University of Montana Presents

The 15th Annual

Program and Abstracts

April 15, 2016 ~ Missoula, Montana

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Special thanks to all the mentors, reviewers, judges, and volunteers who donated their time!

Conference on Undergraduate Research

April 15, 2016

UMCUR Sponsored By:

Office of the President

Davidson Honors College

UMCUR Welcome

WELCOME TO UMCUR!

We are pleased to welcome students, faculty, staff, alumni, and community members to the 2016 University of Montana Conference on Undergraduate Research (UMCUR). Over 120 students will present their research today, and we are delighted to celebrate their accomplishments. This conference has been a tradition at the University of Montana since 2001, and this year we are excited to see UMCUR serve as the climax of our week-long "ix5" celebration of research at UM.

Undergraduate research and creative scholarship are an incredibly important part of the UM experience for a large number of our students and faculty. The research experience leads to many practical benefits for our students, including stronger qualifications for graduate school and/or professional positions. Indeed, we know that college graduates will encounter many "unscripted challenges" throughout their professional careers, and that the fundamental skills they gain through participation in original research will make them much more capable of adapting, analyzing, and flourishing in the global economy of the 21st Century. Perhaps most importantly, undergraduate research also offers our students substantial personal benefits in the form of stronger connections with their faculty mentor(s), a tremendous sense of empowerment, more confidence, and significant intellectual growth.

We extend special thanks to President Royce Engstrom for his support of this conference and his commitment to undergraduate research and creative scholarship at the University of Montana. In addition, many UMCUR projects are carried out with private scholarship support, and we would like to express gratitude to our many generous donors. We also extend our sincere appreciation to the UMCUR Planning Committee, the University of Montana Undergraduate Research Committee, all the faculty , Staff & Community members who heroically reviewed dozens of projects over spring break, our dedicated faculty mentors who guide the excellent research you will see presented today, and the faculty, alumni, community members, graduate students, and undergraduates who have volunteered their time as facilitators for the conference. To all our supporters, please know that we could not hold UMCUR without you.

Lastly, to our student presenters: Congratulations on this tremendous accomplishment! We are proud to feature your achievements and hard work today, and we are extremely proud to have you as students at the University of Montana.

Best wishes for a successful (and enjoyable) day,

Brock Tessman, PhD

Dean, Davidson Honors College

UMCUR Keynote Speaker

12:20 p.m., University Center Theater ~ April 15, 2016

Research that Improves Lives: Harnessing the Power of Neuroplasticity to Improve Language Function for Survivors of Stroke and Brain Injury

Catherine Off

Asssitant Professor in the Department of Communicative Sciences and Disorder

University of Montana

Abstract

Scientists across a number of disciplines seek to better understand the relationship between brain structure and function, and human behavior. They investigate complex questions by examining the molecular and cellular levels, applying neuroimaging techniques, and conducting behavioral research. By bringing together these approaches as neuroscientists, we are beginning to understand how we can influence our own brain's plasticity to maximize learning, modify existing behaviors, and rehabilitate injured brains. As a behavioral scientist and brain injury rehabilitation specialist, I have spent this early part of my academic and research career exploring my fascination of the relationship between brain function and the human's ability to communicate using complex language. Undergraduate study of linguistics and cognitive science inspired me to ask questions about what happens when a complex cognitive system like language goes awry – leading to my ultimate commitment to the field of speech and hearing sciences and rehabilitation medicine. My current research is designed to better understand how principles of neuroplasticity that have been brought to light through motor learning research can be applied to improve language function following brain injury. I am manipulating treatment variables such as the intensity with which we deliver treatment, and the dosage, or number of trials per session, to optimize rehabilitation outcomes. Ultimately, the goal of this research is to complement medical interventions with focused, deliberate, and effective behavioral treatment approaches to improve the lives of those recovering from stroke or brain injury.

About Catherine Off

Catherine Off is an assistant professor in the Department of Communicative Sciences and Disorders at the University of Montana and directs the Brain Resarch of Aphasia and Intensive Neurorehabilitation (BRAIN) Lab. She co-directs the Big Sky Aphasia Program, an intensive comprehensive aphasia program (ICAP) located at the University of Montana that is designed to improve speech, language, and cognitive function following stroke. Catherine is also affiliated with the UM Brain Initiative, the UM Neural Injury Center, and the Academy of Neurologic Communication Disorders and Sciences (ANCDS).

Catherine completed her Ph.D. in the Department of Speech and Hearing Sciences at the University of Washington in 2008 with an emphasis on aphasia rehabilitation. She then worked as a lecturer at California State University - Northridge before taking her position at the University of Montana. Her research focuses on treatment intensity and rural outreach in the context of post-stroke aphasia rehabilitation, with a focus on both patient and caregiver outcomes and graduate student clinician training. Catherine's team investigates principles of neuroplasticity as they relate to the rehabilitation of neurologic communication disorders stemming from stroke and traumatic brain injury in the context of the World Health Organization International Classification of Functioning, Disability, and Health (WHO-ICF) model.

UMCUR Schedule Overview

Conference on Undergraduate Research (UMCUR)

University of Montana

April 15, 2016

University Center 3rd Floor

8:00 AM	Registration & Poster Setup - UC 3rd Floor, Grand Foyer
9:00 - 11:00 AM	Oral Sessions - UC 326-331 • Social Sciences, Physical Sciences, Humanities
9:20 - 12:20 PM	Global Leadership Initiative (GLI) Capstone Presentation Session - UC North Ballroom
11:00 AM - 12:00 PM	Poster Session #1- UC South Ballroom
12:20 AM - 1:30 PM	Keynote Speaker & Awards Ceremony - UC Theater
1:40 - 3:00 PM	Global Leadership Initiative (GLI) Capstone Presentation Session - UC North Ballroom
1:40 - 3:00 PM	Oral Sessions - UC 326-331 • Social Sciences, Life Sciences, Physical Sciences, Humanities
3:00 - 4:00 PM	Poster Session #2 - UC South Ballroom
4:00 - 5:00 PM	Oral Sessions - UC 326-332 • Social Sciences, Humanities, Life Sciences, and Visual/Performing Arts & Creative Writing

**Please check the schedules outside each room for the most up-to-date times for each presenter.*

Awards Ceremony

We are pleased to announce that President Engstrom will present UMCUR Awards at the Keynote & Award Ceremony on April 15th, 12:20 - 1:00 pm.

New This Year

The Committee on Undergraduate Research presented awards to the ten "Best Projects" in each of the five research categories: Humanities, Life Sciences Physical Sciences, Social Sciences and Visual & Performing Arts. Award status included:
A special recognition plaque presented by President Engstrom, an invitation to the ix5 Launch Gala with nationally renowned presenters and additional opportunities for special presentations during UM ix5 Innovation Week April 11-15th, 2016.

Congratulations

The following Students have been awarded for "Best Project" in their Category

Dac Cederberg	Humanities
Hope Radford	Humanities
Jessica Stevens	Social Sciences
Sydney Stivers	Social Sciences
Edmond Brewer	Life Sciences
Ashley Alexander	Life Sciences
Shiva-Nandan Arens	Physical Sciences
Jesse Bunker	Physical Sciences
Emily Curtiss	Visual and Performing Arts
Spencer Ruchti	Visual and Performing Arts

Look for AW (Award Winner) in the time slots throughout the Program

UMCUR Schedule Breakdown

Only the submitting author will be shown in schedule. Please view abstracts in the back of the program for all authors.

8:00	**Participant Registration and Poster Set-Up** - *UC 3rd Floor Grand Foyer & South Ballroom*
Oral Sessions: 9:00-11:00 AM	
UC 326 ~ Social Sciences	
9:00	Social norms: Understanding community perceptions of voluntary services and its effect on parental engagement ~ Emily Stiles
9:20	Voter Registration Demographics in Montana - The Youth Disparity between Voter Registration and Turnout ~ Elizabeth Story
9:40	Religious, Racial, or Ethnocultural Prejudice? Assessing Online Islamophobic Sentiment in the American Context ~ Arif Memovic
10:00	Comanagement Between Federal Agencies and Native American Tribes: Applications and Lessons ~ Rachel Grabenstein
10:20	The Effectiveness of Student Organizations as Legitimate Public Agencies ~ Cody Meixner
10:40	Creating the Campesino: United States' Influence on Agrarian Reform during the 1952-1953 Bolivian National Revolution ~ Carly Campbell
UC 327 ~ Life Sciences	
9:00	Non-structural carbohydrates influence survival under drought in Pinus ponderosa ~ Aurora Lela Bayless
9:20	Sexual Dimorphism and Seasonal Plasticity of the Squinting Brown-Bush Butterfly (*Bicyclus anynana*) ~ Stephanie Parker
9:40	Effects of conifer removal treatments on quaking aspen regeneration and adult growth ~ Philip Williams
10:00	Comparing changes in fuel loading, tree regeneration, and forest structure in once- and twice-burned mixed-conifer forests ~ Wyatt Trull
UC 330 ~ Humanities	
9:00	Ruskis of Hollywood: Stereotypes of Slavs in American Cinema ~ Miriam Krainacker
9:20	Ludmila Petrushevskaya's The T*ime: Night:* The Theme of the Unfit Mother in Post-Soviet Russia ~ Rebekah Wech
9:40	Introspection and Realization in the Parallel Lives of Gautama Buddha and Saint Augustine ~ Charlotte Westwater
10:00	Stigmatization: The Effect of the Montana Meth Project on People Who Use Methamphetamine ~ Sophia Friedl
AW 10:40	Globalization and Small Farmers in Latin America: Effects and Adaptations ~ Hope Radford

UC 331 ~ Physical Sciences	
9:00	Synthesis and Modeling of CYP26 Selective Inhibitors ~ Benjamin Uhlenbruck
9:20	Implications of Climate Change on Mountain Environments: The Case of the Julian and Karavanke Alps, Slovenia ~ Lara Antonello
AW 9:40	Reproductive Output of *Pinus albicaulis* (whitebark pine) at Alpine Treelines ~ Jesse Bunker
10:00	Chute cutoffs and alluvial point bar morphodynamics: How rivers move over time ~ Caelan Simeone

Global Leadership Initiative (GLI)

Capstone Presentation Session

These presentations feature Capstone Research from students in University of Montana's Global Leadership Initiative (GLI). These GLI students are in their fourth and final year of the GLI fellowship. Throughout their four years they have been involved in unique and enriching academic learning that has combined practical experience with their classroom education. GLI students received access to world-class leaders and opportunities to explore society's questions either locally or around the world. GLI's distinctive program brings together students from different disciplines to tackle real-world problems with diverse ideas.

GLI Capstone Presentation Session 9:20 - 12:20 pm UC North Ballroom	
GLI	
9:20	Small Acts of Silence ~ Olivia Keith, Elaine Kelly, Megan Nishida, Claire Chandler, Katherine Leonard
9:40	Glass Recycling in the Missoula Valley ~ Katie Atherly, Michelle Nemetchek, Michael Nelson, Megan Jones, Laura Weingertne
10:00	Creating an Effective Global Education Program for Elementary School Children ~ Paige Sears, Mary O'Malley, Henry Lilly, Jenna Hitchcock, Payton Wulf, Nick Ormsby, Samuel Wood
10:20	ERRA, the Environmental Recycling Research Application A GLI Capstone project that will change the world! ~ Sam Forstag, Elizabeth Hoffman, Leland Hubbard, Miriam Krainacker, Lauren Molin
10:40	Break
11:00	Health and the Homeless Population of Missoula: Wet Housing as a Solution ~ Ciara Gorman, Nicholas Bruner, Sophie Freid, Marissa Ginnett, Samantha Hodgson, Tessa Richards, Stefan Riemens
11:20	Milltown State Park Education Project ~ Caelan Simeone, Mariah Bell, Antonio Morsette, Paul Paeth, Megan Harbaugh
11:40	Misinterpretation of Food Labels and Food Waste ~ Taylor Craig, Austin Clark, Leah Payne, Elizabeth Story, Tana Wilson
12:00	Bluebird Poetry Project: Slam Poetry as a Therapeutic Intervention for Depression ~ Mercedes Becker, Spencer Ruchti, Cara McKee, Austin Herron, Alex Swalling

Want to participate in the 2017 UMCUR? Make sure to visit the UMCUR Website and Like us on Facebook to keep up with current happenings.
www.umt.edu/ugresearch/umcur

Poster Session #1: 11:00 -12:00 PM
UC South Ballroom
(Listed by poster number, left - right)

Humanities			
1	Productive Classroom Literacy Instruction ~ Melanie Goeddel	3	The Communicability of Nature: Redefining Nature's Voice ~ Meg Smith
Life Sciences			
5	The role of glycerol metabolism in the Lyme disease agent ~ Bethany Crouse	6	Using ISSR markers to study genetic diversity in whitebark pine *(P. albicaulis)* ~ Clare Vergobbi
7	The OAβ1R receptor mediates OA signaling at the periphery to promote male aggression ~ Bryn Sutherland	AW 8	Fitness as a Function of Diversity in a Simple Microbial Community ~ Ashley Alexander
9	Ice Cream: Is It Really a Thin Liquid? ~ Marisa Binder	10	Factors of Pre-Med Success ~ Bryanna Ogger
11	Patient and Caregiver Health and Wellness Outcomes following an Intensive Comprehensive Aphasia Program ~ Erin Colleen Powers	12	Serum Resistance in *Bartonella* Species ~ Benjamin Mason
13	Rehabilitation through Communication, Neuropsychology, Counseling, and Training (ReCoNeCT): Connecting students and student veterans impacted by mTBI with holistic interventions, skills, and support ~ Marley Niland	14	Effects of Fluoxetine on Aggressive Behavior in *Betta Splendens* ~ Jeffrey Kelly
15	Motor Impairments of Fluoxetine Administration in *Betta Splendens* ~ Jeffrey Kelly	16	Influence of Fluid Ingestion on Sweat Rate Status While Exercising in the Heat ~ Delaney Frazer
17	The OAβ1R receptor is required in peripheral neurons to interpret environmental information ~ Edmond Brewer	18	The Effect of Fluid Volume and Temperature on Physiological Strain and Performance in the Heat ~ MaryAnn Beach
19	Skeletal preservation and articulation of a White-Tailed Deer ~ Jude Nickison	20	Motor Control of Force Output in Fresh and Fatigued Muscle Fibers ~ Jennifer Miller

Poster Session #1: 11:00 -12:00 PM
South UC Ballroom
- Continued

Physical Sciences			
37	The effect of varying thinning treatments on the accumulation of woody debris within western larch forests ~ Cullen Weisbrod	AW 38	Petrology of the Libby Formation and comparison to the Garnet Range and Pilcher Formations of the Belt Supergroup: The case for stratigraphic equivalency ~ Shiva-Nandan Arens
39	Documenting the sedimentology of an unusual set of gravel deposits exposed along Snowbowl Road ~ Kyle Brangers	40	Developing a Comprehensive, Long-term Monitoring Program for Invasive Weed Treatments ~ Aimee Kelley Dickinson
41	Synthesis and Binding Constants for Poly-Amidoxime Uranyl Complexes for Sequestering Uranium from Seawater ~ Evan McManigal	42	A Retrospective Drug Utilization Review analyzing the impact of pharmacist based immunizations at an Urban Indian Health Center ~ ElizabethVan De Grift
43	Distribution of Gas Hydrates indicators in the Magnolia field, Gulf of Mexico ~ Betina Sodré de Oliveira Rodrigues	44	Neuromuscular responses to an instantaneous force change in exhaustive bouts of exercise ~ Tara Cleveland
45	Gold Nanorods ~ Madison Drake		
Social Sciences			
50	Using Global Maternal Sensitivity Score to Predict Infant Attachment ~ Jamie Pauley	51	An Examination of Literate Vocabulary in the Persuasive Writing of Seventh-Graders ~ Madeline Julin
52	Dynamic Assessment of Speech Adaptability in Children ~ Nicolette Selensky	53	Another Look at Alliteration ~ Cailen Bosch
54	Cladistically modeling Oldowan assemblages: Preliminary theoretical and methodological insights and issues ~ Corey Johnson	55	Determining Child Abuse Potential with the Child Guidance Interview Sub-scales ~ Sabina Sabyrkulova

12:20 - 1:30 p.m. - Keynote Speaker:
UM Professor, Catherine Off - UC Theater

"Research that Improves Lives: Harnessing the Power of Neuroplasticity to Improve Language Function for Survivors of Stroke and Brain Injury"

Pizza Provided in the UC Foyer

GLI Capstone Presentation Session: 1:40-5:00 PM
UC North Ballroom

GLI	
1:40	Sexual Consent Education before Adulthood ~ Trudy Stebbins, Corlin Reed, Holly Seymour, Patricia Gornick, Julia Read, Victoria Vandelinde
2:00	Mitigating the Global Issue of Food Waste through Children's Literature ~ Nikki Parker, Lisa Morgan, Peregrine Frissell, Leann Skach, Graydon Myhr, Greg Arno
2:20	Story Talk: The Conversation You've Never Heard ~ Rebecca Collins, Kimberly Lamar, William Matross, Joel Weltzein, Brianna Zender, Harris Rosendahl, Kathryn Brandos
2:40	The Boiling Pot: Constructing a Social Space to Instigate Sustainability Conversations ~ Laura Barta, Wyatt Trull, Avriel Skolnick, Tegan Miller, Teagan Martin, Ashley Perry Dylan Portoghese

Concurrent Oral Sessions: 1:40-3:00 PM & 4:00 - 5:00 PM
(3:00 - 4:00 PM is Poster Session #2 - No Oral Presentations at this time)

UC 326 ~ Social Sciences	
1:40	Stock Splits: An Analysis of Firms Based on Pre and Post-split Nominal Share Price ~ Cody Sevier
2:00	Faunal Analysis of Togiak Archaeological and Paleoecological Project: How Ecology Affects Indigenous Subsistence Practices in the Arctic Wetlands ~ Dougless Skinner
2:20	We Gon' Be Alright: An Anthropological Analysis of the Musical Reactions of the Black Community after the Killing of Michael Brown ~ Joel Weltzien
2:40 - 3:00	Las Dos Caras de Buenos Aires: Wealth Inequality in Argentina ~ Conor Hogan
4:00	The Refugee Crisis and the European Union; Realism, Liberalism, and the Structure of Integration in Europe ~ Brendan Hooks
4:20	The Role of Capacity Building in Emergency Humanitarian Response: An Ebola Case Study ~ Mary O'Malley
AW 4:40 - 5:00	Is Montana's "24/7 Sobriety Program" Deterring Drunk Drivers? ~ Jessica Stevens

UC 327 ~ Life Sciences	
1:40	We're All Stressed, It's College: An Exploration Into the Perceptions of Stress Among College Students ~ Shelby Lambdin
2:00	Using Feather Corticosterone to Help Understand the Relationship Between Physiology and Nestling Growth in Mountain Bluebirds (*Sialia currucoides)* ~ Ian Morrison
2:20 - 2:40	Can GPS Clusters Predict Calving of Moose in Northeastern Washington? ~ Richard Ramirez
4:00	Improving Classification of Transposable Elements in the Human Genome ~ Gilia Patterson
4:20	Fish Food: An Assessment of Aquatic Invertebrate Communities on the Upper Clark Fork River ~ Nicholas Voss
4:40 - 5:00	To Jump or Not to Jump: Mule Deer and White-tailed Deer Crossing Decisions ~ Emily Burkholder

Concurrent Oral Sessions: 1:40-5:00 PM - Continued	
UC 330 ~ Humanities	
AW 1:40	You Better Wise Up, Janet Weiss: Reclaiming the Queerness of *The Rocky Horror Picture Show* ~ Dac Cederberg
2:00	Classifying Abnormal Network Captures with Early Response: Artificial Intelligence Defense Systems ~ Alaina Brown
2:20	Technology and the Impoverishment of Experience: An Insight Through Marcuse and Heidegger ~ Brenna Gradus
4:00	Missoula's Homeless Children: Effects of Homelessness on Mental, Emotional and Social Health ~ Sarah Shapiro
4:20	Euripides' Medea Revisited: Athenian democracy and the Peloponnesian War ~ Ian Siepker
4:40 - 5:00	Rethinking Leibniz' Infinitesimals ~ Johnathan Bush
UC 331 Social Sciences	
AW 1:40	The Human Cost of Failed Diplomacy: The Political Motivations Behind the 1994 United States-led Invasion of Haiti ~ Sydney Stivers
2:00	Iran Nuclear Agreement: Good Choice or Bad Deal? ~ Mikaela Koski
2:20	Sentiment Expression on Twitter Regarding the Middle East ~ Byron Boots
2:40 - 3:00	An Examination of Structural Realism in US- UN-Iran Relations ~ Julian Adler
UC 331 Visual & Performing Arts Exhibition (4:00 - 5:00 PM)	
AW 4:00	*The Mass of Men Lead Lives of Quiet Desperation*: A Study of Unconventional Point of View and Narrative Structures in Contemporary Fiction ~ Spencer Ruchti
4:20- 4:40	GrizCode: a comedic web series defining what it means to be a University of Montana "Grizzly." ~ Darien Gostas
UC 332 Visual & Performing Arts Exhibition	
4:20	The Art of Sound ~ Sarah Fugman
AW 4:40 - 5:00	Improvisation as a Tool for Choreography and Performance ~ Emily Curtiss

Poster Session #2: 3:00 - 4:00 PM
UC South Ballroom
(Listed by poster number, left - right)

Humanities

2	A Literary Review of Select Educational Philosophies ~ Logan Hegedus	4	Immoral Women in French Literature: The Portraits of Women in *Les Liaisons Dangereuses* by Pierre Choderlos de Laclos and *Madame Bovary* by Gustave Flaubert ~ Hannah Schultz

Life Sciences

21	UMove: A Physical Therapy Mobile Application for Calculating Fitness Levels in Wheelchair Users ~ Lisa Morgan	22	The Role of RNase Y in rpoS Transcript Processing in *Borrelia burgdorferi* ~ Zhibing Zhou
23	Characterization of RNA aptamer binding to Rift Valley fever virus nucleocapsid protein ~ Ilona Csik	24	Studying the Function of ybgL; an *E. coli* protein of unknown function ~ Savannah Whitfield
25	The Effect of Dehydration on Heat Acclimation ~ Justin Stevens	26	Effects of Hydration on Physiological Indicators during Short Term Heat Acclimation ~ Nicole Mickelson
27	Soft Sound Test and 15 dB Hearing Screening Level for Adults ~ Sarah Rice	28	Auditory Processing in Fluency Disorders ~ Megan Chamberlin
29	The Incidence and Prevalence of *Otitis Media* in Montana Daycare and Preschool ~ Kendal Alley	30	Cortical electrical responses occurring prior to speech initiation~ Maira Ambris
31	Backward Masking Determination with Early, Middle and Late Evoked Potentials ~ Taylor Perius	32	Auditory evoked potentials in humans and laboratory rats ~ Emma Bozarth
33	Signal Detection Analysis of Homophonous Sounds with 2D and 3D Lip Reading Presentations ~ Sarah Shultz	34	Backward Masking and Speech Perception ~ Allie Cope
35	The ISI Critical Value in Backward Masking Testing ~ Sarah Schied	35A	Hip Flexor Extensibility and Its Correlation to Hip Hyperextension and Lower Back Pain in Dancers ~ Tessa Richards

Physical Sciences

36	Tracking Growth and Movement of the Slave River Log Jam ~ Brooke E. Hess-Homeier	46	The influence of topography and spatial patterns of soil hydraulic conductivity on groundwater response across a forested hillslope. ~ Mariah Bell
47	Electrostatic interactions of Cytochrome C and Cardiolipin: Quantitative analysis of structural changes of Cytochrome C by spectrometric techniques. ~ Michael Rothfuss	48	Single Photoionization Cross-Sections and Rydberg Resonances of Br+ ~ Dylan Gross

Poster Session #2: 3:00 - 4:00 PM South UC Ballroom (Listed by poster number, left - right)			
Social Sciences			
49	The Effect of Mindfulness-based Interventions on College Students' Mind Wandering ~ MacKinzie Tilleman	56	Effectiveness and Parent Acceptability of YETI for Children with Autism ~ Phillip Thomas
57	The effect of feedback on long-term retention ~ Elaine Marshall	58	Togiak Archaeological Site Hair Samples- What Species? ~ Clare Super
59	ERRT-C: A Treatment for Trauma-Related Nightmares in Children ~ Jasmine Talbert	60	The Implications of Teachers' Perceptions of LGBTQIA+ Youth ~ Kenzie Nash
61	Experimenting in Archaeology: Can red ochre waterproof a hide? ~ James Verzuh	62	Strengthening Early Mathematical Foundations: Number Recognition ~ Mary Burns
63	The Effects of Mindfulness Based Interventions on Working Memory Capacity ~ Emelyn Falley	64	Mental Health Providers Transphobic Biases ~ Finn Story
65	Disaster Relief: A Monitoring & Evaluation Framework for Kopan Monastery ~ Shiva-Nandan Arens	66	A Decade of Deaf Theatre: An analysis of theatre within the Deaf Community, the expansion of its acceptance, and the influence it has today ~ Cortney Wells

UMCUR Oral Presenter Abstracts:

(in order of Category & alphabetized by Title)

Humanities

Classifying Abnormal Network Captures with Early Response: Artificial Intelligence Defense Systems
Author(s): Alaina Brown Mentor: Douglas Raiford
Abstract:
Society is steadily being confronted with an increasing number of issues which bring the concept of security into question. Cyberwarfare is an important issue for our generation, and as humanity progresses towards the development of programs and algorithms that utilize artificial intelligence, it is imperative to incorporate machine learning algorithms into our intrusion detection systems. Artificial intelligence can be used to minimize the human element, which is often the weakest portion of a system, in many different situations.

This study will test the accuracy and efficiency of using multiple different machine learning algorithms to analyze sets of normal and abnormal network traffic and predict the likeliness that any particular instance of activity on a network is a malicious intruder. I will be comparing the results from a few machine learning algorithms and finding which algorithm has the most efficiency, and then comparing this to the efficiency of human monitoring.

Continued

This research will help contribute to the field of Cybersecurity by displaying how artificial intelligence could be used to increase security for nearly any network or system and help propel the combination of the Artificial Intelligence and Cybersecurity fields into the future. I will be comparing my findings to human monitoring.

Euripides' *Medea* Revisited: Athenian democracy and the Peloponnesian War
Author(s): Ian Siepker Mentor: Barbara Weinlich
Abstract:
For a number of years, Euripides' *Medea* has been explored predominantly by feminist approaches, highlighting woman's struggle in ancient Greek society (Rabinowitz, 1993, Mitchell-Boyask 2008). In contrast, this proposed paper is concerned with the question of how *Medea's* final act of infanticide squares with the Athenian male's anxieties surrounding the preservation of the *oikos* (household) and, by extension, the dawning war with Sparta during the time of the tragedy's performance.

By looking at Medea from a historical-sociological angle, this proposed paper will argue that Euripides'tragedy mirrors the neurosis as well as blind hubris spawned by Athenian democracy. Medea then can be seen as a parable through which Euripides attempts to warn the Athenian public that their unjust dealings with their former ally, Sparta, could deal them a devastating blow akin to the blow dealt by Medea unto Jason.
The major points of my argumentation will include, among others, a contextualization of the historical and political situation in Athens in 431 BC, i.e., in the year in which the tragedy was performed; a close analysis of how Medea's societal status is defined and re-defined throughout the play; and a discussion as to how Jason's disregard for Medea's former deeds and sacrifices provides an analogy as well as a haunting image for the injustice that ruled Athens' increasingly self-interested interactions with Sparta. Just as Athens' desire to build an empire led to the outbreak of the Peloponnesian War and ultimately to the demise of the great city-state, so Jason's betrayal of Medea resulted in the loss of his own.

While this socio-historical reading of *Medea* opens up a new field of investigation for the study of ancient Greek tragedy, it also offers an approach that gives new impulses for the study of the humanities in general.

Globalization and Small Farmers in Latin America: Effects and Adaptations
Author(s): Hope Radford Mentor: Steve Siebert
Abstract:
The intersection of agriculture and international development is an increasingly important topic with critical implications for environmental sustainability and poverty relief. As the world becomes more interconnected, it is essential that we examine how and to what extent changing consumer demands and open trade networks affect the structure of agriculture in both the developed and developing world. In particular, we must examine the implications of these changes for small farmers, providing insight as to whether the globalized food trade offers an opportunity for development and poverty relief, or only further marginalizes poor populations and encourages unsustainable farming practices. Argentina and Chile are key examples of countries whose agriculture sectors have rapidly industrialized in response to globalization, and both offer insight into how structural changes may be affecting small farmers. Previous research on the topic has relied primarily on aggregate data or survey-based research methods and has focused primarily on effects rather than responses or adaptations to these changes. This study utilizes an ethnographic case study of eight small farms in Argentina

Continued

and Chile, offering a less expansive but more nuanced insight into small farmers' experiences and responses to globalization. Though results varied, farmers' main adaptations were 1) stepping out of agriculture or otherwise diversifying both on and off-farm income or 2) establishing new models of sale that provide greater income stability.

Introspection and Realization in the Parallel Lives of Gautama Buddha and Saint Augustine

Author(s): Charlotte Westwater Mentor: Paul Dietrich

Abstract:
Gautama Buddha and Saint Augustine: two men born centuries and worlds apart, whose parallel lives tell the story of man's struggle to find meaning in his own life, and to understand himself in terms of the divine. Some time in the middle of the first millennium BCE, the bodhisattva who would become Gautama Buddha took his final birth in the Himalayan foothills of present-day Nepal. Born a prince of the warrior caste and destined for enlightenment, the bodhisattva would escape the world of privilege and excess, before renouncing his titles and possessions and enduring much mortification on his path to Buddhahood. Many centuries later, in 354 CE, a man was born in Numidia, present-day Algeria, whom the world would come to know as Saint Augustine. Born to a Christian mother and a pagan father, Augustine's life was that of a man in conscientious pursuit of justification, emerging from a youth of misguided hedonism, only to suffer many trials on his path to piety and an intimate relationship with God.

Though separated by many years and miles, the extraordinary lives of Gautama Buddha and Saint Augustine bear a striking resemblance to one another. The lives of men like Gautama Buddha and Saint Augustine have often and long since provided insight for those in search of a deeper understanding of themselves and the divine. By examining the lives of these two men side by side, this work attempts to shed light on the fascinating phenomenon of two such polarizing individuals emerging completely independently of one another, yet following very much the same path of self-examination to their respective realizations. What is ultimately gained from this dual examination is not simply a message of enlightenment or conversion, but rather an indisputable assertion of the universal and immeasurable importance of introspection.

Ludmila Petrushevskaya's *The Time: Night:* **The Theme of the Unfit Mother in Post-Soviet Russia**

Author(s): Rebekah Wech Mentor: Ona Renner-Fahey

Abstract:
Post-Soviet Russia was a nation gripped by uncertainty, as profound political, economic, and social changes ensued. One such change was a dramatic increase in the instances of mothers who conceived out of wedlock. Research conducted in the late 1990's showed that this jump in birth rates to unwed mothers was largely comprised of undereducated, impoverished, and often teenage women who were fully reliant on family members. Following the collapse of the Soviet Union, a strained and unpleasant image of motherhood began to surface in Russia's great literary tradition, which was in stark contrast to male-authored depictions of motherhood in years prior. I argue that in observation of the disparity between the male-authored portrayal of Russian motherhood and reality, the theme of the bad mother emerges in the works of female writers.

This paper focuses specifically on one text: Ludmilla Petrushevskaya's *The Time: Night* which I propose is a plausible microcosm of reality.The novella tells the story of one family through the delusional prose of elderly Anna Andrianovna: struggling poet, single mother, and grandmother. In my analysis of *The Time: Night* I examine the relationships that Anna maintains with each of her family members, and show that each of them is wrought with realistically gendered problems that manifest themselves in an endless cycle of chaos and despair. I show that Petrushevskaya is using the theme of the ultimate unfit mother in this fictional tale to comment on both patriarchal constructions of motherhood, and on the idea that woman must be synonymous with dutiful wife and loving mother. I argue that Petrushevskaya conveys that reality can vary greatly from this idea, as the experience of many mothers in contemporary Russia was instead marked by poverty and discrimination.

Missoula's Homeless Children: Effects of Homelessness on Mental, Emotional and Social Health
Author(s): Sarah Shapiro Mentor: Annie Sondag
Abstract:
The mental, emotional, and social health of children are greatly affected by being homeless. Being homeless as a child could affect a person's coping skills and lead to mental health issues that increase the likelihood of substance abuse, suicide attempts, or adult homelessness. The purpose of this research project is to explore the negative effects of homelessness on Missoula children, and to identify services that could be useful in combating those effects. Methods for this project included two data collection strategies. First, a literature review was completed for the purpose of enhancing understanding about the effects of homeless on children nationwide. Second, key informant interviews were conducted with individuals in Missoula for the purpose of exploring the differences and similarities between issues identified in the literature and issues specific to children in Missoula.

The population of homeless families in Missoula is growing faster than any other homeless population in the United States. When looking at the multitude of health issues children face because of homelessness, and the long-term results of homelessness, early interventions are vital. With such a large number of homeless children in Missoula, it is vitally important to find effective interventions to put in place to help prevent future health issues.

N**on-structural carbohydrates influence survival under drought in** *Pinus ponderosa*
Author(s): Aurora Lela Bayless Mentor: Anna Sala
Abstract:
Worldwide forest mortality events associated with climate change are of increasing concern and could have profound consequences on global carbon cycles. There is an increasing need to assess the risk of forest mortality due to climate change. However, model predictions of how forests will respond to drought require specific knowledge of the physiological mechanisms underlying drought-induced mortality. Modeling tree mortality accurately is essential to understanding global carbon cycles. Two main physiological mechanisms have been proposed to explain tree mortality under drought. Hydraulic failure occurs when the water column in the xylem (vascular tissue) becomes under excessive tension and breaks, thus interrupting water transport. Carbon starvation occurs when plants prevent excessive water loss by closing stomata (tiny pores on leaves), a strategy that also limits photosynthesis (carbohydrate supply) and depletes stored non-structural carbohydrates (NSC). Increasing evidence suggests that hydraulic failure and carbon starvation are intimately interdependent and that plant hydraulic function depends on stored NSC. If so, plants must maintain NSC reserves above certain thresholds to maintain hydraulic function and survive. I conducted an experiment to test whether ponderosa pine *(Pinus ponderosa*) seedlings require minimum NSC thresholds to survive and whether these thresholds change with drought. Initially NSCs were artificially lowered with one to six week increments of shade. For each dark treatment plants were then brought back to light and divided into two groups, well -watered and drought stressed. Survival and health were monitored. The strongest decrease in NSC occurred in the first week. Preliminary results indicate that mortality of well-watered and drought stressed plants occurred when NSC in roots decreased to below 30% of that in control plants. Plants whose roots had higher NSC concentrations tended to take longer to die under drought. These data suggest that plants must keep their stored NSC above certain thresholds to survive under drought.

Rethinking Leibniz' Infinitesimals
Author(s): Johnathan Bush Mentor: George McRaIsaac
Abstract:
Newton and Gottfried Leibniz both used infinitesimals—numbers which are nonzero, yet smaller in magnitude than any real number—in the early 1700s to describe instantaneous rates of change in their developments of calculus. However, they were unable to provide a rigorous foundation for the existence of these quantities, and

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mathematicians instead began to embrace the now-ubiquitous epsilon-delta approach to the foundations of calculus, avoiding the notion of infinitesimal numbers altogether. However, in the 1960s, Abraham Robinson finally provided these foundations through what he called "non-standard analysis," and his work provides an extension of the real numbers to include both infinitesimal and infinite quantities: the so-called system of hyperreal numbers. My project is to reconsider the standard construction of hyperreal numbers using a relatively new approach to set theory, which is based on W. F. Lawvere's "Elementary Theory of the Category of Sets." This approach places emphasis on sets and functions between them, rather than on sets and the notion of elementhood as in a traditional set theory, such as that of Zermelo-Fraenkel. This shift in perspective is prompted by the fact that the axioms of a function-based set theory are thought to be more intuitive and accessible to an undergraduate who is encountering foundational mathematics for the first time. During my presentation, we will consider constructions of familiar number systems, e.g., the integers, and conclude with a construction of hyperreal numbers, beginning from the axioms of this function-based set theory. We will see that the elements of these number systems may be regarded as equivalence classes of functions, and we will consider the role of the Axiom of Choice in the construction of these hyperreals.

Ruskis of Hollywood: Stereotypes of Slavs in American Cinema
Author(s): Miriam Krainacker Mentor: Robert Greene
Abstract:
The start of the Cold War saw a change in both US international policy and American cinematic content. There was a sudden rise in the depiction of Russians as the enemy, a trend which continues until this day. Despite a plethora of countries (and enemies), American films again and again rely on Russian caricatures to fill their villainous roles. The rare difference in Hollywood stereotypes comes from American television, in which Russians are occasionally developed beyond simple villains or one-note characters. The demonization of Russians can be contributed to the forever-tense relationships between America and Russia, which date back to the Cold War, as well as the lack of racist accusations that can be made, concerning these depictions. While the portrayal of other countries (such as China, Iran, etc.) has elicited criticism on the basis of racism, the whiteness of the Russian population and the internalized hatred between the US and former USSR prevents such kind of protests. Through careful analysis of American films in three different eras (1960s, 1980s, and today), this paper draws correlation between the American-Russian political atmosphere, and the villanious roles afforded to Russian characters. Considering the continuing, degrading relations between the two countries, as well as the importance of media (not only in a US context, but a wordly one), the question has been raised: should the US look elsewhere, or simply diversify, their choice of villains?

Stigmatization: The Effect of the Montana Meth Project on People Who Use Methamphetamine
Author(s): Sophia Friedl Mentor: Kathy Kuipers
Abstract:
Virtually all Montanans are familiar with the Montana Meth Project, but few know the effects of this project on the people who actually use methamphetamine. In order to make a full report of the impacts of the Montana Meth Project, the perspectives of people who use meth need to be taken into account. Because people who use meth are stigmatized, their points of view are often considered less important than the "average" citizen. This project aims to discover the effects of the Meth Project on people who use meth through an in-depth interview process. These interviews will be conducted with people who used meth before the Project was implemented in 2005, and who used meth until at least 2008, after the brunt of the Project's advertising took place. This will ensure that we capture perspectives before and after the Project, making estimating the effect of the Meth Project more realistic. In stigmatization literature, few papers are focused on the perspective of the stigmatized; most come from the privileged point of view of the stigmatizer. This report will be focused solely on the stigmatized, making it somewhat unique in the field. Additionally, the research conducted by the Montana Meth Project focuses entirely on the perspectives of meth use of students aged 12-17. Their research does not cover adults or actual meth users, a large gap in the literature that this project hopes to fill. This project will inform future steps that the Project takes to reduce methamphetamine use in any upcoming projects, allowing them to take the most effective, least stigmatizing method.

Technology and the Impoverishment of Experience: An Insight Through Marcuse and Heidegger
Author(s): Brenna Gradus Mentor: David Sherman
Abstract:
The influence of technology in contemporary society is increasingly pervasive. While humankind reaps the benefits technology has to offer, these benefits do not come without costs. These costs manifest themselves in phenomena such as ecological destruction and invasions of privacy through surveillance, to name a few. Often these costs are neither articulated nor addressed. Technology, from the Industrial Revolution to the Information Age, has reestablished the way in which we orient ourselves in our world. In doing so it has, in many cases lowered our standard of human experience, thus creating an impoverishment of human experience itself. Both Martin Heidegger and Herbert Marcuse are amongst those who have articulated the ways in which technology impoverishes human experience. Heidegger and Marcuse both pose means by which society might emancipate itself from these negative consequences.

You Better Wise Up, Janet Weiss: Reclaiming the Queerness of *The Rocky Horror Picture Show*
Author(s): Dac Cederberg Mentor: Katie Kane
Abstract:
One could hardly imagine anything queerer than the *Rocky Horror Picture Show*. Four decades after its release, Rocky remains a primary method of introduction into the queer community, and to the idea that not everyone expresses sexuality and gender in the same way. Yet, a disturbingly large portion of academic work on the film aims to reduce it to a merely Saturnalian ritual, erasing its queer impact and dubbing it instead some kind of coming-of-age story for heterosexual teenagers. This is a strange misreading. *Rocky Horror* is not merely queer in its means; it is deeply queer in its ends as well. The purpose of my paper and subsequent UMCUR presentation will be to explore the queerness of *Rocky Horror*, and ultimately demonstrate that it, as a piece of fiction, does not allow for a return to normalcy, but represents a watershed moment in queer representation and interpretation in fiction. This piece is a continuation of the research I have done in my Literary Criticism course last semester.

The methods I employed to carry out this project were to conduct research and develop an argument based around the literary lens of Queer Theory, especially relating to David Halperin's quote "Queer is by definition whatever is at odds with the normal, the legitimate, the dominant." I employed close reading to many scenes throughout the film, with particular emphasis on the final "floor show" scene. I also paid particular attention to the character of Dr. Frank N Furter, as he is especially maligned by previous critics. My approach is original in that there is a lack of academic writing on the subject employing modern queer theory. My project is significant because it represents a modern interpretation of a culturally and socially significant film.

Life Sciences

Can GPS Clusters Predict Calving of Moose in Northeastern Washington?
Author(s): Richard Ramirez Mentor: Erick Greene
Abstract:
Moose *(Alces alces)* populations are declining in many parts of their range, but the causes of these declines are not known. It has been suggested that low birth rates may be one reason for these declines. Estimating birth-rates for wild populations, however, is often difficult and expensive. As new technologies are incorporated into wildlife research, novel approaches to estimating birth rates are waiting to be discovered. One specific way new technologies are being used in wildlife research is through the use of radio collars that save and transmit location information through satellites. For example, researchers studying wolves have used this location information to identify kill sites by patterns of restricted movement. Until now it has been very hard to determine birth rates for moose populations. The goal of my project is to test whether we can use GPS location information to identify when and where moose cows give birth. I will use data gathered by the Washington Moose Demography Project. This data was collected from 67 collared cow moose in the early summer of 2014 and 2015. This novel method I am developing may be an effective and low-cost tool for estimating moose birth rates.

Life Sciences (continued)

Comparing changes in fuel loading, tree regeneration, and forest structure in once- and twice-burned mixed-conifer forests

Author(s): Wyatt Trull Mentor: Andrew Larson

Abstract:
Wildfires drive landscape character in the seasonally dry mixed-conifer forests of western North America. Forested landscapes in this region are a mosaic of overlapping burn perimeters which span a wide gradient of severity and burn age. The goal of this study was to compare the effects of single and repeat wildfires on fuel loading, tree regeneration, and forest structure. Our study site spans the east and west sides of the South Fork of Flathead River in the Bob Marshall Wilderness. Data was collected in 2011, eight years after the initial fire burned both sides of the river. In 2013, the east side of the river burned a second time and in 2015, plots on both the east and west side of the river were resampled. Between 2011 and 2015, mean coarse woody debris load (>7.6 cm diameter) in twice-burned plots decreased by 23%, while once-burned plots increased by 76%. Fine woody debris (<7.6 cm diameter) increased by 12% in twice-burned plots and increased by 184% in once-burned plots. These changes in woody debris are the net outcome of inputs from standing dead trees that fell between 2011 and 2015 (including branch fall) and losses due to combustion and decomposition. Larch seedlings (<1.37 m tall) decreased by 34% in once-burned plots and decreased by 84% in twice-burned plots. The decrease in once-burned plots is primarily due to growth of seedlings into the sapling size class (>1.37 m tall), while the decrease in twice-burned plots is due to fire-caused mortality. The logistical complexity of backcountry travel makes case studies from wilderness areas rare. However, wilderness areas provide an important reference for understanding the role of uninhibited fire in forest ecosystems. This study shows that shorter fire return intervals lead to lower woody debris loads and seedling densities, maintaining forest conditions.

Effects of conifer removal treatments on quaking aspen regeneration and adult growth

Author(s): Philip Williams Mentor: Andrew Larson

Abstract:
Many quaking aspen *(Populus tremuloides)* populations are in decline across the western United States, a trend likely driven by ongoing climate change and past management that has led to increased competition with conifers. Restoration of aspen is a management goal potentially achievable through active forest management, but treatment effects on regeneration and residual growth have not been comprehensively studied. This project examined if removal of competing conifers altered aspen regeneration density, ungulate browsing, and residual adult aspen diameter growth using a control-impact study design. Sampling occurred at the Burnt Fork (ten treatments, four controls) and Bandy (seven treatments, four controls) sites. Nested plot-centric circles with a common center point were used for sampling. Regeneration was counted in 0.004-hectare plots and examined for ungulate browsing. Adult trees were surveyed in 0.04-hecatre plots; diameters and increment cores were taken on the most vigorous tree to represent growth before and after harvest. Ungulate browsing (percent of regeneration browsed) means were higher in treated units (23% and 46% browsed at the Burnt Fork and Bandy, respectively) than in control units (3% and 2% browsed at Burnt Fork and Bandy, respectively). Aspen regeneration was higher in treated units than controls: regeneration at the Burnt Fork site averaged 10743 stems/ha in treated units and 7054 stems/ha in controls, while the Bandy site averaged 13438 stems/ha in the treated units and 6824 stems/ha in controls. Average adult aspen diameter growth rates were stable or increased from pre- to post-treatment in treated units, while diameter growth rates were stable or decreased from pre- to post-treatment in controls. This study demonstrates that silvicultural treatments to remove competing conifer trees can increase aspen regeneration density and maintain or increase adult aspen growth rates. Managers seeking to regenerate declining aspen stands can use conifer removal treatments to promote aspen regeneration.

Fish Food: An Assessment of Aquatic Invertebrate Communities on the Upper Clark Fork River
Author(s): Nicholas Voss Mentor:Diana Six
Abstract:
The 2015 RESPEC Clark Fork River Fishery Assessment identified a reach of the Clark Fork River between Rock Creek and Flint Creek with low trout densities relative to the rest of the river. While examining a variety of potential causes, researchers noted a lack of information on aquatic invertebrate communities, which are a critical food source for trout. To investigate whether benthic invertebrates might account for the difference in trout densities, I used a kick net, yard stick, and flow tracker to sample aquatic invertebrate communities in six locations (three in a low trout density reach and three in a high trout density reach) on the river with consistent depth and flow velocity. This study investigates potential differences in invertebrate biomass, density, and taxonomic diversity that may explain the disparity in trout density between these two reaches. Invertebrate assemblages are also useful as bio-indicators of pollution or other larger issues affecting the ecosystem. When the samples are fully analyzed, this study may shed light on the ecological context of this disparity in trout density, and may better inform fisheries managers so that they can manage the Clark Fork River as effectively as possible.

Improving Classification of Transposable Elements in the Human Genome
Author(s): Gilia Patterson Mentor: Travis Wheeler
Abstract:
Transposable elements (TEs) are sequences of DNA that can replicate and reinsert themselves in the genome. Remnants of TEs are annotated and classified into subfamilies based on their DNA sequence. A subfamily represents all the remnant copies generated in a burst of replication by one parent TE. Biologists use subfamilies to study genetic diseases and to figure out evolutionary relationships (e.g. between human sub-populations), so it is important that TE remnants are classified accurately. We evaluated how accurately the current method annotates and classifies TE remnants in the human genome using a database of known segmental duplications. When a segment of genome with a TE remnant is duplicated, the TE remnants in each copy come from the same parent and should be assigned to the same subfamily. We identified the location and subfamily of all TE remnants in all segmental duplications and compared them. We found that a large fraction of TE remnants are assigned to different subfamilies, raising concerns about the quality of current subfamily classification methods.

Sexual Dimorphism and Seasonal Plasticity of the Squinting Brown-Bush Butterfly *(Bicyclus anynana)*
Author(s): Stephanie Parker Mentor: Cerisse Allen
Abstract:
In many butterfly species, males and females often differ in striking ways. Sexual dimorphism in body size and shape, coloration, behavior, physiology, and life history traits evolve when natural selection or sexual selection acts differently on males and females. The Squinting Brown-Bush butterfly (*Bicyclus anynana*) is one such example with females larger than males. Additionally, this species is phenotypically plastic - the temperature experienced during larval development will determine the adult phenotype. During the warm, wet, season, these males and females are short-lived, colorful, and active. During the cool, dry, season, both sexes are long-lived, cryptically-colored, and inactive. Regardless of the season, the females are always larger than the males. The mating system differs dramatically between the two seasons: in the wet season, males actively court females and females are choosy; in the dry season, females actively court males and males are choosy. Here, we examine the extent of, and differences in, sexual dimorphism of wing size and shape between seasons. Two laboratory populations of B. anynana, originally from Malawi, were reared in 18°C and 27°C, typical temperatures of the two seasonal environments. Approximately 800 eggs were reared at each temperature through adult emergence, for a total of about 400 adult males and 400 adult females. I conducted a geometric morphometric analysis of the wings by identifying homologous landmarks on the forewings and hindwings based on vein-vein intersections, vein-margin junctions and color pattern landmarks. With these data, we are exploring the differences in wing size and shape between the sexes across different temperatures to better understand the relationship between sexual dimorphism and the forms of natural and sexual selection shaping female and male life history and behavior within each seasonal environment.

Using Feather Corticosterone to Help Understand the Relationship Between Physiology and Nestling Growth in Mountain Bluebirds *(Sialia currucoides)***.**
Author(s): Ian Morrison Mentor: Creagh Breuner
Abstract:
Early developmental stress has a variety of effects that can persist to adulthood. Understanding how animals alter their developmental trajectory in response to stress is therefore a crucial goal for biologists. Corticosterone (CORT) is the primary avian stress hormone that is secreted from the adrenal gland in response to a challenge. CORT is a useful tool for measuring condition, as it integrates changes in external condition with internal coping responses. Typically CORT is measured in blood samples, but this only allows for insight into physiology during the instant of the sampling. Extracting hormones from feathers is a new method that can give longer-term insight on nestling physiology. Feathers grow over long time periods, and CORT is deposited throughout growth making it an ideal tool to study hormone physiology over a significant portion of development. I will extract CORT from Mountain Bluebird nestling feathers using methods developed by Bortolotti et al. (2008). I will run the samples through a standard radioimmunoassay to measure CORT levels in each sample. Mountain Bluebird nestlings grow in a logistic pattern and I am interested in understanding when nestlings reach their peak growth rates and how CORT and other factors such as hatch date, brood size, and brood rank explain differences between individuals. To answer these questions, I will use 269 feather samples that were gathered from Mountain Bluebird nestlings during the summers of 2014 and 2015. This research will help us to understand how physiology is altering development and growth of nestlings experiencing different environmental factors.

We're All Stressed, It's College: An Exploration Into the Perceptions of Stress Among College Students
Author(s): Shelby Lambdin Mentor: Linda Green
Abstract:
Between jobs, clubs, classes, families, roommates, social expectations and the transition into adulthood, the traditional aged college student faces a great deal of stress in their day-to-day lives. Adding to the perplexities of this topic, each individual experiences different perceptions of stress. Physical activity is often recommended to reduce stress, but little research has been done in the context of the benefits of physical activity and stress reduction in college students. This research compares two specific groups of college students that fall within specific criteria. The comparison will be made between any differences in perceptions of stress between students who are "runners" or students who "practice meditation". The criteria being that each group's demographics are college students from 18-25 years old. Students in group one will be those of a group from the University of Montana who are "runners" which is defined as participants who run 3-5 times for 20 minutes or more a week for this research. Students in group two will be those of a group from the University of Montana who practice meditation which is defined as participants who meditate 3-5 times for 20 minutes or more a week for this research. Students from each group will be given a survey consisting of questions related to their demographics, frequency of exercise, their perceptions of stress, and coping methods (if any) for stress. Information and data from these surveys will be compared and contrasted. This research will highlight whether or not exercise or mindfulness is more effective, or equally effective in providing positive perceptions of stress. Stress was the top health impact on academics for University of Montana students surveyed by the American College Health Association in the spring of 2014; so finding possible outlets for reduction of stress will provide valuable insight for administration and students.

Physical Sciences

Chute cutoffs and alluvial point bar morphodynamics: How rivers move over time.
Author(s): Caelan Simeone Mentor: Andrew Wilcox
Abstract:
The reach of the Clark Fork River just west of Missoula is quite dynamic, and due to erosion and deposition of sediments can shift quite rapidly during floods. During spring runoff in 2012 the main channel of the Clark Fork River about 1.3 miles west of the Reserve Street Bridge scoured through the point bar (a type of gravel or sand bar) on

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the inside of a meander bend and created a new channel. This event is called a chute cutoff and is one of two main ways that rivers cut through their banks to create new channels. Understanding of the mechanics driving these processes is limited, hindering predictive capabilities. In order to study this event I am conducting a case study using topography surveys in the reach from 2009, 2011, and 2015 to create digital elevation models to examine sediment removal and deposition from 2009 to 2015. This will be aided by the use of aerial photos from the USDA from 2005 to 2015 and analysis of flow data from USGS gaging stations. In addition I will use the Hec-Ras program to model the conditions likely to produce a chute cutoff event. Investigations to date suggest that the cutoff event occurred primarily due to a decrease in the radius of curvature of the proceeding bend causing increased erosion at the base of the point bar, a lack of vegetation on the bar since the last scour event, and a shortening of the length necessary to cut through the point bar. Understanding how these events occur and the mechanics behind them can help to inform managers working to improve the geomorphic and ecological health of rivers while minimizing economic risks such as lateral migrations of the river which can erode property and destroy infrastructure.

Implications of Climate Change on Mountain Environments: The Case of the Julian and Karavanke Alps, Slovenia

Author(s): Lara Antonello, Irena Mrak, Sarah Halvorson Mentor: Sarah Halvorson

Abstract:
Mountain environments are of critical concern for the global climate change agenda among the scientific community. The physical effects of climate change in mountain environments can be observed through changes in three resources of substantive concern to this study: glaciers, snowpack, and water. The purpose of this study is to inventory past climatic variability and current observed changes associated with climate change in the Julian and Karavanke Alps, two significant ranges located in northern Slovenia. This study integrates scientific data and observations through interviews, fieldwork, and secondary literature. This study also compares current global climate change researchwith regional European research in mountain environments.

Central to this study is an analysis of climatic variability as it connects to changes in glaciers, snowpack and water. This approach allows an examination of how changes in these specific Slovenian Alpine areas are addressed through natural resource management and adaptation scenarios.
The goal of this research is to gauge the potential effects and the extent to which the Slovenian Alps are affected by climate change. Climate change research is relevant on a global level where glaciers serve as water reservoirs that dictate the environmental, cultural, and political futures of mountain regions.

Reproductive Output of *Pinus albicaulis* (whitebark pine) at Alpine Treeline

Author(s): Jesse Bunker, Colin Maher Mentor: Cara Nelson

Abstract:
Subalpine *Pinus albicaulis* (whitebark pine) are experiencing high rates of mortality due to outbreaks of native *Dendroctonus ponderosae* (mountain pine beetle) and the exotic fungal pathogen *Cronartium ribicola* (the cause of white pine blister rust). *P. albicaulis* in the alpine treeline ecotone appear to escape *D. ponderosae* attack. This habitat may serve as a refuge for *P. albicaulis* during periods of extreme beetle pressure. However, treeline ecotones can only be functional refuges if they're able to reproduce. To date, no one has documented cone production, seed set, or seed viability in treeline *P. albicaulis* individuals, although reproductive output has been studied at lower elevations. We surveyed reproductive characteristics of *P. albicaulis* in treeline ecotones at six sites in five mountain ranges in the northern Rocky Mountains to quantify sex allocation and cone density. We harvested seed-cones to record seed-cone traits and seed quality for *P. albicauli*s at two of our treeline sites. We also compared x-ray imagery and float test techniques for determining seed viability in *P. albicaulis*. We found that: the majority of individuals within treeline ecotones are not currently reproductive, and those with reproductive structures are mostly male (83.3%); cone density is substantially lower than it is in subalpine stands; and cone size, seed potential and set, and seed size and viability appear to be drastically lower at treeline ecotones than subalpine forests.

Synthesis and Modeling of CYP26 Selective Inhibitors

Author(s): Benjamin Uhlenbruck Mentor: Philipee Diaz

Abstract:
Traumatic brain injury (TBI), caused by sudden trauma to the brain, is a severely disabling disorder that affects more than 1.7 million Americans each year. All Retinoic Acid atRA), the active metabolite of vitamin A, plays an important role in the regulation of neuronal plasticity. Recent studies show that increase in atRA concentration improves learning and memory, increases injury-induced brain-cell generation, and could be used to treat TBI. atRA is absorbed poorly by the body. It also induces its own clearance from the body, resulting in a loss of functionality. The clearance, or metabolism of retinoic acid is predominantly mediated by a certain family of enzymes with one predominant brain isoform, CYP26B1. The research group I am working with has designed a class of selective inhibitors that should eliminate the feedback mechanisms of atRA resistance. They hypothesize that selective inhibition of the enzyme CYP26B1 will increase atRA concentrations in the brain and will treat memory impairment and neuroinflammation from TBI.

About 40 candidate structures need synthesis and testing for their capabilities as inhibitors. My research focusses on the selection and synthesis of three candidate structures for these inhibitors. The project has required me to learn and practice synthesis techniques. This includes the use of SciFinder and other online peer-reviewed databases to research the synthesis of these new chemicals and familiarization with instrument analysis such as thin-column chromatography (TLC) and nuclear magnetic resonance (NMR) spectroscopy. I am also using computer modeling software to study the interaction of the molecules I am synthesizing with their biological target.

I expect to complete synthesis of at least two of my projects in the next few weeks. These chemicals will then undergo biological testing for toxicity and effectiveness as drugs. If results are promising, they could go on to treat TBI or other ailments!

To Jump or Not to Jump: Mule Deer and White-tailed Deer Crossing Decisions

Author(s): Emily Burkholder Mentor: Mark Hebblewhite

Abstract:
Wildlife meet energetic requirements for maintenance, reproduction and survival by considering the physiological, biotic, and abiotic factors that regulate energetic costs. These can include demographic, climatic and anthropogenic factors. The purpose of this study is to investigate fence crossing decisions of mule deer *(Odocoileus hemionus)* and white-tailed deer *(Odocoileus virginianus)* and determine what factors influence their crossing decisions. I hypothesize that deer will choose to cross under a fence rather than jump over if it's more energetically beneficial, based on measured physical and abiotic attributes. Data from remote cameras was collected and analyzed from three study areas; two in Southeastern Alberta, Canada and one in Northcentral Montana. Using a Before-After-Control-Impact (BACI) design, cameras were set up along fence lines within each study area. I recorded individual's species type, age, sex and crossing decision. I also recorded the season, bottom and top wire height, snow presence, and the modification-type of the fence. I used logistic regression to model the probability of deer crossing under a fence versus jumping over it based on important fence and environmental characteristics. My results show that males and white-tail deer are less likely to cross under than females and mule deer. Both species are more likely to cross under during the summer and fall in reference to spring. Deer are less likely to cross under during the winter than in spring, however it was not statistically significant (P-value>0.05). As the bottom and top wire heights increase, deer are more likely to cross under. Snow presence, modification-type, and before/after periods were not included in the model because they were found to be statistically insignificant. Understanding the determinants behind either crawling under or jumping over a fence and how energetic requirements are associated with this decision is important to discerning animal movement for management and conservation practices.

A Predictive Analysis; Realism, Liberalism, and the Structure of Integration in Europe

Author(s): Brendan Hooks Mentor: Karen Adams

Abstract:
How will the current migration and refugee crisis affect the European Union (EU)? Will it evoke a cooperative response among member states or unilateral, nationalist actions that exacerbate existing political issues and weaken the structure of political and economic integration? This question is of great importance regarding the future of this humanitarian crisis as well as the present and future of international relations. The Eurozone currency union is one of the largest markets in the world. Moreover, European states are historically the most important military and economic allies of the United States. The handling of the refugee crisis has serious implications for the future of the war in Syria. As the world looks ahead to new and evolving threats to security and prosperity, a strong Europe is vital to successful policy and action. This paper seeks to answer a question of the effects of crisis on cooperation. I approach this question from a theoretical and historical standpoint. I apply two established theories of international relations - structural realism and neoliberal institutionalism - to three different crises in the recent history of the European Union; the crises of Russian aggression in the East, debt in the South, and refugees across the continent. I divide each crisis into early, middle, and late stages and examine each stage by using scholarly papers, government and institutional documents and news sources to determine which theory best explains the policies associated with each stage of each crisis. I finish with the prediction that the future of the migration and refugee crisis will not be one of integrated cooperation resulting in effective policy, but of lopsided unilateral action.

An Examination of Structural Realism in US-UN-Iran Relations

Author(s): Julian Adler Mentor: Karen Adams

Abstract:
Iranian foreign policy may have subverted the United States' efforts to interact with it in way matching the US realist outlook on diplomacy. Inspecting this claim, I examine the breakdown of imperialist models of rule in Iran by looking to the overthrow of Mossadeq, and to Iran-US foreign policy after Khomeini. I examine globalization and the role of social media through the lens of the Green Movement, the Arab Spring, and the Election of Mohammed Khatami. Using these, I assess the extent to which Iran has subverted or reinterpreted structural realist assumptions underlying US diplomacy with it, and use this to illustrate some larger flaws of a structural realist model of diplomacy in practice:
Structural realism is a good theory for explaining the way states behave on a large scale. This makes viewing diplomacy through a structural realist lens exceedingly appealing. However, It tends towards positivism, or the view that its precepts should ideally be based on objective observation only, giving little explanatory power to cultural values. It tends to treat states as singular entities with singular goals, and this often implies that a state's domestic stability is merely a domestic issue merely, without broader global ramifications. Globalization and the slow breakdown of imperial models of rule have shown that these assumptions do not always hold when actually engaging in diplomatic negotiation.

Addressing these issues, I examine how the successful negotiation of the Joint Comprehensive Plan of Action and United Nations Resolution 2231 (The "Iran Nuke Deal") demonstrates the ways the US should alter its diplomatic strategy to more efficiently guarantee its security. I come to the conclusion that post-positivist and constructivist modifications to the current structural realist view of international diplomacy can enhance the efficacy of negotiation (especially by powerful states) in the face of a rapidly changing world.

Social Sciences

Comanagement Between Federal Agencies and Native American Tribes: Applications and Lessons
Author(s): Rachel Grabenstein Mentor: Martin Nie
Abstract:
The Badger Two Medicine Area in the Lewis and Clark National Forest has faced conflict over management since the 1980s due to leasing of what is considered sacred land. Recently those leases were cancelled. However questions about how to manage the land still remain. This paper explores examples of comanagement between the federal government and Native American tribes in an effort to understand what options and obstacles the Blackfeet tribe will face in future management of the Badger Two Medicine Area. I examined the National Bison Range efforts at comanagement in depth and current comanagement situations with other federal agencies, including the Badlands National Park, which has the potential to be the United States' first tribal national park. Background information is provided on both of these topics. This policy piece found that comanagement suffered at both the National Bison Range and Badlands National Park due to poor communication, political and personal issues within agencies, and issues beyond agency control, such as funding. In situations where comanagement has been successful, strong interpersonal relationships and effective communication have played a significant role.
Faunal Analysis of Togiak Archaeological and Paleoecological Project: How Ecology Affects Indigenous Subsistence Practices in the Arctic Wetlands

Faunal Analysis of Togiak Archaeological and Paleoecological Project: How Ecology Affects Indigenous Subsistence Practices in the Arctic Wetlands
Author(s): Dougless Skinner Mentor: Kristen Barnett
Abstract:
The Togiak Archeological and Paleoecological Project (TAPP) is an initiative to learn about the ancient life-ways of the Yup'ik indigenous poeples of Togiak, Alaska. TAPP is a collaborative project driven by the Togiak community and their interests in understanding and documenting their own past lifeways at the Old Togiak Village. Thirty-five core samples were collected from a series of pre-colonial house structures at the Old Togiak Site in the summer of 2015 and analyzed at the University of Montana. Faunal remains recovered from the cores were examined during this time along with stone tools, botanical remains, pollen, and a variety of other data. The fauna represent just one aspect of the relationship between indigenous tradition subsistence use of animal resources and ecological setting. My research will be based on a combination of faunal analysis and localized Yup'ik perspective. The fauna at the Old Togiak Site range from shellfish; including blue mussel and native little neck clam, to fish; such as char and sockeye salmon, to birds; including snowy owls and mergansers, and mammals; including lemmings and river otters. Analysis includes identification of species, modification such as cooking, cutting, weathering (exposure to surface elements), establishing association with the radiocarbon (14C) dates as well as spatial distribution across the village and the 69 identified semi-subterranean houses. I will use the faunal analysis to create a picture of past environmental possibiliteies at the Togiak Village over the last thousand years, and seek to understand interactions between the land use and environment. This research is vital to increasing the understanding of indigenous life-ways a in a dynamic ecological environment.

Iran Nuclear Agreement: Good Choice or Bad Deal?
Author(s): Mikaela Koski Mentor: Mehrdad Kia
Abstract:
The nuclear deal between Iran and the US, along with other western nations, that came to fruition in the summer of 2015 has been characterized both as a positive change in US foreign relations and as an ill-conceived decision that could produce deadly consequences. Regardless of differing opinions on the content, the Iran nuclear deal will yield outcomes with international ramifications. This project analyzes the potential of the deal through the lens of the historical relationship between Iran and the United States to give much needed context to future interactions. Past US-Iranian relations will provide an indication of undertones that could positively or negatively affect the deal's outcomes.
Continued

This analysis is based on research from prominent historians as well as recent pieces by commentators from both sides of the political spectrum critically evaluating the deal. Likewise, the text of the deal itself and current events also play roles. The scholarship brings together the more amicable historical relationship between Iran and America from the early 20th century with the much more recent nuclear deal. In light of the recent decades of mistrust from both sides, critical examination of the past relationship is necessary for determining whether the deal has more negative or positive potential to shape future relations. The paper finds that the nuclear deal has the potential to create positive outcomes, such as a conceivable thawing of tensions between the two countries and the re-creation of a more welcoming relationship than Iran and the US have experienced in the recent past.

Is Montana's "24/7 Sobriety Program" Deterring Drunk Drivers?
Author(s): Jessica Stevens Mentor: Derek Kellenberg
Abstract:
Nationally and at the state level policy makers are continually seeking ways to effectively deter drunk drivers and lower the risk and social costs they impose on society. Alcohol related accidents account for nearly $60 billion in damages in the United States each year. Montana is no exception to this problem. In 2008, Montana was ranked the deadliest state based on per capita driving under the influence (DUI) fatalities. To combat this issue Montana piloted the "24/7 Sobriety Program." The predominant goal of the program was to increase the likelihood and severity of punishment for repeat offenders as well as to address the underlying issue of alcohol dependence and heavy drinking with forced abstinence, education and treatment. According to previous studies on DUI deterrence, increasing the risk of arrest and surety of penalty will increasingly deter individuals from driving drunk. The purpose of this paper is to determine whether Montana's "24/7 Sobriety Program" is a more effective deterrent of drunk driving than previous Montana DUI policies. To answer this question a Differences-in-Differences regression analysis is conducted to compare the number of drunk driving arrests in Montana counties utilizing the "24/7 Sobriety Program" with those Montana counties not using the program so as to determine the deterrent effect of the program. Initial fixed-effects regression analyses suggest that the program does not have a statistically significant effect on the total monthly DUI arrests.

Las Dos Caras de Buenos Aires: Wealth Inequality in Argentina
Author(s): Conor Hogan Mentor: Maria Bustos
Abstract:
The growing wealth gap in Argentina is affecting virtually every aspect of the society. Tensions between classes are tangible, especially as the political ideology is shifting to the right, and many of the poorer citizens feel abandoned by previous, quasi-socialist governments. In such a volatile period, any efforts to bridge the gap between the lower, middle, and upper class is more important than ever. During my stay in Argentina, I volunteered with a program called Fundacion Si, a program that allowed students and professionals to provide sustenance and assistance to the homeless community of Buenos Aires. We met twice a week, and would split into groups of three, then walk a predetermined route and offer food to people living on the sidewalk. But more than just food, we also provided a human link for these people who so often feel abandoned, as well as medical or legal aid. During my time volunteering, I compiled a series of vignettes documenting conversations I had with some of these people. These vignettes comprise the bulk of my project/research.

I also wrote several short stories/poems/journal style pieces based off of my experience playing rugby, a sport generally associated with the upper class in Argentina, for an especially wealthy club. Many of my teammates (and best friends) belonged to some of the most historically powerful, rich families in the nation, and spending time with them allowed me a glimpse into the opinions and lifestyle of the ultrawealthy in Argentina. To contrast my experience working with the homeless, I will read an excerpt from two of these pieces, which demonstrate this other pole of lifestyle in Buenos Aires. Taken together, my hope is that the pieces represent the humanity I found in everyone, the fundamental characteristics of people, regardless of income or social status.

Religious,Racial,or Ethnocultural Prejudice? Assessing Online Islamophobic Sentiment in the American Context

Author(s): Arif Memovic Mentor: Kathy Kuipers

Abstract:

Empirical inquiry of Islamophobia is an emergent focus in the social sciences. Over half of the peer reviewed literature on the subject has been published in the last five years. Despite increasing interest in Islamophobia, there is no academic consensus for a definition of the term. Moreover, there has been ongoing debate concerning whether Islamophobia is an existing social phenomenon and social problem. These questions are hotly contested by academics, politicians, social commentators in the media, and interested lay persons. Much of the non-academic debate occurs online, specifically in the comment sections of articles and videos published by both local and national newspapers and major news networks. In this study, I performed a content analysis of online commentary pertaining to Islam, Muslims, and Islamophobia in the comments section of articles published by the Washington Post in the spring of 2016, in order to understand the narratives presented by those who believe that Islamophobia is not a social problem and that Islam and Muslims are a threat to the United States and other Western liberal democracies. Although there has been a substantial increase of scholarship pertaining to Islamophobia in recent years, the majority of research has taken place in Europe. Building on this European scholarship, this study is among the first to examine Islamphobic sentiments in the American political context and is, thus, a valuable and timely contribution to multiple literatures.

Sentiment Expression on Twitter Regarding the Middle East

Author(s): Byron Boots Mentor: Laure Drake

Abstract:

Social media has transformed the awareness of events around the world as it allows for instant, up-to-the-second data transmission and communication for a variety of interested parties. Due to the ongoing turmoil surrounding the Middle East and its heightened media attention, I chose to research what type of emotions and interactions are found on Twitter with regard to the region and related topics. I selected Twitter due to the relative accessibility, workability, and anticipated sufficient size of data samples available. Twitter reports 1 billion created accounts with 320 million active accounts as of December 31, 2015. These active accounts, defined as a ratio of followers to followed accounts, generate roughly 500 million tweets per day from around the world. In this research, I am looking at scholarly works, journalism sources, and other reports to learn more about some of the ways Twitter has been used as it relates to the Middle East and better establish context for my data analysis. This information helps guide me in performing real-time sentiment analysis – or opinion mining – on Twitter data using open source sentiment dictionaries with machine learning algorithms to provide highly accurate analysis of emotional response as it relates to the Middle East. This sentiment analysis is performed by assigning numerical values to words to help quantify positive, neutral, or negative emotion associated with my topic. My findings will help to draw conclusions as to whether there are specific emotions correlated with the region and associated topics, the degrees of emotion felt when tweeting about specific subjects, and how spot-checked dates after different events influence the sentiment broadcast on Twitter. This unfiltered look at people's emotions on Twitter serves to quantify how twitter users perceive the Middle East and related topics.

Social norms: Understanding community perceptions of voluntary services and its effect on parental engagement

Author(s): Emily Stiles Mentor: Bart Klika

Abstract:

Home visiting services seek to promote maternal and child health through education, agency referrals, and interpersonal connection. These services are often voluntary, which poses significant challenges in terms of enrolling, engaging, and retaining clients in these evidence-informed services. According to McCurdy and Daro (2001), attributes such as: client characteristics, health professional attributes, features of the agency, and the neighborhood acceptance of the program may influence a client's decision to enroll. Furthermore, factors such as timing of engagement affect engagement of home visitors with clients. In addition, sociodemographic factors of: ethnicity,

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ages of parents and children involved, and educational attainment influence a client's intent to enroll in a given program (Spoth & Redmond, 2000)
.
While engagement levels are often evaluated based on the client's demographic and sociodemographic factors, research also suggests that social norms play a significant role in a client's decision-making process. Despite this finding, the role of social norms as an influence on enrollment, engagement, and retention have not been thoroughly evaluated.

This phenomenological qualitative study evaluates the experiences of six new and expecting mothers in Missoula County to better understand the role of social norms as they relate to enrollment, engagement, and retention in home visiting services. A quasi-snowball sampling method guided this research and in-depth interviews were conducted with each participant. Consistently, participants noted high levels of stigma associated with the receipt of home visiting services, yet they voiced support and recognition of the benefits of these programs. Elaboration of key themes and implications for practice and research will be discussed in the presentation.

Stock Splits: An Analysis of Firms Based on Pre and Post-split Nominal Share Price
Author(s): Cody Sevier Mentor: Keith Jakob
Abstract:
In the field of Finance, one topic of interest is the nominal share price price puzzle, or why the average nominal share price of common stock has remained around $30 per share since the Great Depression. Stock splits are one tool that firm managers have at their disposal in order to regulate the nominal share price of stocks. In this study, I examine the U.S. stock splits that occurred between the years 2010 and 2015 and try to understand the reasoning behind why a firm partakes in a stock split by analyzing the pre-split and post-split nominal share prices. A chronological list of firms that split their stocks over this time period was obtained using the Yahoo! Finance Splits Calendar. Historical share prices and other relevant variables specific to each firm were accessed using the main Yahoo! Finance website. After running a univariate regression, some statistically significant evidence was found indicating that split factor increases with the pre-split price of a splitting firm. However, an additional regression and graphical results show that pre-split price is the strongest explanatory variable for post-split price. This evidence is not consistent with the idea that firms are splitting to a "normal" range, which is determined by market and industry-wide price averages as well as firm-specific prices, or splitting into an optimal trading range to increase marketability. Instead, these results suggest that firms are following norms or tradition when partaking in a stock split.

The Effectiveness of Student Organizations as Public Agencies
Author(s): Cody Meixner Mentor: Sara Rinfret
Abstract:
The Associated Students of the University of Montana (ASUM) is a student owned, student funded, and student operated public agency within the University of Montana (UM). Many University student governments manage small operations, with much oversight from their University administrations; however, there are a few throughout the country that command their own budgets, have complete oversight of their personnel, provide large scale public services, and maintain distinct levels of autonomy from their University. This paper will analyze the effectiveness of student owned, student funded, and student operated public agencies such as ASUM, to evaluate the role they play as established public agencies within complex bureaucratic organizations such as Universities. The study of student organizations as legitimate, complex, and thriving public agencies in and of themselves will benefit the field of Public Administration as it evaluates the effectiveness of a system of administration in which young people are elected into high-level managerial and bureaucratic positions. To determine ASUM and other student organizations' role in society, this paper will rely on evaluations of Woodrow Wilson's dichotomy between politics and administration, to determine an agency's effectiveness as it relates to serving a specific population of constituents within a larger community. To further elaborate on the role this dynamic plays in student agencies, an analysis of John Gaus's work in the field of humanistic public administration will

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help to analyze the priorities of these student-driven agencies and how they relate to and interact with the priorities of other agencies. A thorough review of the ASUM archives and history, in addition to my analysis of these scholars, reviews of literature, and methods concludes that, after obtaining degrees of autonomy, student organizations can play vital roles in the administration of legitimate and complex public agencies.

The Human Cost of Failed Diplomacy: The Political Motivations Behind the 1994 United States-led Invasion of Haiti

Author(s): Sydney Stivers Mentor: Jody Pavilack

Abstract:
In 1990, Haitian citizens overwhelmingly voted Jean-Bertrand Aristide as the nation's first democratically elected president. The following September, Raoul Cédras and other Haitian military officials overthrew President Aristide and forced him from the country. For several years following the coup, the United States, United Nations, and Organization of American States answered Aristide's pleas for help by hosting several negotiation talks and implementing several economic sanctions on Haiti. Sanctions continued until 1994 when President William Clinton called for the United States-led invasion into Haiti to forcefully remove the military regime.

This invasion is particularly interesting for two reasons. President Clinton decided to take action to reestablish democracy and stop the human rights violations in Haiti in September of 1994, only months after neglecting the hundreds of thousands of people killed in the Rwandan Genocide. And secondly, previous to the invasion, the United States government emphasized the importance of peaceful negotiations and nonviolent sanctions. What drove Clinton to suddenly approve of a potentially violent invasion? This paper considers the explanations for the timing of the invasion and ultimately finds that the United States' foreign policy largely depended on the negative feedback that President Clinton received from congressmen and the American public about mounting human rights violations in Haiti as well as the exhaustion of diplomatic negotiations with Raoul Cédras.

The Role of Capacity Building in Emergency Humanitarian Response: An Ebola Case Study

Author(s): Mary O'Malley Mentor: Eric Hines

Abstract:
The appalling death toll of the recent Ebola outbreak in West Africa exposed a large number of emergency response inadequacies within the World Health Organization (WHO) and the International Health Regulations (IHR) that govern the WHO and its member states. The weight of these inadequacies necessitated a review of the IHR. This currently ongoing process has identified many key areas of growth for the IHR and new strategies for the WHO; however, the current discussion does not encompass the very valuable idea of capacity building within emergency humanitarian response. Capacity building is commonly defined as strengthening a country's human, scientific, technological, organizational, institutional, or resource ability to respond to a crisis. The current IHR review places a great emphasis on capacity building in advance of an emergency response event. This paper posits that including steps to promote capacity building while in the midst of a crisis, specifically those steps that connect domestic partners with foreign emergency response teams, would provide a strong addition to the capacity building measures already under discussion. It would also reinforce the permanency of quickly built emergency structures, like clinics, or organizations, like domestic medical teams, which are not always maintained after the crisis situation ends. By examining the 2014 Ebola outbreak and its repercussions through a combination of scholarly sources, appropriate news items, and minutes and proceedings from the IHR Review Proceedings, this paper supports the importance of capacity building as an integral part of emergency responses to humanitarian crises. Specific attention will be paid to the lifespan and usage of construction projects and organizational changes made during the Ebola outbreak. This paper also provides recommendations for the incorporation of this concept in proposed adaptions to the IHR as well as a set of more general recommendations for usage by other humanitarian emergency response actors.

United States' Influence on Agrarian Reform during the 1952-1953 Bolivian National Revolution
Author(s): Carly Campbell Mentor: Jody Pavilack
Abstract:
Throughout 1952 and 1953, Bolivia experienced a violent National Revolution. The *Movimiento Nacionalista Revolucionario* (MNR) rose to power on the platform of universal suffrage, nationalization of tin mines, and the breakup of Bolivia's traditional agricultural system. On August 2, 1953, President Estenssoro of the MNR signed Agrarian Reform into law before a crowd of indigenous leaders, who celebrated the victorious moment. In appearances, the new government had fulfilled its promise of land redistribution, enfranchising the long-oppressed indigenous population.

However, the underlying presence of the United States convoluted reform. Unlike many other Latin American countries during the post-WWII era, the new Bolivian government had both the recognition and financial support of the United States. The relationship between the MNR and the U.S. changed the nature of the revolution, co-opting it in favor of U.S. interests during the beginning of the Cold War. This created a clash between the "official" Bolivian Revolution, and the one enacted in the countryside by an armed peasantry.

The purpose of this research is to reconstruct the moment of indigenous victory on August 2nd. Primary sources are translated accounts of rural Bolivians drawn from ethnographic accounts, as well as many declassified U.S. documents that explicitly draw a money trail. Along with secondary literature, these sources are used as evidence for an analytical historical narrative. It asserts that peasants, or campesinos, were an organized force in their rural communities, driving forward a revolutionary reform process that the MNR withdrew from due to U.S. pressure. As a result, the Agrarian Reform Law was not nearly as beneficial as it seemed. Instead, it illustrates the subversive dynamic between the Bolivian MNR, the U.S. government, and a radicalized native population.

Voter Registration Demographics in Montana - The Youth Disparity between Voter Registration and Turnout
Author(s): Elizabeth Story Mentor: Sara Rinfret
Abstract:
Montana on a county by county basis. I will also compare access to polling stations and polling stations with same-day-voter registration capacity on a state-wide level to determine a correlation between greater access to voter registration and flexible voting day policies with high youth voter turnout. I will analyze voter registration data from the Voter Access Network, as well as include data from voter registration campaigns from the Montana State and the University of Montana campuses, to compare numbers of youth registered to vote, and youth that actually turn out to vote, on a county by county basis. This paper will ultimately clarify the effects of voter registration campaigns on college campuses within Montana, and the political consequences of a concentration of - or a lack of - student voters in the larger community.

We Gon' Be Alright:An Anthropological Analysis of the Musical Reactions of the Black Community after the Killing of Michael Brown.
Author(s): Joel Weltzien Mentor: James Randall
Abstract:
Music is an art form linked to identity, both of the self, and of one's role in culture and society. In many social movements, music has been one of the tools used to unite a group in its message by allowing individuals to express themselves via a larger social unit. My presentation uses anthropological theories to examine this phenomenon through one of the latest and more pressing issues in our culture, the racial conflict in the US following the killing of Michael Brown, in which an unarmed black teenager was shot and killed by a white police officer, who was not charged for any crime. Artistic voices of the black American community, including D'Angelo, Lauryn Hill, and J. Cole, used music to address and begin a discourse about the oppression and violence against black Americans at the hands of white police officers. My presentation will detail how these musical responses share certain traits, and how they unite the listeners by representing and embodying the various emotional and social states associated with grief, unity, and resistance to oppression My presentation examines the musical responses of these prominent artists in an

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attempt to discover the commonalities contained in the music, and how they affect the listener. My methods used will be a two-part analysis, the first being an examination of the lyrical content of the pieces, the second aspect being a sonic analysis of the musical components of the pieces, based on the concept of Thomas Turino's 3 categories of semiotics: symbol, icon, and index. This presentation will illustrate how people of America have responded, both as the self-identifying individual and the social self as defined by Dr. Turino, to the killing of Michael Brown and the events that followed. The conclusions of this presentation will address the significance of the cultural

Visual and Performing Arts (includes Creative Writing)

GrizCode: a comedic web series defining what it means to be a University of Montana "Grizzly.
Author(s): Darien Gostas Mentor: Andrew Smith
Abstract:
The University of Montana has had declining enrollment since 2012, having 16,000 students in 2011 to less than 14,000 now. This statistic correlates with the national attention this university received in 2012 regarding rape reports that were botched. Published in 2015, a book called "Missoula: Rape and the Justice System in a College Town" featured the town name and a photo of the clock tower on the cover which further propagated a "rape" stigma toward this university.

To replace the "rape" stigma and give this school a more accurate image, the authors created GrizCode. GrizCode is a web series featuring a compilation of student interviews on subjects ranging from "picking an advisor" and "the Kaiman," to "going to the gym" and "on-campus laundry." GrizCode provides viewers with the perceptions of students matriculating at UM and advice to those interested in enrolling.

This university has an infinite amount of subjects to talk about, so the authors limited them to main areas of campus, common college-related activity, and general events and landmarks of Missoula. To keep the show interesting, the editing is done concisely, with cuts every 5 to 20 seconds from interviewee to interviewee. This keeps the viewer's attention and gives the show a humorous flair. The authors decided to do a web series because of film's popularity in online entertainment and releasing this information to the internet would make it accessible from an online search of "UM."

This project involved screenwriting, lighting, green-screen, animation, and sound design – everything taught in the BFA Filmmaking program. For the full series, go to YouTube and search for GrizCode.

Improvisation as a Tool for Choreography and Performance
Author(s): Emily Curtiss Mentor: Heidi Jones-Eggert
Abstract:
In her book *Dance Improvisations*, Joyce Morgenroth wrote "Structured improvisation is a mixture of conscious choice and spontaneous reaction. It includes periods of sustained concentration and moments of unreproduceable magic." This "magic" is what I am chasing in my choreography this year. My project is an exploration of the ways that improvisation can be used as a tool for choreography and performance. The bulk of my project includes researching improvisation scores from the Judson Dance Theatre and other significant artists who were active choreographers in the 1960s, and presenting them in a way that combines them with my own movement and choreography style. My goal is to create a thirty-minute work that is almost entirely improvisation. I am drawn toward the works of the Judson Dance Theater because of the many different styles and experiments that came from this movement, from very neutral and straightforward to eclectic and performative.
Improvisation and collaboration is a huge part of being a working dance artist today. This process has not only been beneficial to myself in helping me find my personal movement style and choreographic preferences, but it has also benefited my cast of dancers by exposing them to a variety of choreographic and improvisational tools and practices. It is a crucial skill in collaborative work to be able to follow improvisational prompts and structures and

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to be able to generate material, and this process has provided practice in both of those areas. This project can be considered original research because although I am using historical improvisation scores as inspiration, I am also altering them, blending them with contemporary styles, and coming up with my own improvisation scores, which are then used to inspire original choreography.

The Art of Sound

Author(s): Sarah Fugman Mentor: Richard Hughes

Abstract:
I have assembled a collection of my sonic art projects and combined them into a sound trailer. The piece is showcasing my abilities as a sound artist and what I have learned and created in the media arts program. My goal as a sonic artist is to become a sound designer for a film production company. The first piece is a sonic portrait that paints an audio picture of my internal process of interacting with my favorite films, which have had a huge impact on my life. The challenge was to create a sound piece that described this without any visuals to rely on. The second piece is from my first semester at the University of Montana. I chose a music video by the "Lonely Island", and re-articulated the sonic environment by creating a new and unique sonic pallet. Using Adobe Premiere Pro video editing software I re-edited the visuals, and using Logic Pro 9 audio software, I created the final audio mix which included dialogue, ambient sound, foley, and effects. The third piece expanded my abilities by introducing a programing language into the creation of sonic art. Programming allows me to create real time interactive sonic art experiences. This project challenged me to think differently about sound and opened up a new world of sonic possibilities. The last piece is part of a project I have been working on for a while. Similar to my 2nd piece, I removed all the sound from the music video " I bet my Life" by Imagine Dragons and re-articulated the sonic environment. With so many projects to create and learn from, I continue to explore the numerous possibilities in sound advancements from designing a sound studio to exploring different kinds of audio software programs.

The Mass of Men Lead Lives of Quiet Desperation: **A Study of Unconventional Point of View and Narrative Structures in Contemporary Fiction**

Author(s): Spencer Ruchti Mentor: Erin Saldin

Abstract:
The Mass of Men Lead Lives of Quiet Desperation, a novel-in-progress written by the researcher, examines the phenomenon of unconventional point of view and narrative structures within contemporary fiction. The project consists of the creation of a novel that implements an unconventional narrative structure and a literature review that examines the tradition of unconventional narratives in contemporary fiction, while also analyzing how these unconventional narratives work in relationship with reader at psychological and emotional level. Unconventional narratives include any narrative not told in traditional structures of first person singular past or present or third person singular past or present point of view. Among several others, the literature review includes analysis of Julie Otsuka's T*he Buddha In The Attic*, written in the first person plural point of view, and French artist Edouard Levé's *Autoportrait*, written entirely in declarative sentences. Unconventional point of view can be powerful, oppressive, and even cathartic. The goal of the novel is to engage in the unique epicenter of emotional and psychological energy bound in unconventional point of view. The proposed original creative work is told almost entirely in imperative statements (ex. instead of "You sweep the room," "Sweep the room.") and limits the use of the pronoun "you". The novel follows a group of janitors in a high-end corporate office as they plot to burn down the building where they work, with hopes of finding existential catharsis and liberation from tyrannical corporatism. One of the benefits of unconventional point of view is that form fits function, making for a unique, visceral reading experience. The experience of reading a novel told entirely in imperatives, or demands, is mimetic of the inescapable social, psychological, and economic demands of American work life in a tedious, repetitious, capital-driven state.

UMCUR GLI Presenter Abstracts:
(Alphabetized by Title)

Bluebird Poetry Project: Slam Poetry as a Therapeutic Intervention for Depression
Author(s): Mercedes Mercedes, Spencer Ruchti, Cara McKee, Austin Herron, Alex Swalling
Mentor: Stephen Yoshimura
Abstract:
Given that depression is the "leading cause of disability worldwide," and that less than 50% of people suffering from depression receive treatment, this study aims to provide support for a globally accessible depression treatment (WHO, 2012). The study conducted implemented an internet-based treatment for depression in which users were provided an opportunity to watch slam poetry videos related to mental health issues and write free responses regarding the content of the videos and their subjective experience of depression. Numerous studies provide support for the effectiveness of expressive writing, online mental health interventions, and slam poetry in particular for reducing symptoms of depression. Data collection occurred in two forms. Survey data about participants' moods was collected before and after watching the slam poetry videos and again after providing the written response. Additionally, the researchers performed text analysis using Linguistic Inquiry and Word Count (LIWC) on the written responses to track use of negative and positive emotion words, among others, which have been shown to indicate levels of depression. The data showed an overall increase in positive emotion words and decrease in negative emotion words in participant surveys after each stage of the study. In addition, the text analyses indicated a greater percentage of positive over negative words used by participants in their free-responses. These data support the hypothesis that engaging in slam poetry online can be a globally accessible and effective tool for improving mood.

Creating an Effective Global Education Program for Elementary School Children
Author(s): Mary O'Malley, Paige Sears, Henry Lilly, Jenna Hitchcock, Payton Wulff Mentor: Phyllis Ngai
Abstract:
For many students, college is the first time that they come into contact with peers that can be defined as "different." In an increasingly interconnected world, the lack of opportunity to develop skills required for global living is a problem. To help young generations to achieve intercultural competence, the United States and many other areas of the world would benefit from a form of global education that demands little resources and begins with K-12 students. Our project involves identifying key strategies for global education in average U.S. public-school classrooms and to demonstrate that global education can coexist and strengthen regular classroom activities for all rather than being restricted to expensive study-abroad adventures for few rich kids only. To solve the problem of lack of access to global education, we propose adding on a perspective sharing learning objective to activities already taking place in the classroom. Our project aims to design a global education program using video platforms to connect 4th graders in Missoula to cultural others. The learning objectives include mainly reflection and perspective sharing in the classroom. To assess the effectiveness of our program, we will conduct pre/post surveys with both the teachers and the students involved. The evaluation results will allow us to refine the design of the program for future potential application in schools that lack affordable global education.

ERRA, the Environmental Recycling Research Application

Author(s): Sam Forstag, Elizabeth Hoffman, Leland Hubbard, Miriam Krainacker, Lauren Molin
Mentor: Peter Koehn

Abstract:
While Missoula, MT, heralds itself as being on the forefront of environmental sustainability, our city has a distressingly low recycling rate relative to the rest of Montana. As both Missoulians and global citizens, it is critical that we use all the tools at our disposal to better understand and implement sustainable practices, and our application positions itself at the intersection of social media and sustainability to address this very need. Through analysis of successful application models and collaboration with a local app-development company, we have created an application that encourages recycling habits while gathering data on current recycling trends among the community of users. ERRA provides social incentivizes for users to recycle more by bringing the amount they recycle into the public sphere and providing virtual rewards. Additionally, ERRA plays an educational role, providing users with detailed information about the materials they and their neighbors have recycled in terms of quantity and makeup, a function which will ultimately aid research efforts by providing localized data on recycling trends over time.

While various methods of encouraging recycling currently exist, ours is the first to combine social media with positive peer pressure to foster friendly competition. As a publishable application, ERRA can be easily scaled up to expand its reach. As a city where widespread support for sustainability exists alongside a tradition of successful tech start-ups, Missoula is the perfect community for an innovative platform like ERRA to take root!

Glass Recycling in the Missoula Valley

Author(s): Katie Atherly, Michelle Nemetchek, Michael Nelson, Megan Jones, Laura Weingertner
Mentor: Sara Rinfret

Abstract:
Like many other rural cities across the globe, Missoula, Montana faces numerous obstacles when it comes to glass waste. To recycle its glass, the material must travel over 500 miles to the closest glass recycling center in Portland, Oregon. The cost and carbon footprint from shipping heavy glass materials quickly outweighs the environmental benefits of recycling it. Even if glass is collected for recycling, much of it must be thrown away due to contamination. Bottle caps, trash, and even other kinds of unrecyclable glass can contaminate the recycling batches. Without any efficient process to remove these objects, glass must be thrown into the landfill, as seen in Missoula with Target's recycling program. But this problem is much larger than Missoula; many small towns lack glass-recycling programs, and residents are left feeling wasteful when the only option is the throw glass in the trash. Nonetheless, we argue in this paper that less attention should be given to glass recycling and more research should be conducted on the reuse of glass products. We, therefore, attempt to answer: how can we increase and encourage the reuse of glass? In order to address this question, we will use Missoula, MT as a case study for examination. We will survey glass-recycling habits of students, staff, and professors at the University of Montana to measure interest in glass re-use programs. We will also interview local stakeholders, such as wineries and breweries, who may benefit from programs that reuse consumer glass. Based upon our research to-date, we argue that washing and reusing glass bottles by local businesses is both economical and environmentally beneficial.

Health and the Homeless Population of Missoula: Wet Housing as a Solution

Author(s): Ciara Gorman, Nicholas Bruner, Sophie Freidl, Marissa Ginnett, Samantha Hodgson, Tessa Richards
Mentor: Abhishek Chatterjee

Abstract:
Anyone who walks through downtown Missoula will notice people experiencing homelessness. Missoula has various options for temporary shelter, but there are few options for those who are chronically homeless and inebriated. For the inebriated homeless, jail or the hospital are the only places where they can stay the night, as our local shelters do not accept intoxicated persons.

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Our initial study aimed to discover the best way to house chronically inebriated homeless individuals. Through an extensive literature review of methods used in other cities across the country and around the world, we have identified that a wet housing/wet shelter program is the best way to house these individuals. Wet shelters allow those under the influence to stay in the shelter overnight, while wet housing provides a more permanent housing solution. Every year, thousands of taxpayer dollars go to housing inebriated individuals in the form of jail and hospital beds. This cost could be significantly minimized if a wet shelter complex was created in Missoula, reducing costs to both hospitals and the prison.

In order to promote the creation of a wet housing/wet shelter in Missoula, we will be assisting the United Way in a public relations campaign to raise awareness of the benefits this type of housing would have on the community. This campaign will include writing letters to newspapers and stakeholders across the county, creating a positive online presence, and increasing student awareness about the homeless population. Although part of the 10-year Plan to End Homelessness created by Mayor Engen, buidling a wet shelter/wet housing building has never been implemented in Missoula before, and will be a substantial step forward in caring for Missoula's homeless population.

Milltown State Park Education Project

Author(s): Caelan Simeone, Mariah Bell, Antonio Morsette, Paul Paeth, Megan Harbaugh
Mentor: Josh Slotnick

Abstract:
Water scarcity is a defining issue that has shaped the American West, and despite its increasing importance with climate change it is an issue that is seldom thought about. The first step to better dealing with this crisis is through education in local places such as the site of the Milltown Dam Removal. In the Milltown State Park Education Project, we are working to create a science and history curriculum for 3rd and 4th graders to integrate classroom and outdoor learning at the Milltown State Park within a place-based context. We are partnering with staff from Milltown State park and faculty and students from Sussex school to implement this project. There are five key components to this project. The first is to use the study of water to introduce students to the scientific process. The next three components build on this base and cover other aspects of the Milltown park through in-class lessons and activities. Students will consider the story behind a place through Native American histories and oral traditions, the ecology of a place through in-class trout rearing, and how to thoughtfully communicate about a place through nature journaling. The final section of the project ties each of the five components together in a day-long field trip to the Milltown State Park. There, children will participate in hands-on activities designed to illustrate ideas introduced in classroom lessons. To measure the success of our project, faculty at Sussex School will administer pre- and post-curriculum assessments gauging the students' concept of Milltown State Park. The long-term goal for this project is to build a curriculum, which can be implemented and adapted at Milltown State Park, in collaboration with any and all schools in the Missoula area.

Misinterpretation of Food Labels and Food Waste

Author(s): Austin Clark, Taylor Craig, Leah Payne, Elizabeth Story, Tana Wilson Mentor: Steven W. Running

Abstract:
Food waste is a global problem that occurs at every level of the food chain. It can be as large as an entire shipment of vegetables going bad due to a faulty cooling system, or as small as an individual throwing away food from their own fridge or pantry because it spoiled before they could eat it all, or the label suggested that it had spoiled. Food labeling misinterpretations can be considered preventable waste, making it a tangible, local effect we can tackle within our capabilities and time frame. The purpose of this project is to collect data from consumers in Missoula about what they currently know about food waste, and why they waste food (and money). We will be going out to grocery stores such as Walmart, Albertson's, the Good Food Store and the Orange Street Food Market and surveying shoppers as they leave. The questions in the survey will aim to measure how much Missoula shoppers pay attention to food label dates and subsequently, how closely they adhere to those dates. We will perform the surveys between March 6th and March 19th. We plan to release this information to

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the Missoula Community by publishing an informative article in the local newspapers, like the Missoulian and the Independent. This article will discuss things such as expiration dates and recommended use by dates and how definitive these dates actually are. It will provide suggestions to prevent food waste and ultimately lower the amount of preventable food waste that occurs within Missoula.

Mitigating the Global Issue of Food Waste through Children's Literature

Author(s): Nikki Parker, Lisa Morgan, Peregrine Frissell, Leann Skach, Graydon Myhre, Greg Arno
Mentor: Talena Sanders

Abstract:
Food waste is a global problem that can be greatly reduced through awareness and education. Our group created an illustrated children's book focusing on three main problems seen in global and domestic food waste. We focused on children ages six through eight and structured our book to meet the age group's needs by providing engaging and relatable characters accompanied by text that effectively conveys the problem of consumer food waste. Our research suggested this age range would understand the content without oversimplification and would still benefit and be interested in an illustrated book. A children's book provides a tangible and reoccurring lesson. In Missoula, there are several different programs for school-aged children regarding sustainability, but input from the community suggested a book on food waste would help fill a gap in the available literature. Currently, food waste is more commonly taught at an older age level, or not at all. Our approach presents young readers with a problem that inspires empathy, followed by solutions they can implement in their own homes. For example, children can look at sell by dates, understand food is not always bad if it does not look perfect or have an understanding of when food is actually rotten. Our goal is to raise awareness and interest in food waste and encourage behavioral change at an early age. This approach is successful in other areas of literature, but has not been tried with food waste. We believe this format will be an effective way to address the gap in the literature, and address the problem of apathy at an early age. Although, the environmental implications of food waste are global, the solution starts locally with individual action at the consumer level. If we can change simple behaviors in childhood, the impact will begin to spread globally.

Sexual Consent Education Before Adulthood

Author(s): Trudy Stebbins, Corlin Reed, Holly Seymour, Patricia Gornick, Julia Read, Victoria Vandelinde
Mentor: David Beck

Abstract:
Recent news and media attention have brought to light the city of Missoula's ongoing struggle with sexual assault. Unfortunately Missoula is not unique in this regard, as sexual assault and consent are universal human rights issues. Our goal is to address these on both a local and a global level by creating a culturally adaptive educational model that informs students about safe and healthy sexual consent practices.

We will be partnering with a local nonprofit organization National Coalition Building Institute (NCBI) to train youth leaders with the curriculum that we create. NCBI has established a leadership development program that trains student leaders to help run the workshops around the state that address matters of social justice. We aim to add a sexual consent education module to NCBI's already successful curriculum.
Through this partnership we will develop a training module addressing issues around sexual consent and providing tools and knowledge for students approaching the age of consent. This module will be inclusive enough to be easily replicated and adapted to various institutions, communities and cultures. Through the use of the module, we hope to empower students around the globe by providing them with an understanding of sexual consent rooted in respect and human rights.

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Small Acts of Silence

Author(s): Claire Chandler, Megan Nishida, Elaine Kelly, Olivia Keith, Katherine Leonard
Mentor: John DaBoer

Abstract:
Silence births reflection, contemplation and creativity, ultimately holding importance as a means to an end, a call to contribution and community. Our goal is to share the value of silence and suggest to the world that seeking personal silence is meaningful, even necessary in the chaotic, and noisy environment of the 21st century. Our project culminated in an art exhibition exploring this theme through silent black and white videos projected on a downtown alley wall. We engaged the public by inviting them to experience intentional silence. Individual videos document and explore our personal experiences and extensive research on silence and quiet in a visually provocative way. Our videos encapsulate silence in both its beautiful and plain instances, captured by each team member. This is a personal journey in the form of a group experience. This art exhibit took place on March 4th, during First Friday in downtown Missoula. Roughly 200 people watched our video. Some were passive, merely moving on down the street after a minute or so. Others stayed to chat with us about the project and their personal journeys in silence. We will present our videos for a second time before the UMCUR presentation, on the same alley wall. This time we will be more deliberate about our audience and collecting feedback.
Our silent videos will make up the UMCUR exhibition. We will recreate our First Friday exhibition on a screen or wall during the 4:00-5:00 hour on April 15th. The significance of this project lies in the value it brings to the community. This project allows the public an opportunity to find personal silence and embody the benefits of individual reflection, without the added pressure of producing something in return. Our presentation will offer the knowledge needed to replicate the exhibition or produce small acts of silence in one's community.

The Boiling Pot: Constructing a Social Space to Instigate Sustainability Conversations

Author(s): Laura Barta, Wyatt Trull, Avriel Skolnick, Tegan Miller, Teagan Martin, Ashley Perry, Dylan Portoghese Mentor: Henriette Lowisch

Abstract:
Although the majority of people in the United States is aware of climate change, the issue is notably absent from personal conversations, as individuals engage in what environmental sociologist Kari Norgaard calls "a matter of socially organized denial." We hypothesized that creating a sustainable, appealing social space and making it accessible to the public would promote conversations about sustainability that wouldn't occur otherwise. In order to test this hypothesis, we designed and constructed The Boiling Pot, a mobile sauna built with sustainable methods and materials, which we intend to deploy in open spaces around Missoula. In the design and construction phase, we noted the frequency, nature and intensity of the conversations our project sparked in the community, from in-person communications to social media interactions. We described them through a networking map, which will continue to grow with each deployment. We also kept close track of our design, construction and collaboration process; we have created a detailed manual, which we will share through social media connections established over 10 months. Together, our manual and our networking map will demonstrate that building a social space from scratch, based on sustainable principles, does indeed instigate conversations about sustainability and climate change. To the degree that our sauna can be used as a model for similar DIY projects, the experience can be replicated around the globe, potentially drawing out a much greater number of people than those who gathered in and around the Boiling Pot. We hope that others will adapt and further develop our model depending on their own circumstances, environment and specific needs.

UMCUR Poster Presenter Abstracts:
(In order of Poster Number)

Poster # 1
Productive Classroom Literacy Instruction
Author(s): Melanie Goeddel Mentor: Jessica Gallo
Abstract:
Productive Classroom Literacy Instruction is a research project designed to help both students and educators better understand what literacy means, and that it is more than just the ability to read and write. This project took three high school students in Missoula and had them photograph what they thought of as literacy over a two-week period, at home, in school, and in extracurricular activities or free time. Students were interviewed about why they chose these subjects for their photographs and what they think literacy means, what they think other people think literacy means, and what they wish their teachers knew about literacy. These findings were then synthesized with information from peer-reviewed articles in the field of literacy. The point of this photo story is to see literacy from the perspective of students, not just teachers who may be out of touch with new literacies. My hope is that this project will expand the definition of literacy in the field of education, and enable students to have better experiences with literacy that they feel fits in with their everyday lives. I think that the originality of the photo story method of research will help visually highlight the different types of literacy in today's society. I believe this research project will benefit both educators and students in not only the field of literacy development, but all other fields of education.

Poster # 2
A Literary Review of Select Educational Philosophies
Author(s): Logan Hegedus Mentor: Matthew Schertz
Abstract:
Educational philosophies have differed and been disputed over time for centuries. These philosophies are concrete ideas regarding the education of citizens; elaborating upon the rolls of both disciples and tutors (teachers). Education has been paramount to the formation of a citizen, who is then expected to function within a given society. Each philosophy regarding education is unique in its approach to educating and forming a citizen to fit the mold of each philosopher's utopia. Each selected philosophical review is derived from, *Classic and Contemporary Readings in the Philosophy of Education*, by Steven M. Cahn. An analysis of Plato, Aristotle, John Locke, and Rousseau provides insight toward varying educational strategies. Plato asserts that a proper education leads to guardianship throughout a society and leadership among individuals; Aristotle declares in his education theory that a young well-rounded citizens is achieved through a balanced education of fun and intellectual materials; John Locke extends his theory beyond that of natural intellect, stressing that all children are born with the innate ability to learn and form important social relationships; and Rousseau theorizes that children should be placed in a natural learning environment without the overwhelming pressures of an educator or monotonous lessons, rather education should lead to the formation of a social contract. All four of these philosophers assert varying views regarding how to educate a citizen, the role of the teacher, and what a perfect society looks like. A common thread throughout these philosophies is the necessity of the teacher throughout the learning process. It is up to the teacher to exert an influence over the child to channel creativity, elicit morality, encourage intellect, and acts as a model for what a proper citizen should look like.

Poster # 3

The Communicability of Nature: Redefining Nature's Voice

Author(s): Meg Smith Mentor: Louise Economides

Abstract:

In my paper my aim is to look at works by William Wordsworth, Henry David Thoreau, and Wislawa Szymborska and evaluate how nature appears in their works. With Wordsworth and Thoreau I take a critical approach to their self-centered sense of relationship with nature. In their works, nature takes on the form of a mirror to their thoughts—silent instead of present. Then I look at Szymborska as an example of equality in nature writing. Her work allows nature an individual voice that is in confrontation with the human speaker, using voice to highlight agency and resilience. Nature then begins to have an individual agency and power that takes it from the realm of simply "opposite to culture" (and silent) and into a space of actual presence. Once it has that presence, it can be heard, not just projected upon.

I took a fairly basic English research approach that combines literary works with critical viewpoints to see the work from a new perspective. My critical viewpoint is Ecocriticism (or Eco-phenomenology), a relatively new field in the English academy. In my research I wasn't able to find any work on Szymborska's poem from an Eco-phenomenological perspective, which is my focus. As such, this paper adds to the discuss on Szymborska's poem and contributes to the burgeoning field of research that seeks to open a space for nature in terms of agency and voice, adding it as a character instead of a backdrop.

Poster # 4

Immoral Women in French Literature

Author(s): Hannah Schultz Mentor: Ione Crummy

Abstract:

Throughout history, novels have always been a tool for social commentary. Pierre Choderlos de Laclos with his epistolary novel of *Les Liaisons Dangereuses* dared to challenge societal and gender norms in the eighteenth century through his representation of the character of Madame de Merteuil as using seduction for personal satisfaction and adopting traditional masculine characteristics. Eighteenth century society, which upheld 'feminine' values of modesty and innocence, was shocked by the immorality of the characters and the adame Bovary, also faced societal disapproval and was tried in court due to the perceived immorality of his novel. Emma Bovary, the main character, is an adulterous woman who also adopts masculine traits and struggles with identity in nineteenth century society. Through individual analysis and comparison, I explore the social commentary of these two novels in terms of gender norms and expectations in the societies of their time.

Poster # 5

The role of glycerol metabolism in the Lyme disease agent

Author(s): Bethany Crouse Mentor: Scott Samuels

Abstract:

Borrelia burgdorferi, the bacterium that causes Lyme disease, is maintained in nature through an enzootic cycle, transiting between a mammalian host and tick vector. Following acquisition by a tick, *B. burgdorferiuses* the sugar glucose from the blood meal to survive. When this source of carbon runs out, the bacterium undergoes a state of nutrient stress. During this time, it uses the sugar glycerol as an alternate carbon and energy source. The operon is composed of three annotated genes that enable *B. burgdorferi* to import and metabolize glycerol, the last gene in the operon, encodes the enzyme glycerol-3-phosphate dehydrogenase that shuttles glycerol into glycolysis, the main pathway in the bacterium for extracting energy. The gene is regulated differently than the other genes in the operon, which respond to nutrient stress, so I hypothesize that is required for B. burgdorferi to use glycerol in both the tick and the mammal. Therefore, I have taken a genetic approach to test the role of in survival of the bacterium and have constructed a mutant of *B. burgdorferi* lacking the glpD gene. My preliminary results suggest that the mutant does not utilize glycerol as well as wild-type *B. burgdorferi*. I am currently

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generating a complement of this mutant to use as a control, and I will assay the phenotype of both the mutant and the complement for their ability to grow in glucose and glycerol. Eventually, I will test the mutant for its ability to survive in ticks and mice using the tick-murine model of Lyme disease.

Poster # 6

Using ISSR markers to study genetic diversity in whitebark pine *(P. albicaulis)*

Author(s): Clare Vergobbi Mentor: Diana Six

Abstract:

Whitebark pine (*Pinus alibicaulis*) is experiencing high mortality due to white pine blister rust and mountain pine beetle outbreaks as well as from effects of climate change. Mortality has been so high that the tree is now recommended for listing as an endangered species.

It is unknown how this massive mortality has altered the genetic diversity of whitebark pine populations. These large die-offs may be acting as strong selection events, removing individuals with lower fitness. However, they may also result in a loss of genetic diversity affecting how well the tree may respond to future change. Knowledge on how the outbreak affected genetic diversity in this tree will be critical to develop effective restoration approaches.

I am looking at whether survivors of mountain pine beetle outbreaks have different genotypes than those that have been killed, and what effect the outbreaks may have on genetic diversity. I am using inter-simple sequence repeats (ISSR), a method that detects high levels of genetic polymorphism, to test two hypotheses: 1) surviving trees differ genetically from those that are killed by the beetle, and 2) the outbreak has reduced overall genetic diversity in affected stands. I will compare the genetic diversity in two whitebark pine stands—one that has experienced a beetle outbreak with scattered survivors, and one that has not experienced beetle kill. I have collected needle samples from both populations and have extracted DNA from each sample. I am currently screening primers and performing PCR and gel electrophoresis with the DNA.

In this talk, I will present preliminary data on the genetic diversity, and thus adaptability, of surviving whitebark pines in the population that experienced the outbreak.

Poster # 7

The OAβ1R receptor mediates OA signaling at the periphery to promote male aggression

Author(s): Bryn Sutherland Mentor: Sarah Certel

Abstract:

In order to survive, an organism needs to be able to interpret their surroundings and rapidly make decisions that lead to an appropriate behavioral response. Identifying and examining the roles of specific groups of neurons that receive environmental information, will enable us to better understand how these decisions are made and what behaviors can occur. Previous results from our lab and others indicate that the neuromodulator octopamine (OA) is required in Drosophila central brain neurons to promote male aggression. After OA is released into the extracellular space, it binds to its postsynaptic receptors to elicit a physiological response. In this study, we are examining the role of a subset of neurons that express the OAβ1R receptor on male behavior.

Our initial results demonstrate that removing OAβ1R-expressing neurons decreases male aggression as measured by quantifying how long it takes to start fighting and the number of lunges, a key aggressive behavioral pattern. Wing threats, another form of aggressive behavior, also decreased in both ablated neurons and neurons lacking the OAβ1R receptor. To determine if the OAβ1R receptor mediates changes in male courtship behavior toward a female, I have been performing courtship assays between one wildtype or normal female and two males lacking the OAβ1R receptor. Our preliminary results indicate males lacking the OAβ1R receptor show a significant delay in comparison to controls before they begin courtship behavior, but no defect in their ability to copulate. This delay in initiating courtship could result from a lack of regulation of OAβ1R-expressing neurons by the OAβ1R receptor. Taken together, our results suggest OA signaling through the OAβ1R receptor is required to interpret environmental information to promote or inhibit the aggression and courtship response.

Poster # 8

Fitness as a Function of Diversity in a Simple Microbial Community

Author(s): Ashley Alexander Mentor: Frank Rosenzweig

Abstract:

In simple, constant environments containing one food source, theory and intuition suggest that only one type of organism should prevail. However, a lab population of *E. coli* founded by a single clone quickly evolved into a community of interacting cell types. Bacteria were cultured under glucose limitation, selecting for its avid consumption. One strain, A, best scavenges glucose but does so wastefully, providing strains B and C with by-products that support their growth. Thus, multiple interacting cell types may better use limited resources than one. I therefore posed the questions: How much more fit is each strain relative to the common ancestor, and does cohabitation provide fitness advantages? We competed strains of P, A, B, and C expressing green fluorescent proteins, and quantified their relative numbers in a simple, controlled environment. Fitnesses ranked as (A+B+C)>(A=B)>A>B>C, support the view that a cooperating community can evolve outperform a single individual. Quantifying relative fitness in experimentally evolved communities reveals that the sum may be greater than its parts, providing a clue as to how biocomplexity arises, even in simple systems governed by Darwinian principles.

Poster # 9

Ice Cream: Is It Really a Thin Liquid?

Author(s): Marisa Binder Mentor: Laurie Slovarp

Abstract:

Patients consume thin liquids on a daily basis to meet their hydration needs. Liquids including water, coffee, tea, milk, and soda, are just a few examples of thin liquids. Many patients with dysphagia are restricted from thin liquids due to the risk of aspiration; and it is standard practice to restrict these same patients from having ice cream. The rationale for restricting ice cream is the assumption that once ice cream melts it becomes a thin liquid. However, there is no hard evidence that ice cream is in fact a thin liquid when it melts, nor is there evidence that the ice cream melts quick enough to act like a thin liquid when swallowed. The goal in this research study is to gather information about practice patterns of speech therapists across the country regarding ice cream and to objectively determine whether or not ice cream behaves like a thin liquid. The study has two parts. Part 1 involves surveying speech therapists across the country to get a clear understanding of individual policies and/or work policies regarding ice cream for patients who are restricted from thin liquids. We also gathered information about why these policies were put into place and where speech therapists obtained information to inform the policy. Part 2 of the study involves testing the viscosity of four different types of ice cream using a Ford viscosity cup to objectively determine if any are considered a thin liquid when fully melted.

Poster # 10

Factors of Pre-Med Success

Author(s): Bryanna Ogger Mentor: Mark Pershouse

Abstract:

The success of students' entrance into medical school depends on a number of different applicant factors. Two factors that many schools look at first are the academic scores: medical college admissions test (MCAT) and the grade point average (GPA). This research project looked at the possible correlation between these metrics and the success of the premedical students, in reference to acceptance to a medical school program. I utilized the data that the Association of American Medical Colleges retains for applicants of the past five years and the data supplied by the Director of the Premedical Sciences at the University of Montana. The results did show a significant correlation of the scores being above average for students applying to medical schools and acceptance into medical school. The results can also be utilized to identify schools where students from the University of Montana have a higher probability of receiving positive responses.

Poster # 11

Patient and Caregiver Health and Wellness Outcomes following an Intensive Comprehensive Aphasia Program

Author(s): Erin Colleen Powers, Laiken Wilkening Mentor: Catherine Off

Abstract:

Intensive Comprehensive Aphasia Programs (ICAPs) are rehabilitation programs designed to improve the speech, language, social communication, cognition, and psychosocial well-being of stroke survivors and their caregivers. The objective of this study is to assess psychosocial outcomes for patients and caregivers stemming from our ICAP, the Big Sky Aphasia Program (BSAP). Based upon preliminary results and the previous ICAP literature, data indicates improvements in psychosocial well-being for the persons with aphasia.

The significance of this project is multifaceted. The ICAP treatment model is relatively unexamined, with approximately 12-15 ICAPS existing worldwide. BSAP is unique as it is the only ICAP with an interdisciplinary collaboration between speech-language pathology and counseling to address caregiver outcomes. Results from this study will provide pilot data and serve as an example of the ICAP delivery model for clinical application.

Participants include patients with aphasia and their caregivers. Quantitative and qualitative behavioral outcome measures will be reported for patients from fall 2014 (n=7), summer 2015 (n=8), and fall 2015 (n=4). Caregiver outcomes will be collected during the summer 2016 session for the first time.

The BSAP ICAP includes four to five weeks of individual and group speech-language therapy sessions, weekly support group meetings, recreational outings, home programming and technological training to support communication. Caregiver education sessions are provided once per week, and caregiver support sessions occur twice weekly. For the patients, we will analyze and compare data obtained in person before and after the program from the following outcome measures: the Geriatric Depression Scale (GDS), Assessment of Living with Aphasia (ALA) and the Communicative Effectiveness Index (CETI). Caregiver outcomes will be collected for the first time during summer 2016 using the Bakas Caregiving Outcomes Scale, Perceived Benefits of Caregiving Scale, Brief Measures of Secondary and Intrapsychic Strain and Perceived Support Scale.

Poster # 12

Serum Resistance in *Bartonella* Species

Author(s): Benjamin Mason Mentor: Michael Minnick

Abstract:

Bartonella are widespread bacterial pathogens of vertebrates that have been found in virtually every type of mammal surveyed. Of the 31 validated species in the genus *Bartonella*, 11 are agents of serious infectious diseases of humans, including Carrión's disease, trench fever, cat-scratch disease, and *bacillary angiomatosis* in AIDS patients. As facultative intracellular parasites that employ hemotrophy (infection of red blood cells), the key to survival depends on the ability to replicate within the bloodstream of the vertebrate host or reservoir. It has been demonstrated that *bartonellae* are resistant to the effects of complement proteins in serum, the primary effector of the humoral innate immune system. Although this effect has been characterized in other pathogens, the molecular basis of *Bartonella's* serum resistance is undetermined. The overall objective of this research was to examine the genetic and molecular components of complement resistance in *bartonellae* using *Bartonella bacilliformis (Bb)* as a model. Complement resistance was demonstrated in Bb by complement assays with human serum. Using a far-Western blot, a ~90-kDa Bb protein was identified as a potential human factor H binding protein (Fhbp). Immunofluorescence microscopy demonstrated a Fhbp on the surface of intact bacterial cells. Genomic analyses based on molecular mass were used to identify two candidate Fhbp genes (KC583_0512 and _0314) which are currently being cloned for further analysis. Results of this study will allow us to analyze complement resistance in *Bartonella* and increase our understanding of serum resistance in other pathogenic bacteria.

Poster # 13

Rehabilitation through Communication, Neuropsychology, Counseling, and Training (ReCoNeCT): Connecting students and student veterans impacted by mTBI with holistic interventions, skills, and support

Author(s): Marley Niland Mentor: Catherine Off

Abstract:

The Communicative Sciences and Disorders, Counselor Education, and Educational Leadership programs together with the Neural Injury Center at the University of Montana are collaborating to implement an intensive interdisciplinary program for Montana University System (MUS) students and student veterans who have had a mild traumatic brain injury (mTBI) and/or concussion. Academia can be exceptionally challenging for these individuals as a result of unsolved cognitive issues associated with mTBI such as attention, recall, reasoning and executive functioning, which includes skills such as planning, organization, time management, and problem solving (Krug & Turkstra, 2015). The ReCoNeCT program will include two weeks of individualized treatment along with pre- and post- treatment assessment, debriefing, home programming, referrals, recommendations, and orientation to campus-based and community-based services and resources. Pre- and post-treatment assessment will include a semi-structured interview and standardized assessment spanning neuropsychology, speech-language pathology, and counseling domains. Collectively, the team will also assess academic areas of strength and concern. Following assessment, the interdisciplinary team will provide individualized treatment in-person on the University of Montana campus two days per week and via telehealth and online modules two days per week for two weeks. The purpose of the proposed study is to assess the feasibility of implementing a short, yet intensively-delivered, interdisciplinary intervention and education program designed to increase academic success, cognitive-communication skills, mental health and wellness, and quality of life for individuals with mTBI who are pursuing higher education in the Montana University System (MUS). Participants will be recruited and screened during the spring and summer months and treatment will begin during the fall 2016 semester. This poster presentation will review the literature and provide details about the proposed program.

Poster # 14

Effects of Fluoxetine on Aggressive Behavior in *Betta Splendens*

Author(s): Jeffrey Kelly Mentor: Benjamin Eisenreich

Abstract:

Previous studies have shown strong evidence that the selective serotonin reuptake inhibitor (SSRI) Fluoxetine reduces aggression and inhibits learning in Siamese Fighting Fish (*Betta Splendens*). While this evidence has been replicated across multiple studies, the behavioral mechanism of Fluoxetine on aggressive behavior and learning is still unknown. In particular, Fluoxetine may produce its anti-aggressive effects by altering the motivational arousal component of aggressive responding or through the sedation of motoric activity. In order to examine these two models, a maze-swimming task for access to reinforcing aggressive opportunities was implemented. Based on previous evidence, researchers hypothesized that subjects would have decreased rates of aggressive responding to mirror and live conspecific stimuli when exposed to Fluoxetine than when not being administered the drug through either the blocking of motor or motivational functions. Results from this study indicated that Fluoxetine administration reduces the appetitive properties of aggressive encounters through inhibition of motor processes which impacted the performance of the fish in the task. Based on these results, further studies should focus on the relationship of serotonin pathways on arousal and motor processes in operant and classically conditioned behavior.

Poster # 15

Motor Impairments of Fluoxetine Administration in *Betta Splendens*

Author(s): Jeffrey Kelly, Jaden Emminger Mentor: Benjamin Eisenreich

Abstract:

The serotonergic neural pathway is highly involved in arousal, learning, attentional, and memory functions. The selective serotonin reuptake inhibitor (SSRI) Fluoxetine functions as a 5HT antagonist on this pathway, leading so many implications on behavioral and neurological function. While evidence from the greater literature has

Continued

shown significant evidence that Fluoxetine decreases motoric activity in Siamese fighting fish (B*etta Splendens*) the behavioral mechanism of Fluoxetine on motoric function is still unknown. Fluoxetine may impair the motoric function in subjects through the secondary effect of decreased dopamine transmission in the motor cortex following increased serotonin synthesis in addition to attentional sedation. Additionally, the decrease in motoric behavior may be a byproduct of inhibited motivational processes. In order to examine the experimental question, the movements of 38 *Betta Splenden*s were recorded and analyzed in their home tanks as a supplementary study to an experiment analyzing the effects of Fluoxetine on aggressive responding. Motor behavior recording consisted of measuring grid line-crossings between experimental and control subjects. Results from the experiment indicated that Fluoxetine administration decreases overall motoric behavior and total distance travelled in subjects. These data allow for further investigation into how motor versus motivational processes may be affected by Fluoxetine to produce these results. Results from this study can be projected into a greater understanding of how Fluoxetine and 5HT affects neural motoric behavior processes.

Poster # 16

Influence of Fluid Ingestion on Sweat Rate Status While Exercising in the Heat

Author(s): Delaney Frazer, Jonathon Chapman Mentor: Michelle Johannsen

Abstract:

The purpose of this study was to determine the effects of differing volumes and temperatures of ingested water on sweat rate while exercising in the heat. Participants exercised for 3 hours in a hot room at WBGT 35.5 and 50% relative humidity. The subjects walked on an electric treadmill at 40% VO2 max, rested for 5 minutes, then completed a 1 mile time trial at peak exertion on a non-motorized treadmill (Woodway Curve), with the remainder of the hour spent resting. Subjects ingested 1 ml/kg body weight of water at ambient temperature or 0.5 ml/kg body weight ice every 10 minutes throughout the 3-hour trial. Pre and post body weight were measured to calculate bodyweight loss and sweat rate. Previous studies have not compared differing volumes of fluid of varying temperature, making this experiment novel. Sweat rate is important because it helps determine how much fluid is being utilized to aid in thermoregulation by evaporative cooling. The results of this study suggest that thermoregulation may be more influenced by the temperature of the fluid rather than the volume.

Poster # 17

The OAβ1R receptor is required in peripheral neurons to interpret environmental information

Author(s): Edmond Brewer Mentor: Sarah Certel

Abstract:

In many species, chemical signals from the environment trigger a variety of possible behavioral responses by an organism including feeding, aggression, and courtship. How neurons located at the periphery receive these signals and mediate the strength of this information before sending it forward to the brain remains unclear. The neuromodulator octopamine (OA, the insect equivalent of norepinephrine) has been shown by experiments from our lab and others to be required to promote male aggression. After OA is released into the extracellular space, it must bind to its receptors to elicit a response. In order to discover how signals from the environment are interpreted to regulate the behaviors of male aggression and courtship, I am making the focus of my project to examine which types of sensory neurons express the Drosophila octopamine receptor, OAβ1R.

We are using the UAS/Gal4 system, which comprises of Gal4, a transcriptional activator that binds to UAS, which is an enhancer, in order to increase transcription. We will identify neurons in the periphery that respond to water and sugar. I am removing the legs and mouth parts of males that express a fluorescent marker separately in these different neuron categories as well as expressing a fluorescent reporter for the OAβ1R receptor. I am looking for co-localization between the two markers through examination under a fluorescent microscope and have demonstrated co-localization with pickpocket28, which is a gene coding for an ion channel protein that detects water, as well as gustatory receptor 64, which is a sugar sensing neuron. These results indicate that OAβ1R neurons may be involved in detecting as well as regulating the intake of both water and sugar. Results from my collaborative project will provide necessary information regarding how environmental signals are regulated by octopamine to initiate or modify behavior in any system.

Poster # 18

The Effect of Fluid Volume and Temperature on Physiological Strain and Performance in the Heat

Author(s): MaryAnn Beach, Michelle Johannsen Mentor: MaryAnn Beach

Abstract:

Established hydration standards are based on ambient temperature. However, limited research has investigated the relationship between ingested fluid volume and temperature on thermoregulation. PURPOSE: To determine physiological strain and performance in the heat with varied fluid volume and temperature. METHODS: Eleven recreationally active males (age 24.7±5.9 years, height 179.0±7.3cm, weight 78.4±6.4kg, peak VO258.2±6.0 ml·kg-1·min-1, body fat 14.3±5.9%) completed two trials. in a randomized cross-over design (ice slurry (0.5 ml/kg) (Slurry) or ambient temperature water (1.0 ml/kg) (Room) every 10 minutes).. Study participants walked at 40% VO2 max for 25 minutes, rested for 5 minutes, and then completed a one mile time trial at maximum effort in an environmental chamber (35.5°C, 50% RH) over 180 minutes. Heart rate and core temperature were continuously monitored and used to calculate physiological strain index (PSI). RESULTS: Body weight demonstrated a significant decrease over time (2.2±0.2 and 3.0±0.2% loss for Room and Slurry, respectively, $p<0.05$) but was not different between trials. PSI increased significantly during the steady state segment over time for both trials ($p<0.05$). However, there were no significant differences between trials (Room = 3.5±1.0, 7.9±1.5; Slurry = 3.6±1.1, and 6.9± 0.7 for segment 1 and 3, respectively). Peak PSI at the completion of each time trial increased significantly ($p<0.05$). However, there were no significant differences between trials (Room = 6.7±1.2, 9.5±1.3; Slurry = 6.9±0.7, and 9.4± 0.9 for time trials 1 and 3, respectively). Time trials were significantly slower over time for both trials ($p<0.05$). However there were no significant differences between trials (Room = 9.7±1.3, 12.8±2.4; Slurry = 10.1±1.6, and 12.7±2.6 for time trials 1 and 3, respectively). CONCLUSION: Despite consuming half of the recommended fluid volume, when very cold fluids are consumed, the overall physiological strain and performance are not significantly different compared to higher volume, room temperature water.

Poster # 19

Skeletal preservation and articulation of a White-Tailed Deer

Author(s): Jude Nickison Mentor: Erick Greene

Abstract:

Many of the wildlife specimens collected and retained in natural history museums are just the pelts, taxidermied heads and bodies, and skulls of the animals. More rare are complete skeletons, which not only preserve the bones of the animal but also the character of it's internal skeletal anatomy. In the current age of extinction, it is important to retain complete specimens for future scientific research. Fully articulated skeletons are rare because of the time consuming nature of their assembly. The University of Montana is home to countless wildlife specimens, but only a few of them are fully articulated skeletons. I sought to add to the University's collection by completing and donating an articulated skeleton of a White-tailed deer buck. Instructions in the methods of skeletal articulations for all species, including deer, are limited, so I also created a detailed how-to manual of my project. I fully disassembled and cleaned the bones of a complete White-tailed deer carcass. I then used a ungulate bone building manual by Lee Post, wire, glue, and metal rods to completely reassemble the skeleton in an anatomically correct manner. The articulated skeleton will be on display at the Davidson Honors College for future student learning, inspiration, and curiosity.

Poster # 20

Motor Control of Force Output in Fresh and Fatigued Muscle Fibers

Author(s): Jennifer Miller Mentor: Matthew Bundle

Abstract:

Purpose: Since the 1950s investigators focused on the motor control strategies used by the central nervous system to alter the force outputs of skeletal muscle, and have repeatedly observed a highly linear relationship between the forces applied to the environment and the volume of muscle activated to generate this tension. This classical relationship underpins nearly all existing hypotheses on the mechanisms of neuromuscular fatigue, yet it is unknown whether this understanding holds during the activation of fatigued muscle fibers.

Continued

Methods: Subjects completed a minimum of 40 exhaustive sprint-running trials (typically 5 trials per lab visit), on a high-speed force treadmill at speeds selected to produce failure between 3 and 300 s. We used a within-trial, blinded, speed change, which either increased or decreased the initial speed by 15%, and measured the level of neuromuscular activity using EMG. Surface electrodes were placed over the muscle bellies of the right medial and lateral gastrocnemii, vastus lateralis and vastus medialis; these data were digitized and recorded at 2000 Hz, and subsequently analyzed in custom written software.

Originality: Neuromuscular responses occurring during the development of fatigue have been well studied; however, there is considerable uncertainty associated with how the body modulates force output in muscle fibers that are contracting dynamically. During the initial contractions that followed the speed increment or decrement, we tested whether the volume of active muscle needed to apply the necessary ground reaction force differed from similar measures obtained at the onset of a running trial (i.e. the fresh condition).
Significance: This study will inform the basic understanding of how the nervous system recruits muscle and how muscle communicates with nerves.

Poster # 21
UMove: A Physical Therapy Mobile Application for Calculating Fitness Levels in Wheelchair Users
Author(s): Lisa Morgan, Stefan Riemens Mentor: James Laskin
Abstract:
Determining human fitness can easily be accomplished through numerous examinations and testing methods. A majority of such tests are produced exclusively for individuals capable of free and unhindered movement. Limited attention has been paid to the evaluation and determination of fitness of wheelchair-bound individuals with various degrees of paraplegia. Professor James J. Laskin published an article in the *Journal of Exercise Physiology* concerning a cadence-based sub-maximal field test for predicting maximal oxygen consumption in wheelchair basketball athletes. Our goal is to employ his research in the development of a portable fitness application that promotes healthcare accessibility. The program is an Android application that employs XML for the front-end design, Java for the back-end functionality and SQLite for the database. The app allows individuals to conduct a fitness test while propelling in synchrony with a cadence at 60 pushes per minute. At the conclusion of the 5-minute fitness test, the user will be presented with a fitness evaluation. The level of fitness is calculated with functional level, distance traveled and rated perceived exertion (RPE) variables. Fitness levels are presented as values of maximum oxygen consumption (VO2 max). The application interface is designed with voice and button navigation capabilities. Necessary data entry can be performed and stored on the inherent device. We hope to further the profession of physical therapy through technology and provide greater research opportunities in the years ahead.

Poster # 22
The Role of RNase Y in rpoS Transcript Processing in ***Borrelia burgdorferi***
Author(s): Zhibing Zhou Mentor: Scott Samuels
Abstract:
Borrelia burgdorferi is the bacterial agent that causes Lyme disease. The pathogenic bacteria are transmitted to vertebrates through tick feeding and are maintained in nature in an enzootic cycle. The expression of outer surface protein OspC is essential for *B. burgdorferi* to move from the tick to a mammal. Alternative sigma factor RpoS is responsible for inducing gene expression for OspC production during the enzootic cycle. RpoS is encoded by two versions of RNA: a long one, which is hypothesized to be required for transmission from the tick, and a short one, which is thought to be involved in infection of the mammal. We seek to understand the mechanism of how the long rpoS RNA is generated so that RpoS protein can activate ospC gene expression during transmission. Ribonucleases (RNases) are enzymes that cleave RNA. I hypothesize that the long rpoS RNA is generated by RNase Y cleaving an even longer rpoS RNA. Therefore, I constructed a recombinant strain of *B. burgdorferi* that expresses a recombinant RNase Y with a 10X-histidine tag in order to purify RNase Y from *B. burgdorferi* and directly assay the ability of this ribonuclease to cleave rpoS RNA.

Poster # 23

Characterization of RNA aptamer binding to Rift Valley fever virus nucleocapsid protein

Author(s): Ilona Csik, Katherine Hornak Mentor: J. Stephen Lodmell

Abstract:

Rift Valley fever virus (RVFV) is a mosquito-borne virus that can cause hemorrhagic fever in humans and miscarriage in livestock. There is currently no cure for RVFV.

Viral nucleocapsid protein (N) binding to viral RNA is crucial for RVFV replication, transcription, and genome protection. If N-RNA binding is prevented, RVFV will be unable to propagate in a host. This suggests that disruption of N-RNA interaction is a good potential therapeutic strategy for a new class of antiviral drugs. To exploit this target, molecular details about how N recognizes its preferred RNA binding sites must be elucidated. The Lodmell laboratory previously discovered a small RNA shown to bind N with high affinity called MBE87. MBE87 structure contains two GAUU nucleotide motifs. We have collaborated with Dr. Doug Raiford in the Computer Science department at UM to design RNAs with the same predicted secondary structure as MBE87 but with GAUU motifs at different positions in the structure. We hypothesize that the position of the GAUU motif is important for recognition by N and thus for viral functions.

Using MBE87 and an RNA devoid of GAUU motifs as controls, electrophoretic mobility shift assays were performed to determine if moving the GAUU sequence affects N-RNA binding affinity. We performed the binding experiments in the presence and absence of suramin, a drug recently shown to inhibit RVFV replication. Our results suggest that suramin acts as a competitive inhibitor that binds to the site on N where aptamer RNA also binds. Because suramin binds at a site that at least overlaps with the aptamer RNA binding site, it had a stronger inhibitory effect on weaker-binding aptamers. When completed, this research will lend insight into how N recognizes preferred viral or host RNA binding sites and will pave the way toward development of drugs that target N protein.

Poster # 24

Studying the Function of ybgL; an *E. coli* protein of unknown function

Author(s): Savannah Whitfield Mentor: Dr. Brooke Martin

Abstract:

Endonuclease VIII (nei) is a DNA repair enzyme that cuts single damaged bases out of DNA. In Escherichia coli (*E. coli*), it is made along with four other genes (in the nei operon), but the functions of the other genes are unknown. Chromate is an environmental toxicant that creates the kind of DNA damage that is recognized by the repair protein encoded by the nei gene. In this study, we wanted to see if we could use chromate to investigate the function of the other four genes that are made at the same time.

To test this, single gene deletion mutants were treated with chromate and the effects on cell growth and DNA lesion (damage) formation were measured. Mutant *E. coli* missing the ybgL gene, the gene encoded immediately before nei, were found to be resistant to chromate. This suggests that the toxic DNA damage created by chromate needs ybgL to form in DNA. Double gene deletion mutants have also been generated to see if the effects are amplified when two genes are missing, indicating that the genes may be working together to repair or metabolize DNA damage.

More detailed in vitro studies on ybgL have been performed. The gene was isolated and put into an expression vector to produce the ybgL protein to study. Purified ybgL protein was incubated with different types of oxidized DNA damage to see its effects. Results indicated the ybgL protein has strong nuclease activity. This is the first indication of any function for this gene. We are now developing an in vitro assay using fluorescently labeled oligonucleotides. Studying the function of the nei operon and the ybgL protein to determine what they do for cells is a new discovery in the knowledge of DNA and protein interaction.

Poster # 25

Effects of Hydration on Physiological Indicators During Short Term Heat Acclimations

Author(s): Nicole Mickelson Mentor: Charles Dumke

Abstract:

Hydration of wildland firefighters (WLFF) during heat acclimation trials may impact performance by reducing physiological strain. By inducing dehydration in a controlled setting, physiological adaptations such as increased sweat rate and cardiovascular strain may be enhanced. PURPOSE: To investigate the impact hydration status (dehydrated/ euhydrated) has, through mitigated fluid delivery, on levels of hydration (% dehydration), sweat rate (SR), heart rate (HR), and rating of perceived exertion (RPE). METHODS: Ten aerobically fit male subjects (age=23.0±0.9, weight=82.1±4.6kg) underwent three heat acclimation trials on alternate days in an environmental chamber (40°C, 30%RH) for 90 min at 50%VO2max. Subjects wore WLFF Nomex pants, yellow button up and 100% cotton t-shirt. Fluid delivery was controlled to induce either dehydration (DEH=0.5 ml*kg-1*15 min-1) or euhydration (EUH=2.0 ml*kg-1*15 min-1). After a five week washout period three subsequent trials were held in the alternate hydrated state in a random crossover design. Rating of perceived exertion (RPE) and heart rate (HR) were measured every 15 minutes throughout the 90 minute trial. Pre and post bodyweight were measured to determine sweat rate and percent dehydration. Statistics were performed as a 2 (trt) x 3 (day) analysis of variance (ANOVA) with repeated measures. RESULTS: There was a significant interaction for treatment ($p<0.001$) in percent dehydration (DEH=2.16±0.5, 2.36±0.5, 2.32±0.4, EUH=1.32±0.4, 1.44±0.5, 1.48±0.3%) between DEH and EUH over the three days, but no interaction by day. There was no significant main effects in peak HR (DEH=167.8±11.2, 162.4±11.7, 165.0±14.2, EUH= 165.2±11.4, 163.4±18.3, 163.0±17.2 bpm), SR (DEH=1.34±0.26, 1.37±0.23, 1.33±0.22, EUH=1.32±0.25, 1.37±0.26, 1.3±0.21 L*min-1) or RPE (DEH=15±1.00, 14.33±1.12, 14.00±1.66, EUH=14.44±1.24, 14.11±1.27, 14.00±1.50) for acclimation days 1, 2, and 3 respectively. CONCLUSIONS: Our data suggests that controlled dehydration during 3 days of short term heat acclimation results in elevated percent dehydration.

Poster # 25

The Effect of Dehydration on Heat Acclimation

Author(s): Justin Stevens, Michael Schleh Mentor: Charles Dumke

Abstract:

Minimizing heat-related illness for occupations in hot environments is essential. We hypothesize that short-term heat acclimation (STHA) in a state of hypohydration will improve cardiovascular and perceptual strain associated with heat stress, accelerating heat acclimatization. PURPOSE: To determine the impact of hydration status during STHA on heat adaptations. METHODS: Ten aerobically fit male subjects (23±1.00yrs, 82.1±2.14kg, 53.18±1.63mL•kg-1•min-1 VO2 max, 13.8%±1.31%BF) completed a heat stress test (HST) two days prior to, and following three acclimation bouts over six days. HST/acclimation bouts consisted of 90-minute treadmill walking at 50% VO2 max in hot conditions (40, 30%RH). Additionally, a performance test was conducted that the end of each HST. In a randomized crossover design, fluids were administered during STHA bouts to promote a dehydrated (DEH=0.5 mL/kg) or a euhydrated (EUH=2.0 mL/kg) state. A five-week washout period separated DEH from EUH trials. Participants wore standard wildland firefighter NoMex clothing with a cotton shirt. Peak heart rate (HR), peak rate of perceived exertion (RPE), percent dehydration (%DEH), sweat rate (SR), and peak core temperature (PCT) were analyzed by a 2(trt) X 2(trial)ANOVA. RESULTS: HR and RPE both decreased significantly from PRE to POST with no significant difference between treatments. SR showed a time and trtXtime interaction that nearly reached significance ($p=0.054$) with greater increases in the DEH trial. Conclusion: Our data suggests STHA reduces physiological and perceptual strain, regardless of hydration status. However controlled dehydration improved SR, suggesting the protocol may lead to greater heat adaptations during STHA.

Poster # 27

Soft Sound Test and 15 dB Hearing Screening Level for Adults

Author(s): Sarah Rice, Sarah Schied, Andrea Snelling, Michelle Tatko, Laiken Wilkening
Mentor: Al Yonovitz

Abstract:
Hearing soft sounds is an important auditory experience, especially for those with impaired hearing. SoundScape background sounds are part of the architectural design of many public venues. Adults with hearing impairment are often unable to benefit from hearing soft sounds, even with hearing aids. Adult subjects with hearing impairment identified target sounds embedded within soundScape themes. The soundScapes provided the ambient background for the detection of the soft target sounds. Three target sounds were presented for each soundscape. Two forms of the test were created. Hearing aid gains were set that yielded 15 and 25 dB thresholds. Results indicated that adults could benefit as well as children when hearing thresholds are 15 dB HL.

Poster # 28

Auditory Processing in Fluency Disorders

Author(s): Megan Chamberlin, Kara Joyce Mentor: Al Yonovitz

Abstract:
There is no definite etiology for stuttering. One possible cause is Auditory Processing Disorders (APD). Two specific audiological procedures that have been implicated to test for the presence of APD in children and adults and can be applied to adult stuttering subjects. These include the Masking Level Difference (MLD) and Backward Masking (BM). The MLD is a binaural task requiring listeners to respond to the presence of a tone in a background noise. The tone is presented with a phase dfference between the two ears. While the MLD is useful to test for central processes in binaural processing, the BM procedure is a monaural task. This task requires the subject to respond to the presence of an audible tone before a noise masking noise is presented. This study will report the results of APD testing with subjects with fluency disorders and matched controls.

Poster # 29

The Incidence and Prevalence of *Otitis Media* in Montana Daycare and Preschool

Author(s): Kendal Alley, Nicole Aline, Alison Arthun, Bridget Brannan, Sheila Murphy, Sarah Rice
Mentor: Al Yonovitz

Abstract:
Otitis media (OM) and *Otitis Media* with Effusion (OME) are among the most frequent illnesses experienced by young children and was the most commonly reported diagnosis for children under age 2 as well as for children aged 2 to 5 years seeking medical care for acute illness. Overall in the US medical visits for the treatment of OM and OME accounted for 17.4% by children under 2 years of age and 18.1% by children 2 to 5 years of age. The estimated direct and indirect cost of OME for children younger than 5 years was more than $5 billion. Attendance in day care and preschool facilities has been identified as a risk factor for the development of OME, increasing the incidence of OM approximately threefold among children <2 years old. The incidence of OM and the prevalence of OME have been documented in previous epidemiologic studies of US children followed from birth to 2 or 3 years of age and between 2 and 4 years of age, however, the incidence, prevalence, costs and bacterial pathologies has not been studied in Montana. The study will sample approximately 30 children from two UM preschool facilities. The children were ages 3-5.. Over a period of one month each child was assessed by the use of tympanometry and video otoscopy each week. This study is currently being conducted. The study wll report the incidence and prevalence of OM including the risk factors and costs of OM and OME.

Poster # 30

Cortical electrical responses occurring prior to speech initiation

Author(s): Maira Ambris, Maya Anger, Serena Haller, Lyndsay Hutton, Savanah Lovitt
Mentor: Al Yonovitz

Abstract:
The readiness potential is an event-related potential which refers to the electrical stimulus in the brain that occurs before voluntary muscle movement. Electrical brain potentials have proven to be extremely useful for diagnosis, treatment and research in the auditory system, and are expected to be of equal importance for the speech system. The purpose of this research was to establish a real-time event related brain electrical potential system. In previous studies the marking point for determining the pre- event time epoch has been an Electromyographic (EMG) source. The data are typically acquired off-line and later averaged. This research uses a vocal signal as the marking point, and displays in real time the event-related potential. Subjects were University of Montana students. Electrodes were recorded with silver-silver chloride active electrodes positioned at the vertex, Cz, using the 10-20 system. The left earlobe were used as the reference. The ground was established at the opposite earlobe. Biological pre-amplifiers were used to amplify the weak bioelectric signals 100,000 times. Each time epoch was sampled at 25600 samples/sec. One second of these signals were averaged for 100 trials just prior to initiation of the words or syllables. The inter-trial interval was approximately 25 seconds. For the 100 trials, each trial was saved. Separate odd and even event potentials were averaged. Digital band-pass filters were used to observe the negative potential and also to observe the microstructure within the waveform. The obtained waveform was consistent and reliable between and within subjects. The microstructure of the waveform was also obtained showing specific waveform morphology. There are a number of clinical outcomes that can be beneficial from finding a repeatable signal, including diagnosis and treatment of: apraxia, speech disorders resulting from traumatic brain injury, stuttering, nonverbal behavior in children, and individuals who have experienced a stroke.

Poster # 31

Backward Masking Determination with Early, Middle and Late Evoked Potentials

Author(s): Taylor Perius, Nicole Aline, Kendal Alley Mentor: Al Yonovitz

Abstract:
Backward Masking (BM) occurs when a tonal stimulus is followed by a noise masker. BM functions have been shown to relate to age, lead toxicity, and in children with language disorders. These functions may be indicative of Auditory Processing Disorder (APD). This study investigated if Evoked Potentials (EP) could be utilized to obtain BM functions. This would be an objective procedure for detemining APD and would be useful in diagnosis. A 10 msec tonal stimulus, a 10 msec Inter-Stimulus Interval (ISI) and a noise masker were used. The subjects were college-aged students with no history of auditory dysfunction. All stimuli will be temporally placed correctly according to the BM stimulus condition. The electrodes were placed at the vertex (Cz, referenced to the right ear) to obtain the evoked potential. A total of 4,000 EEG time epochs were used to determine the summed evoked potentials. Each summed evoked potential comprised 1000 EEG epochs (4 x 1000). The inter-trial interval was 1 sec. The results of the four separate EP's were compared using subtractive techniques to clearly obtain the changes in the waveform morphology under BM conditions. Results indicated diffential responses depending on the masking condition.

Poster # 32

Auditory evoked potentials in humans and laboratory rats

Author(s): Margaret Mitzel, Anna Ross, Emma Bozarth Mentor: Al Yonovitz

Abstract:
Evoked potentials provide a basis for the objective analysis of the auditory system. An animal model of hearing is very useful for studying untoward effects of drug therapy, toxic substances and noise-induced hearing loss. The Auditory Brainstem Response (ABR) can be recorded using surface electrodes from lower animals and humans. The morphology of the ABR has been shown to correlate well with structures of the auditory pathway. This research compares the results of the human ABR with that of rat responses. A specially designed software

Continued

program allowed concurrent ABR responses. This program will be discussed as well as the method for obtaining rat ABR's. The concurrent responses were designed to provide a reliability index that was utilized to improve the determination of auditory thresholds. The stimuli were pure tones with a Blackman envelope. The Blackman envelope provides a minimal amount of spurious signals for brief stimuli (2 msec). A complete auditory threshold for all octave frequencies can be obtained in less than one hour.

Poster # 33

Signal Detection Analysis of Homophonous Sounds with 2D and 3D lip reading Presentations

Author(s): Sarah Shultz Mentor: Al Yonovitz

Abstract:

Lip reading is an important component for communication by the deaf and hearing-impaired. This study investigated lip reading responses using improved video through 3D presentation. The actual process by which the lip reader translates the lip movements they identify into a message is very complex. The lip movements observed represent only fragments of the complete message. The lip reader's recognition problems are complicated by the fact that the sounds of English are not easily discriminable. The visible movements associated with the production of the sounds are frequently very similar, and as a consequence are easily confused. The main purpose of this study was to investigate 1) the ability of lip readers to use visual information alone to identify phonemes in varying contexts including nearby co-articulation effects and vowel neighborhoods; and 2) lip reading responses using the effect of improved video presentation through 3D video, providing better and more realistic video presentation. The experimental procedure used signal detection and a two-alternative forced-choice method of subject response. Reaction times were used to construct ROC curves. Subjects contrasted homophonous sounds with 2D and 3D video presentations. This study provides evidence that subtle differences in production allow discrimination between visemes, the sounds that look the same on the lips.

Poster # 34

Backward Masking and Speech Perception

Author(s): Allie Cope, Kendra Foster Mentor: Al Yonovitz

Abstract:

Backward masking (BM) has shown differential effects with age and auditory processing. BM may be related to reduced speech discrimination. This study utilized 21 Vowel-Consonant (VC) stimuli followed by a white noise masker. The Interstimulus Interval (ISI) is the time between a presented consonant and the masking noise. The ISI interval was 5 msec and the noise duration was 50, 100 and 200 msec. Each stimulus was randomly presented ten times. Confusion matrices were obtained by having the subject respond to the presented consonant. The confusion matrix is essentially the correct and incorrect responses. The data yielded consonant intelligibility and information transmission for distinctive features. The results indicated a reduction in selected features as well as reduced consonant identification as BM became more effective. This study provides evidence for reduced speech understanding in children and adults with auditory processing deficits and the elderly experiencing hearing difficulties.

Poster # 35

The ISI Critical Value in Backward Masking Testing

Author(s): Sarah Schied, Bridget Brannan, Alison Arthun Mentor: Al Yonovitz

Abstract:

Backward Masking (BM) has been studied both as a psychoacoustic phenomenon and as a potential diagnostic indicator of auditory processing. BM refers to the process of intentionally raising the sensory threshold for a target stimulus by means of an interfering stimulus after the target, usually an auditory masker. Backward masking has demonstrated high significance for the study of Auditory Processing Disorders (APD), including many learning impairments. A comprehensive study compared the BM thresholds of a group of children with language impairment with a control group (Marler et al., 2003) and found significant differences between the groups. Gehr and Sommers (1999) found that in an older age group with normal pure-tone auditory thresh-

Continued

olds, BM thresholds were significantly higher. In BM assessment, the subject typically responds to a brief tonal signal followed by an Inter-Stimulus Interval (ISI) of silence and then by a noise masker. This study used unique instrumentation that obtained the adaptive ISI to maintain threshold. In all previous studies the ISI is varied by the experimenter and an adaptive auditory threshold is obtained at each ISI. This study employed a threshold tracking procedure where the subject did not alter the intensity of the tonal stimulus, but instead, the subject tracking changed the length of the ISI.

Poster #35A

Hip Flexor Extensibility and Its Correlation to Hip Hyperextension and Lower Back Pain in Dancers

Author(s): Tessa Richards Mentor: Lori Mitchell

Abstract:

In the world of ballet, flexibility and strength are the keys to success. A leg extended to extraordinary heights is equated with beauty and expertise, whereas a lower height is seen as lesser quality. Dancers are trained from their first ballet lesson to reach their toes to the utmost end of their range of motion, and push themselves beyond the regular restrictions of the human body. Despite the pressure put on dancers to be extremely flexible, tight hip flexor muscles (the rectus femoris and the iliopsoas group) are a common complaint, restricting hip hyperextension (called an arabesque). To compensate for this restriction, dancers tend to rotate the pelvis incorrectly, most commonly leading to lower back pain.

Poster # 36

Tracking Growth and Movement of the Slave River Log Jam

Author(s): Brooke E Hess-Homeie Mentor: Andrew Wilcox

Abstract:

Large wood accumulations in rivers, called log jams, influence channel morphology and flow processes. My research investigates a large log jam on a side channel of the Slave River. The Slave River flows north through northern Alberta and the Northwest Territories where it empties into the Great Slave Lake. The Slave River is 3km wide, and has average peak summer flows of 6,000m3/s. The objective of my research is to map the growth of the log jam in the upstream direction as logs float downstream from their origin and get trapped in the log jam on the upstream end. I am using field data including tree cores, log lengths and diameters, vegetation data, and aerial imagery spanning from 1930-2015. Through aerial imagery analysis using ArcGIS, I have determined an average rate of upstream log jam growth of 2.4 meters per year. However, this growth does not happen at an average rate, but rater through yearly episodic influxes of wood. I have observed morphological changes in the channel meanders downstream of the log jam including the formation of new islands and channel banks from vegetation growing out of decaying log jam materials. I have collected tree cores from Spruce trees growing out of decaying log jam material at the downstream end of the log jam, as well as one from the upstream end of the log jam. The Spruce at the downstream end average 40 years old, while the Spruce at the upstream end is 3 years old. Since it takes roughly three years for vegetation to sprout in deposited logs, this indicates at least a 43 year timespan for the deposition of 103 meters of log jam between the downstream tree cores and the upstream tree core, confirming the rate of episodic log jam growth of roughly 2.4 meters per year.

Poster # 37

The effect of varying thinning treatments on the accumulation of woody debris within western larch forests

Author(s): Cullen Weisbrod Mentor: Andrew Larson

Abstract:

Very little is known about how forest thinning affects accumulation of dead wood. Dead wood is ecologically important, providing carbon storage, wildlife habitat, and, as woody surface fuel, contributing to fire behavior. Alternative thinning regimes were studied to discover their effect on biomass of snags (standing dead wood), fine woody debris (FWD; <7.6 cm in diameter), and coarse woody debris (CWD; >7.6 cm in diameter) in pure western larch (Larix occidentalis) stands. This study uses a randomized block design, with each of 10 treatments replicated once at four locations (i.e., blocks) in western Montana. Treatments are a 3x3 factorial cross of stand

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density (494, 890, 1680 trees ha-1) and thinning frequency (1, 2, or 4 thinning entries), and an untreated control. Within each of the 400.9 m2 treatment plots, total height and diameter at breast height was measured for all snags, as was total length and diameter at each end and the midpoint of every CWD particle. FWD was sampled in four 1 m2 subplots within each treatment plot. FWD samples were sorted, dried, and weighed in the laboratory. The treatment thinned to 494 trees ha-1 in 2 entries had the lowest total dead biomass (13.3 Mg ha-1) while the control treatment had the highest (53.2 Mg ha-1). CWD stocks increased, while FWD stocks decreased, with thinning frequency; snag biomass increased strongly with density. CWD was rare in the unthinned controls, in which >90 % of total down woody debris were in the FWD size class. Thinning strongly decreases woody debris accumulation relative to unthinned control areas, which has direct implications for management of potential fire behavior and carbon storage: lower fuel loads in thinned forests should lead to reduced potential

Poster # 38

Petrology of the Libby Formation and comparison to the Garnet Range and Pilcher Formations of the Belt Supergroup: The case for stratigraphic equivalency

Author(s): Shiva-Nandan Arens Mentor: Marc S. Hendrix

Abstract:

The Belt Supergroup is a sequence of sedimentary and meta-sedimentary rock ~20 km thick that underpins much of western Montana, with equivalents extending into adjacent parts of Idaho and Canada. The Missoula Group forms the uppermost portion of the Belt Supergroup and is best expressed and best exposed around the Missoula Valley. Within the Missoula Group are six separate formations, all of which are siliciclastic. Our investigation focuses on the Missoula Group's youngest two formations, the Garnet Range and Pilcher, along with a purportedly equivalent stratigraphic unit, the Libby Formation, which occurs in several structurally isolated fault blocks ~200 km NW of Missoula. In particular, we have sought to compare the petrology and detrital zircon geochronology of the Garnet Range and Pilcher Formations with that documented from the Libby Formation. To this end we examined and sampled outcrops of the Libby Formation at Flagstaff Mountain and along Fishtrap Creek in October 2015. The coarsest samples were cut into thin-sections for petrographic analysis, and we isolated the datable mineral zircon from a subset of these samples using facilities in the UM mineral separation laboratory. Results indicate that the coarsest samples collected from the Libby Formation are coarse siltstone. Sedimentary structures and hand samples of Libby indicate similarities between the three formations. Framework grains include abundant angular quartz and rare alkali feldspar. Detrital muscovite is notably common, as is diagenetic chert. Zircon separates evaluated by scientists at the Boise State University geochronology lab are at the lower size limit for radiometric dating via laser ablation-inductively coupled plasma mass spectrometry (La-ICPMS). Along with zircon, other dense minerals were recovered during the separation process. To further test whether the Libby Formation is equivalent to the Garnet Range and Pilcher Formations, these dense minerals will be analyzed and compared to seperates from the Garnet Range and Pilcher Formations.

Poster # 39

Documenting the sedimentology of an unusual set of gravel deposits exposed along Snowbowl Road

Author(s): Kyle Brangers Mentor: Marc Hendrix

Abstract:

This study focuses on documenting and interpreting the sedimentology of a set of gravel deposits presently exposed along Snowbowl Road approximately 1.5 kilometers above the intersection of Snowbowl Road with the Grant Creek Road. The gravel deposit is exposed on the north side of the road in a series of artificial exposures which were cut in the 1950's when the Snowbowl Road was constructed. The deposit consists of a set of discontinuous exposures along ~100 meters of the road, and roughly 6 meters of stratigraphy is exposed. The main gravel deposit is dominated by pebble-sized clasts that are typically angular and oblate. The make up of these class are still unknown and requite further investigation. Sand is present but not ubiquitous. Much of the gravel is characterized by an open framework. Pebble imbrication is locally present in some of the beds. Bed thicknesses are generally centimeter to decimeter scale and bedding contacts include both sharp and gradational varieties. The gravel deposits are also characterized by cut and fill structures that measure up to ~ 30 meters across and ~ 4 meters in height. In addition to the main gravel deposit exposed in the road cut is a smaller fan-shaped deposit

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located at the thalweg of a small drainage and composed of several layers of poorly-sorted, locally matrix-supported conglomerate. The smaller fan-shaped deposit is interpreted to have formed as a result of sediment transport during large flow events and deposition onto the flat roadway. The main gravel deposit is preliminarily interpreted to represent shoreface erosion and deposition along a gravel beach associated with glacial Lake Missoula.

Poster # 40

Developing a Comprehensive, Long-term Monitoring Program for Invasive Weed Treatments

Author(s): Aimee Kelley Dickinson Mentor: Alexis Gibson

Abstract:

Invasive weeds are a pervasive problem in the United States. Every year, millions of dollars are spent to combat invasive weed species and protect native and endemic ecosystems. Many different groups are engaged in the fight against invasive weeds ranging from federal agencies such as the Forest Service to local non-profits and citizen groups. The most pervasive management action employed to reduce invasive weeds is hand-spraying herbicide. However, few groups monitor their weed treatments. Last spring I was paired with the Great Burn Study Group (GBSG) to develop a monitoring program for their weed treatments in the Kelly Creek watershed. Prior to working together, they lacked a comprehensive program, which would allow them to answer questions, analyze data, share knowledge, and employ adaptive management. The program I am creating for them poses a specific question with measurable variables, delivers new sampling protocols, provides tools for data management and analysis, and proposes new strategies for technology transfer. The goal of this program is to provide the GBSG with tools to assess their management actions and share results. It is also intended to be accessible to citizen scientists and people new to the organization. Furthermore, this program can be shared with other groups in the area to advance weed management actions in the region.

Poster # 41

Synthesis and Binding Constants for Poly-Amidoxime Uranyl Complexes for Sequestering Uranium from Seawater

Author(s): Evan McManigal Mentor: Orion Berryman

Abstract:

In today's world the need for a constant, easily obtainable power supply is an everyday challenge. One underutilized resource that the world has is nuclear power, namely nuclear fission. Currently there is an estimated 4.5 billion metric tons of naturally solubilized, fissile uranium in seawater, reaching concentration levels close to 3.3 ppb; approximately 1000 times the current estimated amount available for terrestrial mining. This opportunity to move away from terrestrial mining presents both economic and environmental benefits, with the current seawater mining methods posing little to no environmental hazards. Most soluble uranium is in its U(VI) oxidation state, taking the uranyl [UO2]2- configuration. This compound readily forms stable complexes with carbonate, CO32-, with the most stable complex being [UO2(CO3)3]4-. In order to make the sequestering process both economically and chemically feasible, designed molecules must form complexes that can compete with carbonate; a challenging task due to its atypical geometry. To accurately determine if our molecules can compete with this carbonate species, their binding constants must be determined and compared to the uranyl carbonate complex. We have efficiently synthesized and purified five multi-topic amidoximes that are possible contenders for uranium extraction, with synthetic and purification strategies for five more amidoximes. Utilizing UV/Vis and potentiometric titrations, we determined the binding constants of the amidoxime ligands. Successful completion of this project will produce recyclable, multi-topic amidoxime molecules for the efficient, economical, and environmentally friendly sequestering of uranium from seawater.

Poster # 43

Distribution of Gas Hydrates indicators in the Magnolia field, Gulf of Mexico

Author(s): Betina Sodré de Oliveira Rodrigues Mentor: Marc Hendrix

Abstract:

Gas hydrates are a complex solid structure formed when molecules of light hydrocarbon, usually methane, are trapped in a cagelike structure of frozen water. To be formed, water and gas must exist in an area with high pressure and low temperature in the uppermost few hundred meters in marine sediments or in some permafrost zones onshore. This study investigated the occurrence and distribution of gas hydrate indicators in a reflection seismic dataset from the Magnolia deepwater oil field in the Gulf of Mexico, approximately 180 miles south of Cameron, Louisiana. The first step in this study was to establish the geothermal gradient in the sediments, determine the water bottom temperature, and estimate the gas composition. Common values cited in the literature for this area were used. Subsequently, the program CSMHyd, from the Colorado School of Mines, was used to determine the pressure-temperature stability curve for gas hydrates. The depth range in which hydrates can form, the Gas Hydrate Stability Zone (GHSZ), extends from the seafloor to the depth at which the stability and geothermal gradient curves intersect. The base of the GHSZ horizon was generated throughout the 3D seismic dataset using Petrel Seismic Interpretation software. Strong, reverse-polarity seismic reflections were interpreted to indicate accumulations of free gas trapped beneath the GHSZ, thereby suggesting hydrate presence above the base. The mapped gas indicators are consistent with the presence of gas hydrates as documented in other seismic studies and drilling in other areas within the Gulf. Petrel was used to map faults that might provide conduits for vertical gas migration and that serve to disrupt the continuity of the free gas features. Gas hydrates might be hazardous. Therefore, knowing where they are can prevent potential accidents during drilling operations. Also, gas hydrates may be produced as an energy source someday.

Poster # 44

Neuromuscular responses to an instantaneous force change in exhaustive bouts of exercise

Author(s): Tara Cleveland, Bonnie Medlin, Dean Miller Mentor: Matthew Bundle

Abstract:

Purpose: This study examined the mechanisms used by the muscular and nervous systems to maintain force production in exhaustive exercise trials.

Methods: The subjects reported to the laboratory a minimum of 8 times. During each visit, subjects typically completed 5 high-speed treadmill sprints to failure. We measured descending motor drive and neuromuscular activity via bipolar surface EMG and simultaneous gait kinetics from a custom force instrumented treadmill.

Originality: Human runners, change speed by altering the forces applied against the ground during foot-ground contact. Previously, our laboratory has identified the force thresholds necessary to trigger the onset of compensatory neuromuscular activity, which is used to maintain force production during efforts inducing muscle fatigue and ultimately eliciting task failure. At lower levels of force production and effort, this compensatory behavior is absent and EMG measures are essentially steady throughout the activity. We used a novel experimental protocol involving a mid-trial 15% speed change, which was either positive or negative, blinded to both the research team and the subject, and randomly administered to evaluate whether the accumulation and development of fatigue occurred in response to the level of muscle force applied.

We therefore specifically expected to observe either increments or decrements in the rate of neuromuscular compensation based on the direction of the speed change administered.

Significance: This study informs the mechanisms used by the neuromuscular systems to communicate the development and time course of force impairment that occurs during muscle fatigue.

Poster # 45

Gold Nanorods

Author(s): Madison Drake Mentor: David Macaluso

Abstract:

Scientists are capable of creating gold nanoparticles with molecule-like dimensions. These particles can produce specific biological responses, which make them highly desirable for numerous biomedical and commercial appli-

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cations. Although gold is typically biologically inert, the nanorods must be tested for toxicity to make sure they are safe. In our work, human THP-1 cells were exposed to gold nanorods of various diameters and light absorbances related to plasmon resonances. The THP-1 cells were transformed into macrophage-like cells for 24 hours prior to particle exposure. These cell cultures were then incubated for an additional 24 hours with gold variants, after which we run LDH* and MTS* assays to evaluate their toxicity. We determined that several nanorods were extremely toxic while others appeared harmless. We also assessed the relative bioactivity of the nanorods using an IL-1beta (ELISA) assay. We found some particles to be active only at the lowest concentrations and others to be bioactive only at high concentrations. The results indicated highly variable biological responses to gold nanorod exposure, which appears to primarily depend on particle geometry. There also appears to be a 'safe zone' where the gold was neither toxic nor bioactive which corresponds to gold nanoparticles with peak optical absorption in the 800 nm wavelength range. We intend to further explore these results by exposing mice to a 'safe' gold nanorod species in comparison to a bioactive and toxic variant, while also looking at changes in lung morphology, gold retention, and inflammatory markers between exposure groups.

Poster # 46

The influence of topography and spatial patterns of soil hydraulic conductivity on groundwater response across a forested hillslope.

Author(s): Mariah Bell Mentor: Kelsey Jencso

Abstract:
Hydrologic connectivity represents the development of a transient water table between hillslopes and streams and is a requisite for discharge in forested mountain landscapes. Many studies have indicated that topographic convergence of hillslope area leads to more sustained hydrologic connectivity. However, we still do not fully understand how soil heterogeneity may lead to differences in subsurface flow rates, and therefore runoff contributions, across hydrologically connected hillslope positions. To address this knowledge gap we collected 260 measurements of saturated hydraulic conductivity (Ksat) across a 350,000 m2 hillslope in the Lubrecht Experimental Forest, MT, USA. We compared the spatial patterns of Ksat to shallow groundwater responses across a network of 30 recording wells and changes in streamflow measured at the base of the hillslope. Our preliminary analyses indicate that Ksatis reduced in topographic low points relative to planar and divergent positions. These are also locations that exhibited more sustained hydrologic connectivity and elevated shallow groundwater heights. These observations suggest a potential linkage between landscape topography, soils, hydraulic conductivity and the duration and rate of hillslope runoff contributions to streams.

Poster # 47

Electrostatic interactions of Cytochrome C and Cardiolipin: Quantitative analysis of structural changes of Cytochrome C by spectrometric techniques.

Author(s): Michael Rothfuss Mentor: Bruce Bowler

Abstract:
Cytochrome c (Cytc) has a well-established role reacting with superoxide radicals to form molecular oxygen within the mitochondria. Cytc is bound to the inner mitochondrial membrane via the phospholipid cardiolipin. When Cytc dissociates from cardiolipin and crosses into the cytoplasm, it joins Apoptotic protease activating factor 1 (Apaf-1) to initiate programmed cell death. In the presence of reactive oxygen species (ROS), Cytc exhibits peroxidase activity which oxidizes cardiolipin and causes this dissociation. Additionally, Cytc can dissociate from cardiolipin in response to traumatic brain injury. We have worked to characterize the binding between Cytc and cardiolipin, information which may prove useful in developing a treatment for traumatic brain injury. In particular, the interaction between the anionic binding site (site A) and the phosphate head group of cardiolipin remains unclear. To study this interaction, we have mutated two amino acids postulated to be involved at this binding site. These amino acids, two lysine residues at positions 86 and 87, were replaced with alanine residues through point mutations introduced by PCR. Analysis of conformational changes of Cytc upon cardiolipin binding was performed by monitoring changes in fluorescence from Cytc's tryptophan residue, an amino acid located near the active site. Samples were prepared utilizing UV-Vis spectroscopy and light scattering techniques

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to quantify experimental parameters. In conclusion, our analysis showed increased binding between Cytc and cardiolipin when the two lysine residues at 86 and 87 were replaced with alanines. This suggests that, contrary to initial speculation, that these two lysine residues help to destabilize the binding of Cytc to cardiolipin.

Poster # 48
Single Photoionization Cross-Sections and Rydberg Resonances of Br+
Author(s): Dylan Gross Mentor: David Macaluso
Abstract:
Absolute single photoionization cross-section measurements for Br+ are reported in the photon energy range of 17.0 eV to 32.4 eV. The merged beam technique which uses counter-propagating ion and photon beams was used for these measurements. One Rydberg resonance series is presented, which originates from the 3P2parent ion state of Br+ and converges to the 2P3/2final product ion state of Br2+. The ground state and metastable state ionization thresholds for Br+ and Br2+ are not yet confirmed, but are discussed. Analysis of each Rydberg series is calculated using quantum defect theory.

Poster # 49
The Effect of Mindfulness-based Interventions on College Students' Mind Wandering
Author(s): MacKinzie Tilleman, Phillip Thomas, Emelyn Falley, Brandon Kipp Mentor: Anisa Goforth
Abstract:
Recent research has found that the human attention span has decreased to a short eight seconds, one second shorter than a goldfish (Patrick, 2015). Research suggests the mindfulness-based interventions (MBIs) improve individuals' attention abilities, including working memory capacity (Kane & McVay, 2012). Mind wandering is one aspect of attention, and is defined as thoughts flowing freely without any direction or control of the individual having them. One study found that even eight minutes of a mindfulness activity decreases mind wandering (Mrazek, Smallwood, & Schooler, 2012). These results show that short mindfulness activities can have a worthwhile effect on students' attentional processes, which has potential implications for students such as increasing working memory capacity and reading comprehension (Kane & McVay, 2012; Smallwood, McSpadden, & Schooler, 2008). The purpose of this study, therefore is to discover if mindfulness-based intervention does decrease mind wandering in college students.

In a randomized controlled trial study, 30 participants were recruited and were randomly assigned to one of three conditions: a recording led relaxation task, a recording led mindfulness-based intervention, or a control task of reading an article. Researchers used a mind wandering probe to measure the amount of mind wandering done by each participant throughout all sessions. This probe followed each intervention and included four questions to see how much effort the participant put into the intervention and how well they felt that they followed directions. Data is currently being analyzed from the 30 completed participants by two research assistants in the CRESP lab. Past research calls for well-designed studies to support mindfulness as an effective intervention for students, and this study supports the theory that mindfulness interventions are indeed useful for decreasing mind wandering in students.

Poster # 50
Using Global Maternal Sensitivity Score to Predict Infant Attachment
Author(s): Jamie Pauley Mentor: Lois Muir
Abstract:
Mary Ainsworth developed a scoring system to determine a mother's level of sensitivity toward her infant (AMSS). The maternal sensitivity construct includes the caregiver identifying a signal has occurred, interpreting it correctly, and responding promptly and appropriately. Ainsworth and Bowlby defined attachment as an affectional bond that one individual forms with another and that endures across time and space. It has been found that high maternal sensitivity is a precursor to secure attachment classification. Children with secure attachment often have better developmental outcomes and lower rates psychopathology than children with insecure

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attachment. The AMSS rates the mother's sensitivity toward her infant whereas the Strange Situation Procedure (SSP) is a laboratory procedure used to determine infant attachment classification. In past studies, researchers observed one interaction and coded the mother's behavior pattern using AMSS. Earlier research with this data set revealed that the maternal sensitivity scores at 4 weeks does not predict infant attachment at 16 months, but maternal sensitivity scores at 16 months does predict infant attachment. The current study hypothesizes that observing more than one mother-infant interaction will better predict attachment classifications. Observing a dyad in multiple settings and multiple infant ages, should offer a more complete picture of the mother's maternal sensitivity pattern, resulting in a better prediction of infant attachment. Archival data of sixty-eight dyads were used for this study. Each dyad was videotaped at the infant's age of 4 weeks during interaction in the home. At the infant's age of 16 months, the dyad participated in SSP in the laboratory. For the current project, maternal sensitivity will be coded using the AMSS and given a global score from 1-9 based on the combined observations of each dyad. Analyses are expected to reveal that the global score from 2 interactions better predicts attachment, compared to a single interaction.

Poster # 51

An Examination of Literate Vocabulary in the Persuasive Writing of Seventh-Graders

Author(s): Madeline Julin, Laura Allred, Kiley Kremmel Mentor: Ginger G. Collins

Abstract:

Purpose - To analyze written persuasive language samples of seventh-graders to add to the local normative database by examining the use of literate vocabulary. Literate vocabulary refers to words that have a low frequency of natural occurrence in language, however, tend to appear in formal writing. Specifically, we will be examining the use of adverbial conjuncts (e.g., in conclusion, personally, technically), abstract nouns (e.g., freedom, enjoyment, opinion), and metacognitive/metalinguistic verbs (e.g., persuade, decide, imagine).

Methods - Written language samples were collected from seventh-grade students from a middle school in Missoula, Montana. All students were prompted to write a persuasive essay on a common topic. Each student's essay was keyboarded into the Systematic Analysis of Language Transcripts computer program. Each vocabulary variable was coded as either [AC] (adverbial conjuncts), [MTVL] (metalinguistic/metacognitive verbs), [ABN] (abstract nouns).

Originality - Language sample analysis (LSA) is under-utilized when assessing older students, since few language norms for this age group have been established.

Significance - LSA is a widely known preferred clinical practice for speech-language pathologists according to the American Speech-Language Hearing Association, but is seldom used with school-aged clients in the upper elementary grades and beyond. It is important to regularly collect and analyze language samples because language development is continual throughout childhood, adolescence and adulthood. Few studies have used LSA to determine developmental milestones in adolescent language, so this study will contribute to the gap in the literature regarding adolescent language norms. With this we hope to obtain an understanding of the average productivity and usage of literate vocabulary for adolescents in 7th grade. These writing samples can be used to create a normative database in regards to these measures. If literate vocabulary usage is significantly correlated with reading scores, this will further strengthen the argument for language sample analysis in the upper grades.

P**oster # 52**

Dynamic Assessment of Speech Adaptability in Children

Author(s): Nicolette Selensky, Amber Fortier Mentor: Amy Glaspey

Abstract:

Speech-language pathologists (SLP) assess and treat issues that affect a person's ability to communicate, including speech sound development and disorders in children. SLP's use various assessment tools to measure a child's current skill level and determine if treatment is needed. One type of assessment is dynamic assessment, which allows a clinician to provide support through demonstrations and instructions. This approach gathers information to determine if a child is able to learn sounds with assistance. Dynamic assessment is commonly used by clinicians, but formal testing measures are limited. Having a consistent methodology could increase reliability of dynamic assessment by reducing testing variability among clinicians. With the interest of knowing a child's

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potential throughout treatment, speech adaptability is determined by examining a child's ability to say sounds when given varying levels of support. This method includes cues and examining speech production in multiple linguistic environments, such as at single word production to complex sentence production. The Glaspey Dynamic Assessment of Phonology (GDAP) is one tool that measures a child's speech adaptability. Scoring is based on a 15-point hierarchical scale, where the score decreases as the child needs less support. To evaluate the effectiveness of the GDAP, the speech sounds of a three-year, 11-month old boy with severe speech sound disorder were measured during treatment. The following research questions were addressed: Is change observed throughout four weeks of therapy in one three-year, 11-month old boy's speech production as measured by the GDAP?

Is more improvement observed in one three-year, 11-month old boy's production of hard sounds or easy sounds over four weeks of therapy as measured by the GDAP?
Results indicated that the GDAP showed change in the child's speech adaptability over four weeks of therapy. The relationship between target difficulty and progress in treatment, along with further clinical implications, will be discussed.

Poster # 53
Another Look At Alliteration
Author(s): Cailen Bosch, Ashley Strandberg Mentor: Lucy Hart Paulson
Abstract:
Alliteration has been a long-standing phonological awareness learning goal in preschool classrooms. A young child's ability to isolate beginning sounds in words by the end of pre-kindergarten is one of the best predictors of literacy learning in second grade. However, the body of research describing the progression of how and when young children learn alliteration skills is limited. Some studies report significant floor effects, others used a range of tasks that make comparison of results challenging. The purpose of this study was to identify the progression of alliteration skill ability in 3- to 5-year-old children within a range of tasks to detect, identify, and produce beginning sounds in words. Researchers developed a range of tasks based on previous studies and used these to assess a sample of young children to determine trends in alliteration development. The study sample was recruited from a variety of agencies serving preschool children. The study results will allow better understanding of the hierarchy of phonological awareness development and appropriate instruction in preschool settings.

Poster # 54
A Preliminary Phylogenetic Analysis of Oldowan Stone Tool Assemblages
Author(s): Corey Johnson Mentor: Anna Prentiss
Abstract:
Phylogenetics are useful for modeling cultural evolutionary relationships between taxa and can be used to reveal patterns of change reflected in the archaeological record. Lithic technology represents an ideal subject for phylogenetic analyses of culture because of ubiquitous use in hunter-gatherer and early hominin populations, its ecological and memetic malleability, and the vast literature regarding the roughly 3.3 million-year-old lithic archaeological record. The Lower Paleolithic (~3.3-0.3 Ma) archaeological record provides important insight into early hominin evolution and behavior regarding landscape use, migration, and cognitive complexity. Although Lower Paleolithic stone-tools are less morphologically diverse than subsequent technologies, a considerable amount of measurable variation can be found within and between Lower Paleolithic assemblages. There have been relatively few attempts to phylogenetically model Lower Paleolithic technologies, and in the case of Oldowan (Mode 1) core-tools there have been no issued attempts. The core-tool component of the Oldowan Technological Complex represents one of the best targets for measuring behavioral variation in stone-tool production and cultural evolutionary relationships over the 800,000 year period (2.6-1.8 Ma) of the Lower Pleistocene before the advent of the Acheulean Technological Complex. This poster presents the results of a phylogenetic analysis which models data from fifteen (15) Mode 1 stone-tool assemblages from Africa and Eurasia. These results illustrate a low level of homoplasy and show that Oldowan core-tools from discrete assemblages can act as meaningful taxa in phyloge-

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netic analyses. This poster also highlights several issues with phylogenetically modeling Lower Paleolithic technology and suggests future ways to improve upon this by including the use of more complex Lower Paleolithic typological systems, and the creation of a comprehensive, organized and universally available Lower Paleolithic information database.

Poster # 55

Determining Child Abuse Potential with the Child Guidance Interview Sub-scales

Author(s): Sabina Sabyrkulova, Jasmine Talbert, Sarah Dahle, Anna Williams, Kenneth Flamand
Mentor: Paul Silverman

Abstract:
A structured assessment, the Child Guidance Interview (CGI) (Infant/Preschool Form), is being developed to distinguish child abusers from non-abusers. Unlike other instruments, the CGI is designed to defeat the "fake-good" motivations of parents. The CGI presents parents with specific child guidance scenarios involving problematic child behaviors and asks parents to offer their responses. Previous CGI research has established that respondent's adaptive or maladaptive responses correlate with child abuse potential. However, specific types of adaptive and maladaptive practices have not been investigated. The CGI is intended to identify adaptive and maladaptive practices in six categories originally identified by the Parenting as Social Context Questionnaire (PASCQ). Adaptive categories are Warmth, Structure, and Autonomy Support. Maladaptive categories are Rejection, Chaos, and Coercion. Additionally, responses were subclassified within each category. Archival evaluation records of parents, some of whom are abusers, have been collected. Parents were administered the Child Guidance Interview (CGI), along with other measures including a demographic questionnaire. Records were coded to identify presence and types of abuse. The information contained in demographic questionnaires included parent's abuse history, foster care history, age they left home, gender, age, ethnicity, marital status, family size, SES, and education. CGI responses were coded for frequencies of adaptive and maladaptive parenting practices. Some demographic characteristics and CGI responses were modestly correlated with abuser status but were inadequate predictors of abuse.

Poster # 56

Effectiveness and Parent Acceptability of YETI for Children with Autism

Author(s): Phillip Thomas, MacKinzie Tilleman, Emelyn Falley Mentor: Anisa Goforth

Abstract:
Children with Autism Spectrum Disorder (ASD) experience social communication deficits that have been associated with loneliness, fewer friendships, and less satisfaction with friendships (Bauminger & Kasari, 2000). One in four children also have symptoms such as irritability, arguing, and defiance (Kaat & Lecavalier, 2013). Research studies have shown that social skills group interventions significantly improved youth's social interactions, such as an increase in communication with peers and greater use of greetings (Barry, Klinger, Lee, Palardy, Gilmore & Bodin, 2003). Further, parents' acceptability of social skills groups is also important to ensure that the intervention is meeting their child's needs. Few studies have investigated parents' views and acceptability of social skills interventions.
There were two primary goals of this study: 1) to examine the effectiveness of an individualized treatment program for two children with ASD and disruptive behaviors within a social skills group and 2) to understand parents' acceptability of Youth Engagement Through Intervention (YETI), a social skills program. YETI was conducted at a university clinic with 9 children during a one-week intensive treatment that addressed social communication, emotional regulation, and executive functioning. A single-subject methodology was used for the two children to examine if an individualized treatment program comprised of positive attention and structured ignoring reduced disruptive behaviors. A qualitative methodology involving the completion of a survey by 9 parents and an interview of four parents was used to examine parents' perceptions of YETI. Results of the single subject design revealed that the individualized treatment was effective at reducing one child's disruptive behaviors. The other child experienced a decrease in his behaviors but not consistent with the addition and removal of the treatment. Qualitative analysis found that overall parents have a positive perception of YETI, with the main suggestion being an increase in the frequency and duration of YETI.

Poster # 57

The effect of feedback on long-term retention

Author(s): Elaine Marshall Mentor: Yoonhee Jang

Abstract:

Final exams at the university level are regarded with high importance because they can determine a grade in a class. Because final exams encompass information that students have been previously exposed to and tested on, retaining the correct material from intervening tests throughout the semester is ideal. Butler, Karpicke and Roediger (2008) showed that receiving feedback after tests improves retention of correct answers and allows for the correction of initially incorrect answers on a later test. However, it is unclear what feedback is best for long-term retention intervals. This study investigates the effectiveness of different types of feedback on long-term retention. The experiment uses 100 multiple-choice questions with four options to choose from as test material. After completing the test, participants are randomly placed into one of four feedback conditions, which are as follows: feedback displaying the original question and four options, with the correct answer bolded and underlined; feedback displaying the original question and only the correct answer bolded and underlined; feedback displaying only the correct answer bolded and underlined; an unrelated set of free response questions as the control condition. Participants return to take the final test two days later, which is a reordered copy of the original test. Because it has been shown that exposing test takers to other incorrect answers can lead to the development of false information (Roediger & Marsh, 2005), it is expected that participants who received feedback displaying the original question and only the correct answer bolded and underlined answered more questions correctly on the final test than participants in the other feedback conditions. This study can serve as evidence for both students and professors to use for the enhancement of final test scores. Students can use the information to more effectively prepare for tests and professors can improve feedback.

Poster # 58

Togiak Archaeological Site Hair Samples- What Species?

Author(s): Clare Super Mentor: Meradeth Snow

Abstract:

The Molecular Anthropology lab at UMT will conduct DNA analysis on ancient hairs to determine what species they came from. Dr. Kristen Barnett, an anthropology postdoctoral scholar, obtained these samples from the Old Togiak archaeological site, the location of the half mile long remains of an ancient village on the southwest coast of Bristol Bay, Alaska. The site contains 62 house mounds and has been studied using surface/subsurface mapping technology and thirty-six core samples. In ten of those core samples, eleven unidentified hairs were found. I will be assisting in mitochondrial DNA analysis of the hairs, focusing at first on the Cytochrome B region to determine the species the hairs belong to. Non-humans samples will be analyzed further with additional molecular markers. We hypothesize that the hairs in their context must have come from a) the people who lived at the site, b) animals, such as dogs, who lived with them, or c) what the people there were eating and/or using. Any information we discover will be incorporated into the oral and ethnohistory Dr. Barnett is creating with the Yup'ik people, the current residents of New Togiak and the descendants of those who lived at the archaeological site. The Togiak community is readily involved with the project. Information from these samples, in addition to the other aspects of the larger project, will add to their already rich culture and heritage.

Poster # 59

ERRT-C: A Treatment for Trauma-Related Nightmares in Children

Author(s): Jasmine Talbert, Susan Ocean Mentor: Cameo Stanick

Abstract:

More than five million children in the United States are exposed to some form of trauma each year (Pfefferbaum, 1997). Victims may develop a variety of posttraumatic stress symptoms, including PTSD. Sleep disturbance and nightmares are potential side-effects of trauma that can have detrimental results on the well-being of the child. ERRT, or Exposure, Relaxation, and Rescription Therapy was designed and proven effective in the treatment of trauma-related nightmares in adults. This treatment was recently adapted for use with children, known as Exposure, Relaxation, and Rescription Therapy-Child Version (ERRT-C). ERRT-C incorporates practices from

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well-established child-focused trauma treatments as well as parent components that focus on improving sleep hygiene and reducing nightmares. The purpose of this research is to provide (1) an overview of the ERRT-C program (5-session outline), (2) a literature review of the studies conducted thus far on ERRT and ERRT-C (n studies), as well as findings from a small case series (N=2) that demonstrated preliminary support for ERRT-C. ERRT-C is a brief, innovative, child-focused adaption of an existing evidence-based treatment for trauma-related nightmares. The dissemination of effective treatments is crucial to their widespread implementation. A review of this research will help to expand knowledge and use of ERRT-C.

Poster # 60

The Implications of Teachers' Perceptions of LGBTQIA+ Youth

Author(s): Kenzie Nash Mentor: Kathryn Oost

Abstract:

People belonging to a sexual or gender minority are more likely to experience significant amounts of stigma and prejudice, specifically in school settings. Often times research looks at students' perceptions of a school climate as a whole, but does not generally address the repercussions of the specific components it is comprised of. The current study examines how teachers' perceptions of students' LGBTQIA+ identity correlates with their overall sense of identity. Participants were 67 LGBTQIA+ identified youth who completed a survey examining correlates among different dimensions of identity status, identity reassurance, and sense of self. Pearson's product-moment correlation coefficients were computed to assess the relationships between teachers' perceptions and 8 LGBTQIA+ specific survey questions. Statistically significant correlations ($p < .01$) were found in three measures, ranging between $r = -.318$ and $r = -.404$. Statistically significant correlations ($p < .05$) were found in two measures, ranging between $r = -.252$ and $r = -.285$. This study narrows down the focus on the implications of school personnel's perception of LGBTQIA+ identity and how it directly affects students and their notions of self-esteem (e.g., competence, worthiness, affect, etc.), and feeling of belonging among cohorts and faculty. These results can be used in schools to influence the implementation of anti-discrimination policies in regard to sexual and gender minority youth, as well as sensitivity/ cultural competence training among school staff.

Poster # 61

Experimenting in Archaeology: Can red ochre waterproof a hide?

Author(s): James Verzuh Mentor: Anna Prentiss

Abstract:

Red ochre appears naturally all across North America and the pigment has been found at a number of ancient peoples sites. Many theories exist about the reason this material is present at these sites including that it may have been to waterproof hides used in ancient dwellings. It is difficult for archaeologists to test such a theory with only what has survived to the present. My research then uses experimental archaeology, which is testing an archaeological hypothesis by making an object or performing an action rather than looking only at ancient remains, to see if red ochre can really improve the waterproofing qualities of a hide. To do this I have tanned a deer hide that was acquired in North America and used said deer hide to see how different amounts of red ochre applied to the hide affect its ability to hold or repel water. Nothing has suggested that this kind of experimental archaeology has been done before and the amount of this pigment appearing in different sites across North America where animal hides would have been used makes that a connection worth testing. The results of this research will serve as another piece of the puzzle in understanding the ancient people of this continent and their adaptations to it. This research will be able to help other archaeologists make inferences when evidence of both red ochre animal skins are found at a site in North America.

Poster # 62

Continued

Strengthening Early Mathematical Foundations: Number Recognition

Author(s): Mary Burns Mentor: Jingjing Sun

Abstract:

Children enter elementary school with a diverse range of mathematical understanding, and students' preliminary mathematical experiences can have a lasting effect on their self efficacy and attitudes towards school. Number recognition is an essential skill of early numeracy that allows for students to develop a strong mathematical foundation to build upon, and instructing these skills early is vital for children to view education with a positive outlook. Unfortunately, many students struggle with this facet of early numeracy.

This study focuses on how one 'intensive' kindergarten student's number recognition skills were affected by individualized interventions. It explores where the student struggled with number identification, whether the student could show object-number correspondence, and if the student exhibited a growth in understanding of numerals. To determine the student's number recognition skills before interventions, the student was given an AIMSweb pretest. Following this test, the student had three 20 to 25 minute individual interventions over a two week period, focusing on number recognition and object-number correspondence. The student then completed another AIMSweb progress monitoring test. Again, the student participated in three 20 to 25 minute individual interventions over a two week period, then was administered a final AIMSweb progress test.

Over the month, the student showed a 10.71% improvement in number recognition accuracy. After identifying the area of struggle for the student, numbers five through ten, the interventions were targeted specifically towards those numerals. Once the interventions were targeted, accuracy grew from 3.57% to 6.94% in two weeks. The student displayed a strong awareness of object-number correspondence, and also showed an increase in participation during whole group math instruction in the classroom. These results highlight how targeted individualized interventions can help develop number recognition skills for struggling students.

Poster # 63

The Effects of Mindfulness Based Interventions on Working Memory Capacity

Author(s): Emelyn Falley, Phillip Thomas, MacKinzie Tilleman, Janeal McDonald Mentor: Anisa Goforth

Abstract:

Researchers have sought to determine more effective methods of improving learning outcomes for decades, but have more recently examined mindfulness-based interventions (MBIs). Mindfulness is characterized as being completely present in the current moment, and has been shown to have potential positive implications for attentional abilities and working memory capacity (Mrazek, Franklin, Phillips, Baird, & Schooler, 2013), or the limited workspace that alternates between processing demands and storage. MBIs have been shown to increase working memory capacity (WMC), increase positive affect, and protect WMC from erosion during high stress situations (Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010). Although previous research (e.g. Chiesa, Calati, & Serretti, 2011) reflects the effectiveness of MBIs for increasing WMC, some limitations and negative results demonstrate a need for more research regarding mindfulness interventions. Therefore, the purpose of this research was to determine if MBIs increased WMC in a sample of 30 college students.

Participants were randomly assigned to an experimental mindfulness condition, a comparison relaxation condition, or a control of reading. The study entailed a total of six sessions over six weeks. During the first, fourth, and final sessions participants received a battery of diagnostic tests and a demographic survey, and completed their assigned intervention during all but the first session. For the purposes of the current study, the results of the Operation Span Task (OSPAN) are being examined by two research assistants to determine any changes in WMC of the participants, and researchers theorize participants who completed an MBI will show significantly larger increases in WMC than participants of other conditions. These results would support MBIs as a method for increasing WMC in students, and suggest there is potential for MBIs to positively impact learning outcomes and thereby increasing academic success of students.

Poster # 64

Mental Health Providers Transphobic Biases

Author(s): Finn Story Mentor: Hillary Gleason

Abstract:

Transgender and gender nonconforming individuals face a disproportionate amount of discrimination and prejudice in their daily lives. In addition, transgender and gender nonconforming individuals often face trouble accessing mental health services and care. Provider-level barriers contribute to the troubles transgender people encounter in mental health settings. By minimizing these barriers, care would be more accessible to all gender nonconforming individuals. This study examines the relation between contact with the LGBT community and provider-side barriers because of the implications having contact with LGBT people may have on care delivery. Mental health providers (n=96) from various disciplines were surveyed about their transphobic biases with The Genderism and Transphobia Scale (GTS) and their relationships with LGBT individuals. Data is still being collected before analyses will be run. An ANOVA will be used to examine the relationship and look for differences between providers with no LGBT acquaintances, providers with few LGBT relationships, and providers with many LGBT relationships. Implications for mental health care providers and transgender individuals include easier accessibility to care and will be discussed further.

Poster # 65

Disaster Relief: A Monitoring & Evaluation Framework for Kopan Monastery

Author(s): Shiva-Nandan Arens Mentor: Kimber H. McKay

Abstract:

The April 2015 Nepal earthquake was the largest such event since 1934. It killed thousands, injured tens of thousands, and left an estimated two million homeless. The property damage was estimated to be equivalent to 25% of Nepal's GDP. The chaos caused by the earthquake was soon compounded by a complex political gridlock and resulting blockade, which has only recently been resolved. In this catastrophic setting, the non-governmental organization response was difficult to coordinate, and occurred with reduced capacity due to inadequate or total lack of access to resources. Kopan Monastery temporarily shifted the locus of its work to the immediate relief effort, from its normal educational operations. Since earthquakes are a continuous possibility in Nepal and other tectonically active regions, active monitoring and evaluation (M&E) of disaster response is an important part of preparedness for future events. We suggest a framework to monitor and evaluate Kopan Monastery's response to the April 2015 Nepal earthquake. Our work indicates that a simple LogFrame approach informed by social networks analysis of the disaster response will provide the best framework. This can be manifested by a short-term repeatable timeline of actions stakeholders at the monastery can do during an ongoing relief effort. Most geological disasters are difficult to plan for and respond to, as they involve sudden stochastic events. Earthquakes are magnitude-predictable, yet not time-predictable. However, risk can be seen as chronic and can be minimized with adequate techniques. In Nepal, the swiftness and flexibility of an organization's response is vital in ensuring immediate needs are provided for. Accordingly, the M&E framework must be flexible, simple, and straightforwardly applicable to sudden catastrophic events. We hope our M&E framework will provide Kopan Monastery with the tools to assess and modify its response to better serve its community in the future.

Poster # 66

A Decade of Deaf Theatre: An analysis of theatre within the Deaf Community, the expansion of its acceptance, and the influence it has today

Author(s): Cortney Wells Mentor: Bernadette Sweeney

Abstract:

The gap between two worlds, Hearing and Deaf, has started to close thanks to the world of Theatre. This growing phenomenon has started to manifest in the Deaf and Hard of Hearing communities, offering new found ways of expression, acceptance, and growth. The dramatic, positive turning points that have occurred in the last ten years of Deaf Theatre has had a big impact on the Deaf community. However, little information exists about where this growth has stemmed from, prompting my research into why this has occurred and what it has done for the Deaf community. Primary sources such as interviews with deaf schools, several Deaf individuals who are interested

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or have partaken in the theatre for the deaf, and print sources pertaining specifically to the Theatre for the Deaf. Secondary sources are also going to play a role in my research such as books, articles and reviews on deaf portrayals or productions. Due to the lack of detailed research on this particular topic, my research contains original inquiries and holds a unique viewpoint. It investigates recent events that have significance for the deaf/hard of hearing and hearing world alike. Companies like Deaf West and the National Theatre for the Deaf have started paving the way through high profile shows such as Pippin, Big River, and most recently, Spring Awakening. These companies and high profile shows are opening up many doors for the deaf and hard of hearing communities. The reveal of Deaf theatre is surprisingly new and innovative and offers numerous opportunities for this community. With these opportunities, the Deaf population can provide the hearing public and new perspective on an unfamiliar culture.

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