, a function of its craftsmanship, and unstitching it, as Neo-Materialists are wont to do, destroys its wholeness, artistry, and integrity.

Presenter: Rob Carney

Title: Weird Is Good: Poetry, Evolution, and Architecture

Author: Rob Carney

Affiliation: Utah Valley University

Abstract: Because I’m a poet, I’ve been asked at times to explain what makes poetry distinct from prose, or to give an answer to the question, “What is the purpose of poetry?” I do have answers. And I will reveal them to those who ask for them. But I’m more interested in exploring questions than providing answers. For example: how is a moose like Frank O’Hara; and why is Faulkner like stalagmites; and have you ever thought poems are like coffee shops, or gone to work as a snow-globe designer; and what does lynx music sound like? My point is that the questions we ask about poetry need to evolve to accommodate any given poem as a strange and living construction of language.

Presenter: Megan Naihe

Title: Queequeg: Cannibal and Savior of the Pequod World

Author: Megan Naihe

Affiliation: Weber State University

Abstract: In Herman Melville’s *Moby Dick*, Queequeg combines the characteristics often associated with so-called “savage” cultures with the redemptive qualities associated with Christ. He is a South Seas cannibal from a fictional island, and yet he is also the savior of the *Pequod* world, as his own symbol of death, his coffin, literally saves Ishmael. Through my presentation, I argue that Queequeg’s character exposes hypocrisies of religion and colonization. He *is* a cannibal; however, 19th century America and other “civilized” countries behaved like cannibals: consuming primitive places and people by destroying and devouring their resources and cultures. Thus, his character offers readers an alternative, superior solution to colonization and capitalism. Rather than conquering and converting people, Queequeg teaches others—especially Ishmael—redemptive attributes of understanding, acceptance, and respect.

Presenter: Todd Goddard

Title: Mark Twain's Geographic Imagination in *Life on the Mississippi*

Author: Todd Goddard

Affiliate: Utah Valley University

Abstract: Twain's relationship to and understanding of place is characterized by robust sense of nostalgic identification and attachment. Yet Twain demonstrates in *Life on the Mississippi* that place is inherently open and always in process. For Twain, place is more event than static object, more verb than noun. Rather than fixed and unchanging, it is an articulated moment in an ongoing and neverending process of change (both social and "natural") and a constant reordering of a constellation of social relations.

Through an investigation of *Life on the Mississippi*, this paper explores Twain's articulation of a nostalgic and portable sense of place that ultimately resists what he sees as the inherent instability and inevitable dissolution of place. In doing so, Twain anticipates present-day geographers like Doreen Massey by recognizing the radical openness and constant changeability of place. Indeed, by detailing the physical and cultural history of the Mississippi river, and through his elaborate description of his education as a riverboat pilot, Twain suggests that place itself can be preserved *only* in memory and *only* by those properly trained to read it. In addition, the paper will explore recent critical debates on the nature of space and place, the relationship between temporality and spatiality, human interactions with landscape and environment, as well as the tensions between the local and the global.

PHYSICAL SCIENCE ORAL PRESENTATIONS

Presenter: Yhoshua Wug

Title: a-Si as a Protective Layer to Block the Oxidization of Al mirrors

Authors: David D. Allred, R. Steven Turley

Affiliation: UCLA

Abstract: Arguably, the best chance to produce an IR-optical-UV-EUV mirror for a future space observatory is a EUV multilayer mirror coated by a very thin bare aluminum layer. However, using a bare Al layer presents challenges that first must be overcome. Al oxidizes rapidly when contact with the atmosphere occurs. The customary solution is to cover the mirror with a protective evaporated fluoride layer. Unfortunately, these are opaque under ~110 nm. Whereas, Al is reflective down to 85nm and could be used as a mirror without a barrier. Once the mirror is in space, where there is no oxygen, Al would no longer need a barrier layer. Fluorides cannot be removed once they are deposited without damaging the mirror. a-Si could be used as a protective layer that is potentially removable. A dry chemical process that would use the Al layer as an etch stopping barrier could be used to remove the a-Si protective layer. It is hypothesized that this could be done without roughening the aluminum, however, such process has not been researched for this purpose. We will report on the first step of evaluating a-Si as a barrier, that is, its properties as a protective layer to block aluminum oxidation.

Presenter: Katherine Wilcox

Title: Using Exoplanet Transits to Calibrate the Great Basin Observatory

Authors: Rhett Zollinger

Affiliation: Southern Utah University

Abstract: Southern Utah University is one of four university partners who manage and operate the new Great Basin Observatory (GBO). The GBO became operational in August 2016. Since the telescope is still new, some of its capabilities are still untested. In order to determine the telescope limits for exoplanet transit detection, we have started taking photometric measurements of transiting systems. We then verify that the results from our photometric data are consistent with expected values. So far we have successfully analyzed several transits and are still in the process of determining the lower limit for transit depth detection. Once our work is finished, we will have a better understanding of the GBO capabilities which will benefit future SUU students and other GBO university partners. In our presentation, we will explain our method for exoplanet transit observation and discuss our results.

Presenter: Dallas Anselmo

Title: CCD Measurements of AB and AC Components of WDS 20420+2452

Authors: Alan Nelson, Kevin Andrews, Ethan Brown, and Bryan May

Affiliation: Southern Utah University

Abstract: Measurements of position angles and separation are obtained from CCD images and recorded for the triple star system WDS 20420+2452 with components POU4886AB and POU4887AC. Our measurements suggest that component B is not gravitationally bound to the primary component. No orbital trend is observed for POU4887AC, but further observations may indicate an orbital trend.

Presenter: Himkala Paudyal Khanal

Title: Optical constants and oxidation of niobium thin films

Authors: David D. Allred

Affiliation: Brigham Young University

Abstract: Computer models show that ultrathin niobium films may be a useful part of a near-normal incidence EUV multilayer reflector for the range of 25 to 35 nm. Our calculations indicate that the highest reflectance in such multilayers will come with the niobium layer on top. Therefore, it is important to know how fast the niobium films oxidizes in dry air, since chemical and structural changes in the top layer will drastically change the optical performance of the multilayer. We report on the kinetics of the room-temperature oxidation of sputter-deposited several niobium films (thicknesses ranging from 5 to 15nm) on samples cleaved silicon-nitride coated (100-orientation) silicon wafers. Whereas previous investigators of Nb thin films analyzed their data in terms of the Cabrera-Mott model which shows the thickness of the oxide film increasing logarithmically with time, we observed linear or parabolic oxidation in our ultrathin films. We will discuss the use of variable-angle spectroscopic ellipsometry (SE) as a quick, relatively easy-to-use tool to study the oxidation of thin-film Nb layers. We also report the optical constants of our ultrathin Nb films.

Presenter: Payton Christensen, Kyle Christiansen and Brandon Wiggins

Title: Tidal Disruption Events Around Massive Black Holes

Authors:

Affiliation: Southern Utah University

Abstract: We have a supermassive black hole in the center of our galaxy (Sagittarius A). A stellar (or average-sized) black hole is created when, in essence, a star collapses in on itself. While stellar black holes may be 10's of solar masses in size, supermassive black holes tend to weigh millions or tens of billions of suns. The growth of massive black holes depends on the character of their accretion disks. We study the formation of accretion disks by the phenomena of tidal disruption, which gives insight into super massive black hole formation itself. We tested several specific scenarios involving the course of a star in the vicinity of a black hole. Using smoothed particle hydrodynamics, we modeled the process of tidal disruption on the star in its trajectory, spaghettification, and consequent obliteration. We discuss implications of our results for how massive black holes may have grown through cosmic time.

Presenter: David D. Allred

Title: What a genetic-algorithm based, optical-design program teaches us about dual-function (Extreme ultraviolet + broadband UV-optical-IR) multilayer mirrors.

Authors: R. Steven Turley

Affiliation: Brigham Young University

Abstract: NASA has identified as a key technology requirement, deemed an essential goal for future flagship missions such as LUVOIR (Large, ultraviolet-optical-IR surveyor), improving the operating efficiency and environmental stability of standard aluminum (Al) mirrors at wavelengths shorter than the operating cutoff of Hubble (HST) at 115nm. Only Al mirrors can achieve high reflectance far into the UV, as low as 85 nm, aluminum plasma edge. Unfortunately, Al oxidizes rapidly upon air exposure, diminishing the reflectance of bare Al mirrors below 200 nm. While a minor problem on Earth -- the atmosphere blocks radiation below this wavelength-- mirrors used in space could use the whole range of Al's high reflectance, if a bare, or nearly bare, Al mirror, could be deployed. In addition to providing reflection over the important Lyman UV (93-122 nm), bare aluminum mirrors could make possible extreme ultraviolet (XUV) reflectance as well. This is because below its plasma edge, aluminum thin films are partially transparent down to aluminum L edge at 17 nm. This is the focus of this report. If an appropriate EUV multilayer underlies the aluminum, its reflectance can give the mirror high UV reflectance at the designed wavelength. We have designed multilayers for 25.6 nm which

corresponds to the 3P to ground state transition in singly ionized helium (He II). Helium is the second most common element in the universe and its emissions can help characterize energetic astrophysical sources. This is a challenging portion of the spectrum to obtain high-performance multilayers, since most materials are quite absorbing. We have used a genetic algorithm program to find multilayer combinations with high reflectance. We will discuss what the multilayer calculations teach about obtaining high reflectance in the longer wavelength portions of XUV.

Presenter: Michael Greenburg

Title: The Effects of Surface Roughness on Reflectance

Author: Michael Greenburg

Affiliation: Brigham Young University

Abstract: My research involves determining the effect on reflectivity of surface roughness that is similar in scale to the wavelength of incident light. The influence of surface roughness is fairly well understood in the cases that it is much smaller or larger than the wavelength of light being reflected, but otherwise simplifying approximations break down. One must solve a boundary integral problem to determine reflectance as a function of angle; discretizing and turning this problem into a matrix-vector equation allows one to write and use a computer program to find the solution. I have inherited a program that does so in two dimensions (using a slice of a full 3-D surface, with only x and z coordinates), and retrofitted it to allow massive parallelism. I am currently building a program that does so in three dimensions, which will allow me to confirm that the results of the 2-D program are consistent with what we expect in three-dimensional space. Since the 2-D program is vastly more memory-efficient, confirming that it accurately represents reality will allow us to confidently perform massive computations without the costs of finding a full three-dimensional solution. Large simulations are important since small simulations imply small surfaces, and reflective performance decreases as surface size decreases. It is therefore challenging to isolate the decrease in reflectance that is due to roughness with small simulations. Huge computations will allow the effect of small surface size to be trivialized, giving a much-improved model of the effects of wavelength-sized roughness. I will report on the implications of consistency between the programs, progress on the 3-D program, and on preliminary results from the 2-D program.

Presenter: Tanner Gamble

Title: Sun Fire on Earth: The Hydrodynamics of Kiloton Explosions

Authors: Dr. Brandon Wiggins

Affiliation: Southern Utah University

Abstract: Nuclear weapons and proliferation are becoming more of an issue in today's world. As this continues to become an increasing threat, the effects of a nuclear blast need to be better understood. In our research, we will be using FLASH, an authoring software, to better understand the magnitude of the shock wave and the spread of its effects. To do this we will be testing different parameters and observing how they affect the hydrodynamics of a nuclear shock wave. To show the results of our observations, we will be creating pictures, graphs, three dimensional images, short videos and calculations. These will be generated using FLASH and a supercomputer. This research will allow a better understanding of nuclear blasts, their effects and the parameters that may affect them.

Presenter: Andrew Misseldine

Title: The Mathematics of Mario Party 10

Author: Andrew Misseldine

Affiliation: Southern Utah University

Abstract: The Mario Party video game franchise by Nintendo has offered a fun, wholesome party game experience for millions of happy gamers since 1998. The newest installment of the series, Mario Party 10 for the Wii U, continues in this tradition. These video games play like a board game but with regular mini-games where players battle for coins and hearts. While players can best these mini-games by strategy, skill, timing, and massive button-mashing, victory in these mini-games and the overall board game often comes down to luck. From dice rolls to card drawing and other games of chance in between, this talk will analyze effective Mario Party 10 strategies based upon the mathematics of probability and group theory.

Physical Sciences

Presenter: Chin-yah Yeh

Title: How Rational Functions Shape the World - Through Phase Transitions among Physical States

Author: Chin-yah Yeh
Affiliation: Salt Lake Community College

Abstract: Rational functions are fundamental in manifesting phase transitions and critical phenomena which are crucial in the onset and evolution of the universe. Every rational function $R(x) = P(x)/Q(x)$ can be decomposed into two parts: a polynomial and a sum of poles, where each pole is characterized by a real or imaginary number. By carrying out analogy and extending the argument to other metric spaces, we test on rescaling the complex plane and try to elucidate phase transitions in the physical world.

Presenter: Nic Bastian, Jaden Brewer
Title: Classifying the Schur Rings Over the Integers
Authors: Andrew Misseldine
Affiliation: Southern Utah University

Abstract: Schur rings are a type of algebra that is spanned by a partition of finite groups that meets other conditions. Schur rings were originally developed by Schur and Wielandt in the first half of the 20th century. They were originally developed to study permutation groups and have since been more widely studied. They were especially studied in the 1980s and 1990s to look at finite cyclic groups, which are finite sets that cycle through their elements equipped with an operation satisfying certain properties. Past research has provided a classification of Schur rings over finite cyclic groups. We will provide an extension of this classification to Schur rings over infinite cyclic groups. This will be accomplished by using a mapping technique involving what we call freshman exponentiation. Using this we will show that there are only two types of Schur Rings over the integers up to isomorphism. As all infinite cyclic groups are isomorphic to the integers this will prove our claim.

Presenter: Jacob Siebach
Title: Helping Students Overcome Difficulties in Math With Physics
Author: Jacob Siebach
Affiliation: BYU

Abstract: Having taught middle school, privately tutored individuals, and worked with high school and college students, I have seen (and experienced myself!) challenges in connecting mathematical concepts to real situations. I will share the experiences that I have had in discovering the "pain points" of the students.

I would like to develop a curriculum that spans several semesters. Instead of teaching first-semester Physics and Calculus separately, I would like to take two semesters to teach Trigonometry and Calculus as a part of the Physics class. Since Newton invented the Calculus to explain Physics concepts, it is most easy to present a physical problem to the student and then teach them the mathematical tool used to solve it. This is akin to teaching someone how to build a birdhouse, which involves learning the use of a measuring tape, saw, and hammer as part of the process. Similarly, I believe that by teaching half of Physics I and Calculus I in one class, and then teaching the second half of both in the following semester, students will see the physical concepts for which the tools were designed, and they will begin to intuitively understand when to use which tool to solve the problem. I would like to begin a discussion on the challenges that will be involved in assembling such a series of classes, along with the potential advantages.

Presenter: Vern Hart
Title: A Neural Network for the Non-Invasive Differentiation of Cancer Cells Using Near-Infrared Laser Scattering Data
Authors: Ryan Bevan, Mason Acree, Daniel Blumel, Christopher Berneau, James Graham, Diana Turcios
Affiliation: Utah Valley University

Abstract: Cell nuclei are responsible for ~40% of the optical scattering which occurs in a cell. While these nuclei are typically spherical in healthy cells, they begin to enlarge and elongate during the earliest stages of most cancers. The complex structure of these cells makes it difficult to accurately simulate optical scattering in vivo. As a result, recent efforts have involved the application of artificial intelligence to analyze scattering patterns from cells without the need to physically model the complex interactions involved. In this study, we investigated optical scattering patterns for five different cancer cell lines, which were irradiated in vitro by near-infrared diode lasers at wavelengths of 532, 635, and 850 nm. The resulting patterns were collected with a CCD beam profiler and used to train a neural network. Significant differences were observed in the appearance

and spectral distributions for the various cell lines. Spherical WEHI-3 cells were used as a control and compared with MIE scattering simulations for spherical particles. Accurate quantification of these patterns could lead to the detection of cancerous cells at low concentrations in otherwise healthy tissue, thereby providing a mechanism for non-invasive cancer cell detection and earlier screening methods.

Presenter: Kyler Radmall

Title: Silver Nanoparticle Synthesis with Microfluidic Devices

Authors: Christopher Monson, Rachel Radmall, Max Brown

Affiliation: Southern Utah University

Abstract: Our research focuses on the synthesis of silver nanoparticles using microfluidic devices. These devices are of particular interest to us because of the controlled environment that they provide for reactions to take place. As the name suggests, the “micro” scale of this device gives us a high surface area to volume ratio while the “fluidic” aspect allows a controlled flow rate and pattern. This provides reproducible products with accuracy and precision. Our microfluidic device is created by using Polydimethylsiloxane (PDMS), a polymer that is similar to glass. Using a magnesium wire we can shape our microfluidic device to fit the needs of our experiment and then suspend it in PDMS. The magnesium wire can be dissolved once the PDMS solidifies, forming a hollow chamber in which we can perform our reaction and synthesize our silver nanoparticles. Silver nanoparticles have a wide range of applications but the focus of our research will be to learn more about what causes inconsistency in the size of the particles. Since one of the major challenges of nanoparticle synthesis is creating a product that is uniform in size, learning how to control the synthesis process to create highly uniform nanoparticles would be beneficial. To accomplish this, we plan to gather more information about the nanoparticles using Raman spectroscopy. We will also use a UV-Vis spectrometer and spectrofluorimeter to analyze the stages of nanoparticle synthesis.

Presenter: Richard Barney

Title: Quantum Erasure with the Stern-Gerlach Effect

Authors: Jean-François Van Huelé

Affiliation: Brigham Young University

Abstract: Wave-particle duality is one of the most fundamental principles of quantum theory. Consequently, objects on the quantum scale can exhibit both wave properties (e.g. self-interference) and particle properties (e.g. defined path). These wave and particle properties are complementary in the sense that the more a quantum object behaves as a wave, the less it behaves as a particle, and vice versa. The degree to which a quantum object behaves as a wave or a particle can be changed by entangling one of the object observables with another observable in the system. This change can be reversed either entirely or partially by creating another entanglement. This reversal process is known as quantum erasure. The Stern-Gerlach effect has been shown to split a beam of quantum objects into multiple beams with defined spin. The result is that the object spins become entangled with their positions. We present an analytic expression for the time evolution of quantum objects experiencing this effect and visualize the interference fringes which arise in such a system with multiple Stern-Gerlach events. We note that the phenomenon of quantum erasure is evident and quantify the corresponding effect on the quantum object wave and particle properties

Presenter: Mariah Clayson

Title: Measuring Oxygen Levels in Anoxic Environments Using a Microfluidic Device

Authors: Brian Anderson

Affiliation: Southern Utah University

Abstract: Aquatic anoxic environments affect many aspects of the world around us. For example, fish require dissolved oxygen to live and our pipes will corrode more easily if oxygen levels are too high. We have fabricated a microfluidic device that is sensitive enough to measure low levels of oxygen, is reusable, and inexpensive. Our device consists of a block of PDMS with embedded wires and channels. It measures oxygen in anoxic aqueous environments using an electrochemical process analogous to that of the Clark electrode. Our design is based on the STOX electrode, which is essentially a Clark electrode inside of another Clark electrode. The STOX electrode is sensitive and we hope our device will have similar sensitivity, but will be less expensive. We have successfully fabricated a device, calibrated it, and performed field tests.

Presenter: Jacob Dean

Title: Spectroscopic and Quantum Chemical Investigation of Nature’s Most Adaptive Photosynthetic Pigments

Authors: Clayton Staheli, Kelsey Rico

Affiliation: Southern Utah University

Abstract: Photosynthetic organisms have realized the Sun potential as a source of nearly unlimited energy for billions of years. They have developed the machinery to harness the Sun energy in an all-encompassing solar cell including an efficient light-electric transducer akin to our own solar cells, but with the added benefit of a long-term storage mechanism in chemical bonds. The front-end of photosynthesis is the light-harvesting step, which all subsequent steps crucially depend on. As such, this step is generally the most efficient with light capture and transport occurring at efficiencies routinely >90%. At the heart of this efficiency is Nature's molecular design of light-harvesting proteins containing pigments that absorb the sunlight, and rapidly transfer that energy among themselves and to other proteins so that it may be converted to electrical potential. The primary pigments utilized by cryptophyte algae and cyanobacteria belong to a class of molecules called bilins, or linear tetrapyrroles, and are arguably the most chemically/structurally diverse pigment class found in nature's enabling organisms to tailor their light capture to their environment and light availability. To address the intrinsic light-harvesting properties of this special class of pigment, we take a bottom-up approach employing UV-visible, fluorescence, and IR spectroscopic studies coupled with high-level structural calculations of the individual pyrrolic sub-units which make up these tetrapyrroles, followed by di-pyrrole sub-units, and finally entire bilins. This approach enables us to investigate the nature of those electronic states responsible for light absorption, and to track them as the structure is built up to larger and larger units. We have found that already at the dipyrrole level the pigments begin to absorb light in the solar range with high efficiency. Furthermore, structural and chemical differences have shown a distinct impact on these properties.

Presenter: Matthew Harmon

Title: Soil analysis of molybdenum metal near Milford, UT

Authors: Kim Weaver, Elizabeth Pierce

Affiliation: Southern Utah University

Abstract: Because molybdenum forms a complex with many different biomolecules that are responsible for nitrogen fixation and other essential cycles we hypothesized that areas denser in foliage would have higher concentrations of molybdenum in the soil. Our study site, just northwest of Milford, Utah, is near the outflow of an old tungsten mine. Initial surveys found variable molybdenum concentrations over an area of about six square miles, providing diverse, natural areas to take sampling from for our study. We took three samples from eleven different areas, where the first sample was directly under a sage bush, the second was about a pace away, and the third was two paces away. We then measured the molybdenum concentration using soil digestion methods, and we are currently measuring the amount of biomatter in each sample through combustion of the soil in a muffle furnace. We demonstrate that molybdenum concentrations in soils do not particularly change over time allowing for further study, and we are working on determining whether molybdenum concentrations are greater near sage bushes and other areas high in organic mass.

Presenter: Stephen Smith

Title: Reconstitution of Supported Lipid Bilayers into Lipid Vesicles

Authors: Mike Ornstead, Ruth Hunter

Affiliation: Southern Utah University

Abstract: Lipids are an important part of cell membranes. When in water, these lipids form a model cell shape called a vesicle. When lipid vesicles come in contact with smooth glass they form Supported Lipid Bilayers (SLB) which are unrolled, flattened, lipid vesicles on glass. These bilayers are important for the purification, separation, and study of cell membrane substituents. We form an SLB in a microfluidic device to study the conversion of bilayers into vesicles. As a fast-moving buffer flows over these bilayers, it disrupts the bilayer and strips portions of it from the glass. We hypothesize that these stripped lipids are then reformed into vesicles. However, we can only observe their stripping. We are building a particle analyzer to determine the number and size of the particles that are produced from stripping the bilayer. In our device, a laser shines on the solution from the stripping experiment and the scattered light is analyzed thus making a light scattering particle sizer.

Presenter: Steve Ipsen

Title: Using the Chemical Composition of Coal Creek to Better Understand the Lack of Biodiversity

Authors: Porter Edwards, Kim Weaver

Affiliation: Southern Utah University

Abstract: Coal Creek in Cedar City has very low or no biodiversity present. Some of the creeks above Coal Creek have been found to have some living organisms. This sparked the question as to why the main creek does not support life. Since the fall of 2012 analysis has been performed on hundreds of samples to determine the concentration of total metals, dissolved metals, anions, chlorophyll and more. The purpose of this research is identify possible explanation behind the low biomass and biodiversity of the creek. Principally, we have focused on the chemical characterization of the creek and its tributaries in order to better understand the processes occurring within coal creek. The data collected will be presented and hypotheses will be shared as to why Coal Creek cannot sustain life.

SOCIAL SCIENCE ORAL PRESENTATIONS

Presenter: W. Scott Jackson

Title: Empire Builders: Why Critical Race Theory Instigated an Unnecessary Break from Critical Legal Studies

Author: W. Scott Jackson

Affiliation: Snow College

Abstract: Critical Race Theory split off from Critical Legal Studies because the founders of CRT claimed that more attention was owed to racial issues. While the reasons for the division may have been laudable, they were misguided. CLS was equipped to deal with racial matters more effectively than CRT because CLS addresses, in addition to race, a range of disadvantaged groups. CLS focuses on race, gender, socioeconomic struggles, and more. Therefore, CRT may have been an important subfield of CLS, but completely abandoning CLS was detrimental to the overall cause of all underrepresented groups that needed critical representation.

Presenter: Nathan G. Caplin and Nick Marsing

Title: The Matlock Effect: Psychological and Legal Implications of Media Consumption on the Presumption of Innocence

Authors: Nathan G. Caplin and Nick Marsing

Affiliation: Snow College

Abstract: For centuries, English-speaking audiences have embraced law-inspired entertainment—from Shakespeare’s Merchant of Venice (circa 1596~97) to Robert Boalt’s A Man for All Seasons (1960). Shakespeare dedicated more known pages to “law than [to] any other profession.” (R.L., 2016) A glance at the Nielsen ratings confirms that crime and legal dramas are uniquely popular. Modern programming, such as CBS’s Bull, illustrates the public’s interest not only in the legal system, but in the psychology behind such proceedings. The ubiquity of law-inspired and crime-oriented entertainment raises questions about such media’s impact on potential jury pools. Scholars have researched media’s influence on jurors’ perceptions and how these perceptions influence jury trials—a centuries-cherished system of justice. Researchers debate the power of the CSI Effect, and while some find scant evidence in support of the phenomenon (Podlas, 2005), psychological research indicates that the CSI Effect does impact jurors (Durnal, 2010). Judges and attorneys have expressed concern regarding jury biases that may be acquired through law-oriented media. We seek to measure how potential jurors’ media choices influence their commitment to the principle of “presumption of innocence”—the constitutional benefit every juror must grant criminally-accused defendants.

Participants in our study will be divided into three groups. The first group will view media that portrays defendants and defense attorneys more positively; the second group will view media that portrays the prosecution more positively; and the third (control group) will refrain from law-oriented media. Participants will forego other crime-related and law-oriented media for the duration of the experiment. After viewing the prescribed legal dramas, participants will respond to a series of scenarios and questions designed to measure the participants’ commitment to the presumption of innocence. Our study measures how certain legal dramas influence potential jurors’ commitment to the constitutional principle of the presumption of innocence.

Presenter: Raymond Bertheaud

Title: How does Political Uncertainty Affect Stock Prices? New Evidence from Prediction Markets

Authors: Raymond Bertheaud and Sheng Xiao

Affiliation: Westminster College

Abstract: We examine how political uncertainty affects stock prices. We developed a new measure of political uncertainty based on daily data from prediction markets: Iowa Electronic Markets. Nobel laureate Kenneth Arrow et al. (2008; 'The promise of prediction markets.' *Science*, 320(5878), 877.) says prediction markets are forums for trading contracts that yield payments based on the outcome of uncertain events. There is mounting evidence that they can help produce forecasts of event outcomes with a lower prediction error than conventional forecasting. Our daily political uncertainty measure is the rolling standard deviation of the 'price' of the Democratic Presidential Candidate 'Contract' in Iowa Electronic Markets, which indicates the predicted probability of the Democratic Presidential Candidate winning the election. We then empirically test the theoretical predictions of the following paper: 'Pastor, L., & Veronesi, P. (2012). Uncertainty about government policy and stock prices. *The Journal of Finance*, 67(4), 1219-1264.' Specifically, Pastor and Veronesi's (2012) theoretical model predicts: 'Stock prices should fall at the announcement of a policy change, on average. The price decline should be large if uncertainty about government policy is large, and also if the policy change is preceded by a short or shallow economic downturn.' We use Presidential elections in the U.S. since 2000 as natural experiments to examine how political uncertainty affects stock prices. Our analysis confirms the theoretical predictions of Pastor and Veronesi (2012). Specifically, in our regressions, we find that S&P 500 index falls as political uncertainty rises before an economic downturn (2000 and 2008 Presidential elections). We also find that S&P 500 index rises as political uncertainty rises when the economy is not heading towards a downturn (2004, 2012 and 2016 Presidential elections).

Presenter: Shadman Bashir

Title: Cosmologies and Laws in Contemporary Conflicts

Author: Shadman Bashir

Affiliation: Dixie State University

Abstract: The paper is a brief analysis of the existence of three different and unique entities and life forms active in contemporary global conflicts. They are Artificial Intelligence, Humans and Souls. In conflicts especially religious conflicts all three play important roles in not only the actual fighting but also the process of identifying and setting up victory scenarios. This makes it very difficult to apply the humanitarian laws on and off the battlefield within such a conflict because of the fact that most parties to such a conflict live in and believe in their own respective universes. Even a quick analyses of the wars in Afghanistan and Iraq is enough to prove this. These wars are being fought by all parties within a multiverse with multiple cosmologies. It will not be incorrect to classify such conflicts as "Cocktail Conflicts".

Presenter: Lesa Landrith

Title: Adjunct Faculty: The Theory Behind Inclusion.

Authors: Lesa Landrith and Kerry Kennedy

Affiliation: Weber State University

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

Presenter: Bryan Dalley

Title: When a Mind Wanders: A Replication of Feng, D'Mello, and Graesser (2013)

Authors: Bryan Dalley, Sandra Cameron, Jessica Huffaker, Cloe Johnson, and Dallin Ball

Affiliation: Utah Valley University

Abstract: Mind wandering is a cognitive shift from a task to something unrelated, such as memories. To explain the cause of mind wandering, two hypotheses exist: the executive-resource and the control-failure hypotheses. According to the executive-resource hypothesis, task-related and task-unrelated thoughts compete for executive resources. When tasks are difficult, mind wandering occurs less often because there are less executive resources available. According to the control-failure hypothesis, related and unrelated thoughts compete for control, and mind wandering occurs when the person fails to suppress task-unrelated thoughts. When tasks are difficult, mind wandering occurs less often, but only if there are enough cognitive resources available. Because there is evidence for both hypotheses, it is unclear which hypothesis is correct. Feng, D'Mello, and Graesser completed a study (2013) to identify how text difficulty predicts mind wandering frequency. In accordance with the executive-resource hypothesis, they found that participants were less likely to answer correctly to a comprehension test item if they had mind wandered while reading difficult text. However, in line with the control-failure hypothesis, they found that participants were more likely to mind wander when reading a difficult sentence. Because of the replication crisis, we directly replicated their study. We obtained some similar results as Feng et al., but we also obtained results that contradict their results. When we analyzed if mind wandering while reading difficult texts predicted reading comprehension scores, we obtained a smaller odds ratio (1.174 vs. 1.87), which indicates that the effect may be weaker. When we analyzed if mind wandering occurred more frequently while reading difficult texts, we obtained a larger effect size (1.343 vs. 1.24), which adds additional evidence to the control-failure hypothesis. Our study is important because of its supporting evidence on the control-failure hypothesis and for its implications on the importance of replications.

Presenter: Chris Anderson, Ph.D

Title: The Intersection of Marital Problems, Unhealthy Lifestyles, and ADHD Challenges

Authors: Chris Anderson, Ron Hammond, Devin Gilbert, and Justin Wilbert

Affiliation: Utah Valley University

Abstract: This IRB approved study included a random sample of 10,000 former UVU students. It yielded 265 completed surveys and 177 surveys for married respondents. This presentation includes results from only 91 of those married respondents who were statistically compared on the basis of their Marital Problem Scale Scores being either Low (bottom quartile, N=42) or High (top quartile, N=49). Factor Analysis was conducted to identify Scales. Bivariate Correlations and Frequencies were used for other considerations and analysis. T-Tests were used to compare the means of each group. Results indicated that those with higher Marital Problems scored significantly worse (<.05 level) on 20 out of 20 variables including, marital relationship, healthy lifestyle activities, emotional issues, and other wellbeing measures. The results raise some concerns. Of specific concern was the overall statistically significant score High Marital Problem respondents were found to have in comparison to Low ones. These included: ADHD-related tendencies which interfered with the marital relationship and with the ADHD-related issue of being dependable in their marriage. Although no causal factors can be established, there is a clear intersection of Marital Problems, ADHD issues, and unhealthy lifestyle choices. Implications for teaching, counseling, and health coaching with respect to ADHD, health, and marital issues are discussed (UVU IRB approval #01833).

Presenter: W. Scott Jackson

Title: The Process of Sanctification: A Bourdieusian Approach to the Declension of Power in New England Puritan Clergy

Author: W. Scott Jackson

Affiliation: Snow College

Abstract: In this paper, I explain the declension of Puritan power following the Great Migration up until when Massachusetts lost its charter in 1684. Historian Perry Miller argued that an overall declension in Puritan culture occurred during this period. However, that notion has been dispelled. There is a resurging field exploring declension in areas outside of Miller's scope of Puritan culture. I determine that colonial New England existed as a functional theocracy by using Pierre Bourdieu's approach to explain clerical power through symbolic and religious capital. I explore civil and economic power struggles in the decades following the Great Migration to determine that the Puritan clergy's power is what declined during this period, not overall Puritan culture.

Presenter: Denise Whitney

Title: United Way of Salt Lake 2-1-1: Evaluating the Effectiveness of Housing Referrals

Authors: Denise Whitney, Kerry Kennedy

Affiliation: Weber State University

Abstract: The United Way of Salt Lake connects residents all over Utah to local resources through their confidential and free 2-1-1 service. One of the most common requests they receive is referrals for affordable housing. In assessing ways that 2-1-1 can improve their services, a needs-based diagram was created to help identify common needs that people in particular situations would benefit from, such as those looking for housing. For this project, this diagram was used to broaden referrals for housing to include other needs, such as food, employment, and utility assistance. Callers who requested housing information were tracked for a period of 75 days, and then received a follow-up call 3-4 weeks after their initial call to assess the helpfulness of the referrals and if their situation had improved. Out of 125 callers, 44.8% participated in the survey, of which 75% were female, 41% had children, 37.5% had a disability, and 64.3% were Caucasian/non-Hispanic. This data was used to determine the effectiveness of giving more expansive referrals to those seeking housing in improving their overall situation. More results to follow.

Presenter: Dennis Wei

Title: Spatial Patterns and Determinants of Housing Prices in Salt Lake County: Amenity, Transportation and Submarkets

Authors: Dennis Wei, Han Li, Yangyi Wu

Affiliation: University of Utah

Abstract: Housing prices in Salt Lake County have appreciated rapidly in recent years, creating a serious problem in affordability. Relying on the assessed property value data, this study comprehensively investigates spatial patterns and underlying determinants of the housing market, with an explicit emphasis of the role of local environments, such as accessibility, amenities, transportation systems, and submarkets. Regarding the spatial morphology and submarkets, we develop a hybrid spatial data mining method and identify 43 housing submarkets in Salt Lake County. For determinants, with the control of submarkets and spatial heterogeneity, results of advanced hedonic pricing models with spatial econometrics and hierarchical linear modeling show that single-family home values in Salt Lake County are affected not only by structural attributes, but also by urban amenities and accessibility factors such as air pollution, forest coverage, quality of public schools, and commuting cost. Moreover, the forest coverage has more positive influences on the east side of Salt Lake County, while the negative effect of air pollutions is less pronounced on housing value in the southeast. Particular attention has also been paid to the role of transportation systems. We find that the negative impacts of transportation systems such as traffic noise and air pollution are greater than the positive impact of accessibility. Single-family residents in Salt Lake County are willing to pay more to reduce environmental health risks than to get better accessibility.

Presenter: Dan Poole

Title: Understanding Us: Student Research to Support a Community Partner Working on Homelessness

Authors: Nikole Bench, Patricia Bernabe-Alonso, Israel Cervantes, Bianca Dellapenta, Marie Ellis, Whitney Hancock, Mackenzie Hughes, Tyler Jamieson, Ryan Johnson, Kaitlyn Keil, Kristen Kessler, Grace Lee, Zach Naylor, Carrie Parry, Dan Poole, Jennifer Salazar, Kymberly Simons, Celeste Suite, Aaron Wadley

Affiliation: Salt Lake Community College

Abstract: Salt Lake Community College students in the SOC 2900 Doing Sociology course, in collaboration with the Social Work Association student club, have partnered with a local non-profit organization called Understanding Us. This organization currently provides several programs focusing on individuals experiencing homelessness in Salt Lake City. Currently, Understanding US is running a Tai Chi program at the downtown library. Student researchers will attend these sessions and collect preliminary demographic survey data to help the organization better understand the population they are serving in order to best meet the needs of participants.

Presenter: Rob Carney

Title: Archaeology, Fireworks, and How to Carve a Pumpkin: Social Scientists Have All the Fun

Author: Rob Carney

Affiliation: Utah Valley University

Abstract: You can't fit a whale in a firework stand, but in this short essay I'm going to try. I'll discuss Bear's Ears

and poor urban planning. I'll call for less politics in our holidays. And I'll share my own version of an origin story since ritual matters, landscapes matter, and the sacred isn't a commodity. These are three assertions we could poll and measure, or reach as conclusions based on observation, but satirizing the ridiculous works too, and more quickly. So given our time constraints, you can count on some of that.

Presenter: Victor Barraza, Erin Call, Mikaela Watson

Title: Environmental Bias and Belief in the 2017 Utah Valley University Student Population: New Ecological Paradigm Survey Results and Conclusions

Authors: Victor Barraza, Erin Call, and Mikaela Watson

Affiliation: Utah Valley University

Abstract: This study analyzes the results of the New Ecological Paradigm Survey given to Utah Valley University Students from 2017 to 2018. The state of Utah, particularly the Wasatch front has a unique environmental, political, and religious background. Not only is the air quality of Utah County frequently the worst in the country, nearly 60% of the population identifies as Republican, and over 80% of the population identifies as LDS. Volunteers were given surveys with 19 questions concerning their attitude and beliefs on topics ranging from climate change, environmental use, and political affiliation. In total, 222 participants returned completed surveys with a majority being students from PSY1010 General Psychology classes. In numerous responses, the survey results indicated a break in opinion, a disconnect between how humans should act toward the environment and how the Earth can support human activity. The student body was willing to admit that climate change is directly human caused, that humanity has a negative effect on the environment, and that a major environmental catastrophe was on the horizon. But, they also believed that humans can and should modify the environment even if it would be a disastrous act, unable to be fully controllable, and unable to find a solution for. These results indicate a willingness to laissez faire environmental issues, possibly affected by the unique composition and heavily leaning independent and Republican political affiliation of the student body and of Utah County.

Presenter: Jeremy Bryson

Title: Dark Sky Compliance: Measuring the Effectiveness of Outdoor Lighting Ordinances in Ogden Valley

Authors: Jeremy Bryson and Amanda Cooley

Affiliation: Weber State University

Abstract: Urban sky glow, or the artificial brightening of the night sky over inhabited areas due to excessive or inefficient outdoor lighting, has many negative impacts in Utah's local environments, including the disruption of ecosystems, energy waste, and dimming residents' views of the night sky. Communities around Utah, including the Weber County's Ogden Valley, are beginning to enact outdoor lighting ordinances to mitigate the impacts of this type of light pollution and conserve the dark night sky. However, it is still unclear how effective these lighting ordinances are in practice. In this paper, we aim to measure the impact of the Ogden Valley Dark Skies Ordinance which was recently enacted in August 2017. Through a detailed inventory of commercial properties in the Ogden Valley we are able to measure and map outdoor lights and signage that is in violation of the new ordinance. The purpose of this initial inventory is to establish both the methodology for the inventory and to capture the baseline of compliance at the time Weber County enacted the Dark Sky ordinance. Later field work will use the same methodology to measure the effectiveness of the Dark Sky ordinance in reducing the number of non-compliant commercial properties in Ogden Valley. Both the methodology and the results of this research can help other communities around Utah measure the effectiveness of outdoor lighting ordinances, and thus establish local policy solutions to light pollution.

Presenter: Rick Phillips

Title: Demography and Information Technology Impact Religious Commitment among Latter-day Saints in the Intermountain West

Author: Rick Phillips

Affiliation: University of North Florida

Abstract: Studies show that defections from organized religion are increasing in the United States. People with no religion now outnumber Roman Catholics, the nation's largest denomination. Consistent with this national trend, defections from The Church of Jesus Christ of Latter-day Saints (the LDS, or Mormon church) are also increasing. In 1992, demographers estimated that 3-4% of people baptized into the LDS Church had defected from the faith. But in 2015, the Pew Research Center found that over a third (36%) of people raised LDS no longer consider themselves members of the Mormon church. Thus, while the LDS church continues to grow

through missionary outreach and high birth rates, more people disaffiliate from the organization now than in recent decades. This paper uses a national, representative sample of U.S. Mormons to identify specific reasons for the increase in defections from the church. Findings show that this phenomenon is largely concentrated in Utah and adjacent states. The data suggest that changing demographics in Utah have transformed the state's religious subculture, making it easier for less committed Mormons to leave the faith. I find limited support for the notion commonly advanced by activists and journalists that encountering information critical of the church on the internet is a significant catalyst for defection from the church.

Presenter: Elijah Nielson

Title: Marriage in the latter days: The Mormon policy on same-sex marriage

Author: Elijah Nielson

Affiliation: Utah Valley University

Abstract: Advocates for social justice in a diverse society must be careful that their advocacy does not in turn become oppressive to other vulnerable populations. Under the modern gay rights movement, a troubling dominant discourse has emerged that, if taken to an extreme, is oppressive to the co-existing, subordinate narratives of religious minority groups such as The Church of Jesus Christ of Latter-day Saints (LDS Church). For example, the LDS Church's doctrinal view on same-sex marriage contrasts sharply from the dominant, gay-affirming discourse and as a result has been stigmatized and marginalized. In this article I employ critical discourse analysis (CDA) to examine the dominant, gay-affirming discourse and make visible the LDS Church's marginalized but co-existing and subordinate narrative. I argue that by making the narrative of this religious minority group visible, proponents of social justice are better equipped to truly advocate for liberty and justice for all populations in a new atmosphere founded on mutual respect in civic discourse.

Presenter: Thomas C. Terry Ph.D.

Title: Thereby Throw Sand: Presidential Media Respect through Honorific References in White House Press Briefings, 2001-2017

Author: Thomas C. Terry Ph.D.

Affiliation: Utah State University

"The Media have been accused of being collectively and individually opposed to President Donald Trump, while simultaneously exhibiting disrespectful and dismissive behavior coupled with barely controlled contempt and condescension. This study examines simply how often White House press corps reporters used the honorific "President" when referring to presidents Donald Trump, Barack Obama, and George W. Bush at the daily briefings. It finds little real difference between the presidents, although President Trump is treated slightly more favorably.

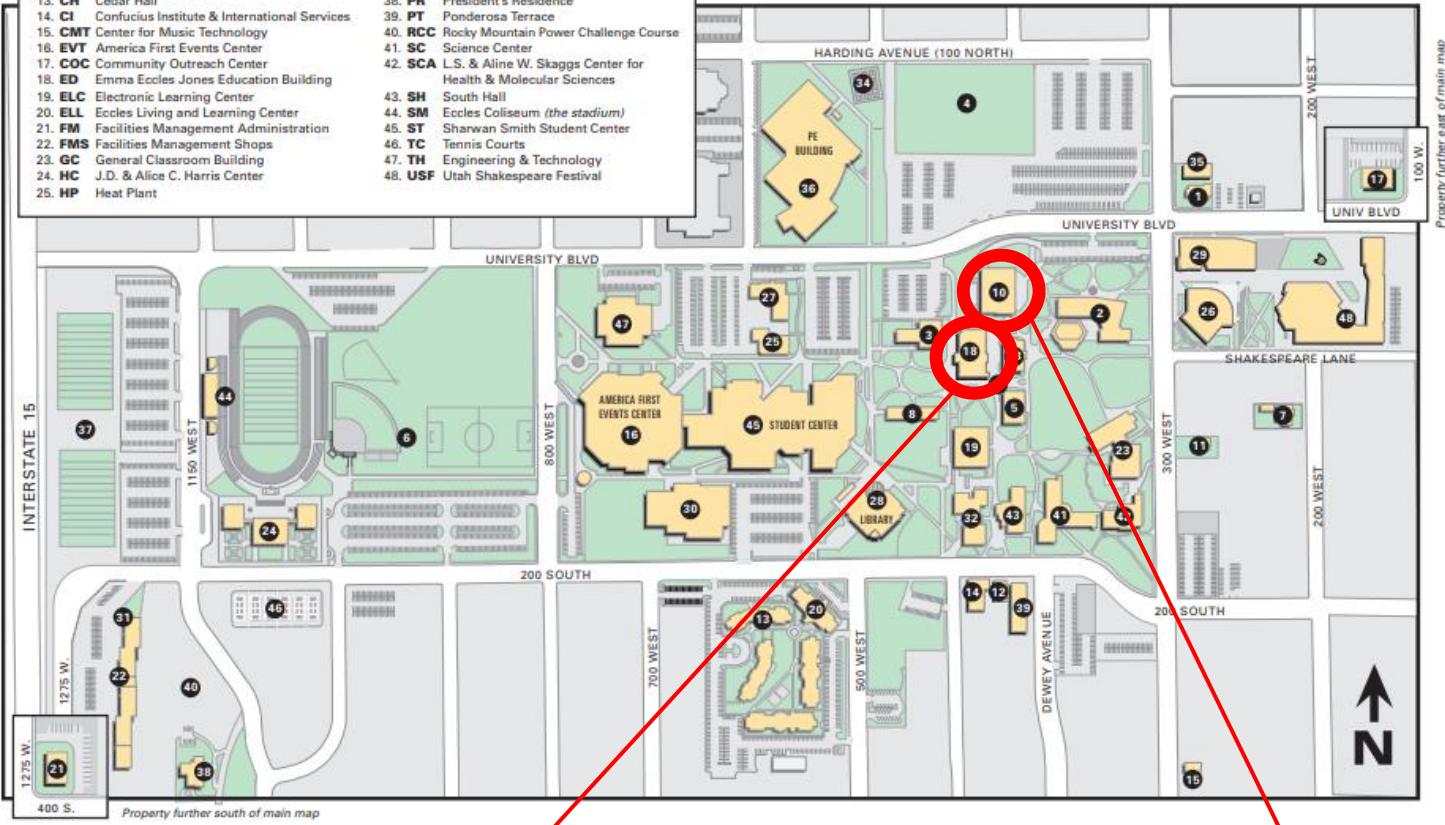
If, indeed, the Media are the "opposition party" as President Trump's former top adviser Stephen Bannon has claimed, then its headquarters would be the pressroom at the White House and its cadres would be the many dozens of reporters crammed into it for the daily feeding frenzy. And how might this opposition to the 45th president be most apparent? Perhaps by neglecting to give Mr. Trump the honorific of "president" when referring to him. It is the purpose of this study to determine whether over 16 years and the past three presidents (Bush, Obama, Trump) respect for the president has declined as measured by the presidential honorific accorded him at the invariably combative and frequently acrimonious White House press briefings held by each president's first press secretaries (Fleischer, Gibbs, Spicer) in their first few months at the podium."

CAMPUS BUILDINGS

- | | |
|--|--|
| 1. AL J. Reuben Clark, Jr. Alumni House | 26. JT Randall L. Jones Theatre |
| 2. AU Auditorium | 27. LEC Leadership Engagement Center |
| 3. BB Bennion Building | 28. LIB Gerald R. Sherratt Library |
| 4. BBF Bud Bowman Field | 29. MA Southern Utah Museum of Art |
| 5. BC R.C. Braithwaite Liberal Arts Center | 30. MC Multipurpose Center |
| 6. BSF Softball/Soccer Fields | 31. MT Motor Pool/Receiving |
| 7. BM Burch Mann House | 32. MU Music Center |
| 8. BU Dixie Leavitt Business Building | 33. OM Old Main |
| 9. CA Carter Carillon | 34. PC Pickleball Courts |
| 10. CC R. Haze Hunter Conference Center | 35. PD SUU Police Department |
| 11. CDL Shakespeare Child Care Center | 36. PEB J.L. Sorenson Physical Education Building |
| 12. CEC Community Engagement Center | 37. PF Practice Fields |
| 13. CH Cedar Hall | 38. PR President's Residence |
| 14. CI Confucius Institute & International Services | 39. PT Ponderosa Terrace |
| 15. CMT Center for Music Technology | 40. RCC Rocky Mountain Power Challenge Course |
| 16. EVT America First Events Center | 41. SC Science Center |
| 17. COC Community Outreach Center | 42. SCA L.S. & Aline W. Skaggs Center for Health & Molecular Sciences |
| 18. ED Emma Eccles Jones Education Building | 43. SH South Hall |
| 19. ELC Electronic Learning Center | 44. SM Eccles Coliseum (<i>the stadium</i>) |
| 20. ELL Eccles Living and Learning Center | 45. ST Sharwan Smith Student Center |
| 21. FM Facilities Management Administration | 46. TC Tennis Courts |
| 22. FMS Facilities Management Shops | 47. TH Engineering & Technology |
| 23. GC General Classroom Building | 48. USF Utah Shakespeare Festival |
| 24. HC J.D. & Alice C. Harris Center | |
| 25. HP Heat Plant | |

SUU SOUTHERN UTAH UNIVERSITY

JANUARY 2018



Emma Eccles Jones Education Building

R. Haze Hunter Conference Center

Parking for Campus Visitors
 NOTICE: Permits are not required in green lots.
 Visitors to campus have three options to park:

Visitors may park in any lot during the evenings from 4:00 pm to 7:00 am, Monday through Friday, and at all times Saturday and Sunday unless otherwise noted. No overnight parking is permitted from November 1 to April 30. Check for signs at parking lot entrances for restrictions.

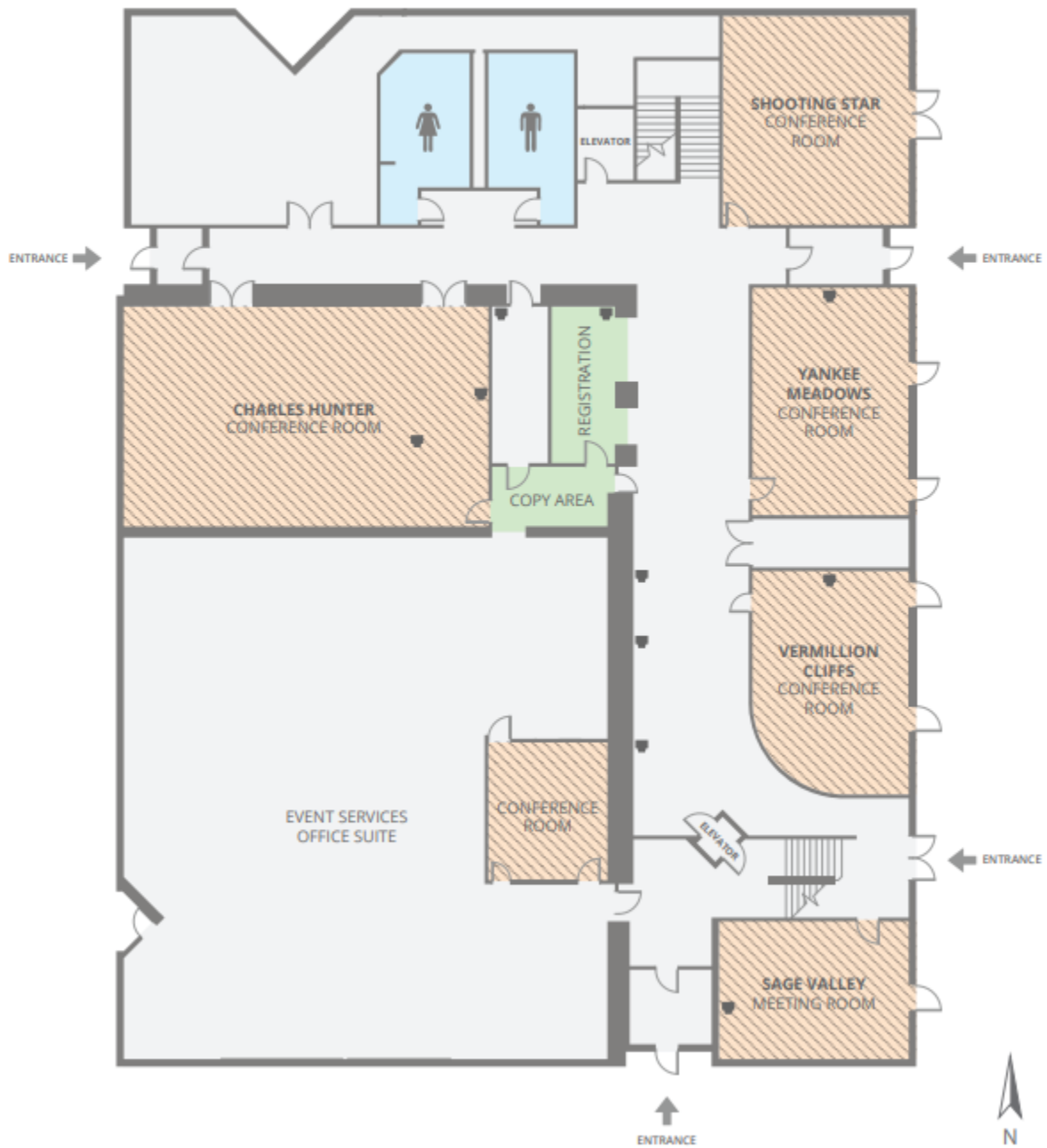
R. HAZE HUNTER CONFERENCE CENTER

SOUTHERN UTAH UNIVERSITY

100 Level

Meeting Rooms

Data Port



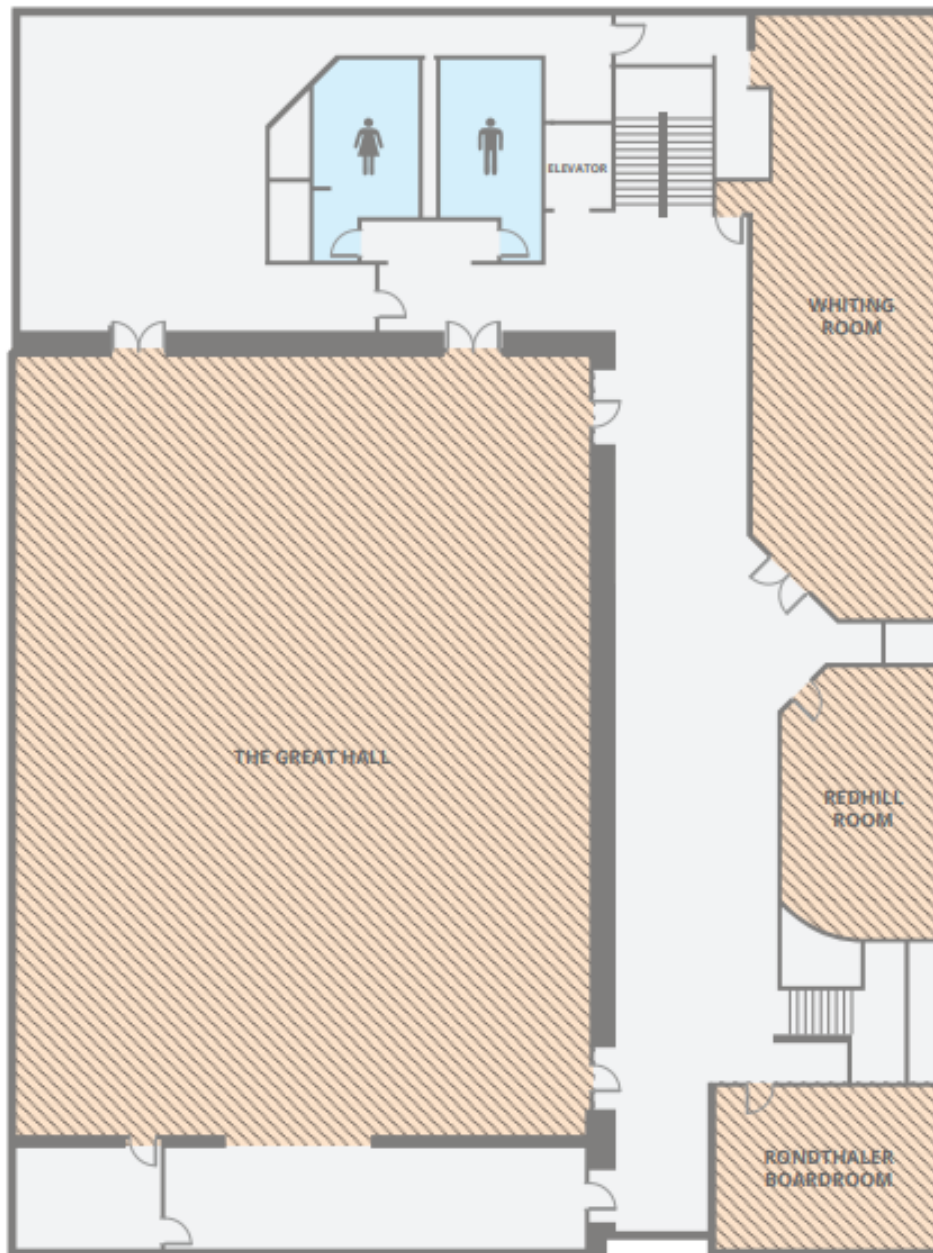
R. HAZE HUNTER CONFERENCE CENTER

SOUTHERN UTAH UNIVERSITY

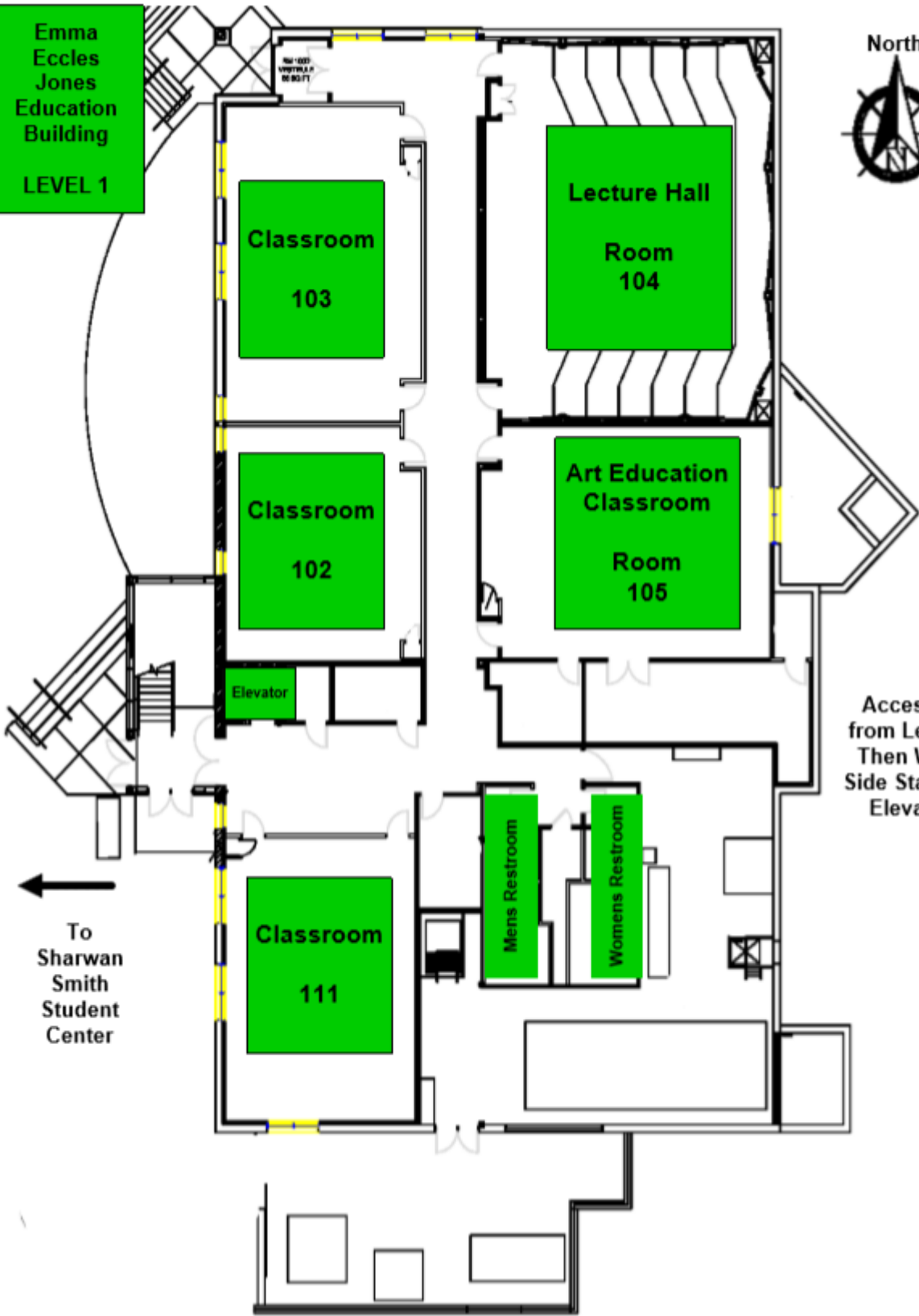
200 Level

Meeting Rooms

Data Port



Emma
Eccles
Jones
Education
Building
LEVEL 1



Access is
from Level 2
Then West
Side Stairs or
Elevator

←
To
Sharwan
Smith
Student
Center

**Emma
Eccles
Jones
Education
Building**
LEVEL 2

**Classroom
204**

**Classroom
205**

**Classroom
203**

**Classroom
206**

**Classroom
202**



Elevator



**To
Hunter
Conference
Center**

**Front
Door**

**To
Sharwan
Smith
Student
Center
By Way
Of
Level 1**

**Classroom
215**

**Mens
Restroom**

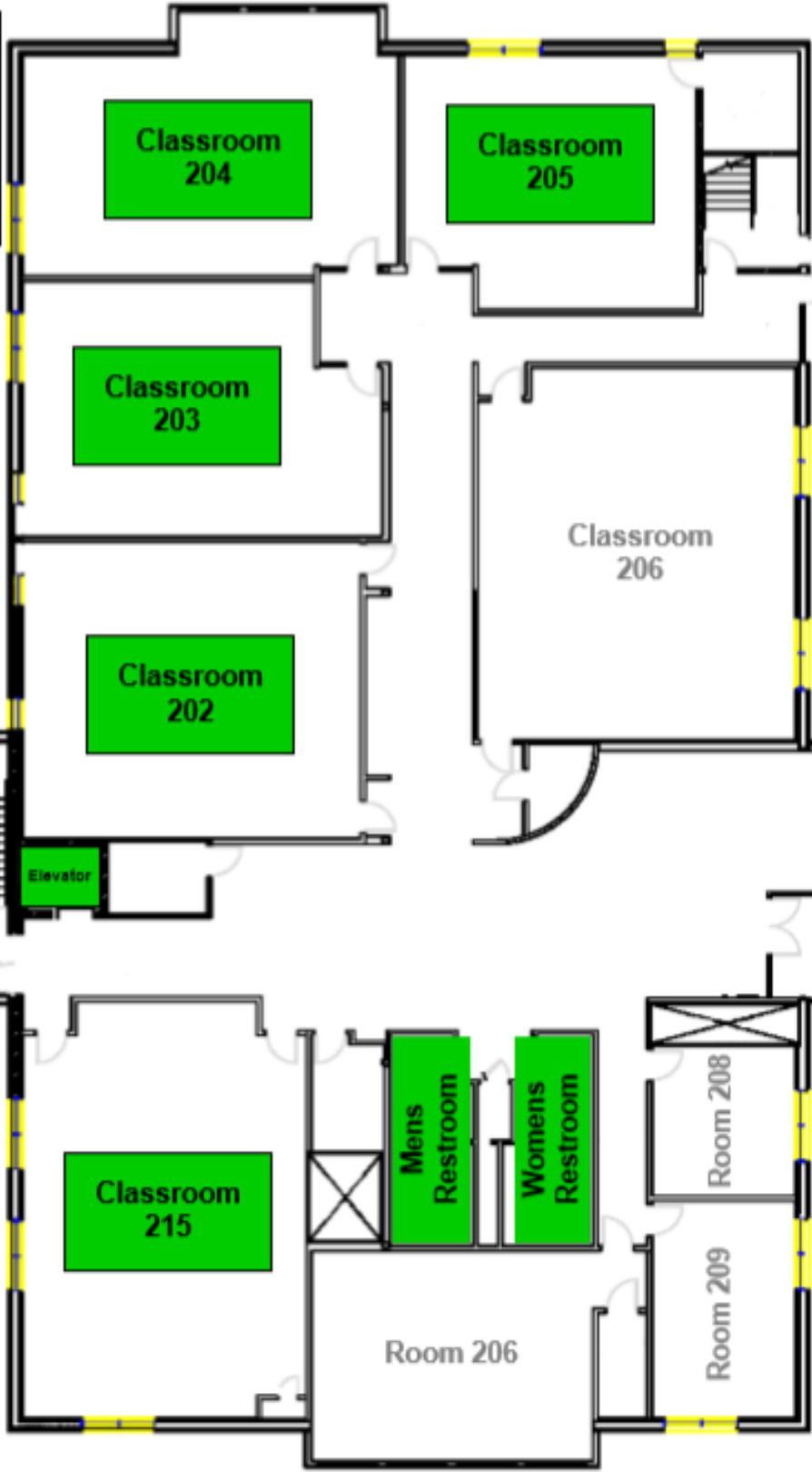
**Womens
Restroom**

Room 208

Room 206

Room 209

**To
Electronic
Learning
Center**



Utah Academy Spring Excursion will feature sociology and anthropology experts on Bears Ears National Monument

Join us for the annual UASAL Excursion on Friday June 1 and Saturday June 2, 2018

James Singer will lead a discussion "Bears Ears is not only a physical location but an actual site where different social forces, social groups, narratives, cultures and peoples have collided. Looking at Bears Ears from a sociological point of view, this presentation will show how power, resources, spirituality, religion, race, economics, and politics, all intersect to create the climate we're experiencing today. This analysis will help the attendees better understand the theoretical underpinnings and the structural forces at play about what makes Bears Ears a flashpoint."

Jim Dykmann who did his dissertation on this site will take us on a guided tour of Butler Wash and Mule Canyon Indian Ruins. These ruins are located along Highway 95, between Blanding and Natural Bridges National Monument. Butler Wash shelters a cliff dwelling that can be seen after a short hike. Mule Canyon Ruin is adjacent to the road and contains dwelling units, a reconstructed open kiva, and a partially reconstructed tower.

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