

THE UNIVERSITY OF MONTANA PRESENTS

# UMCUR

10<sup>TH</sup> ANNUAL  
UM CONFERENCE ON  
UNDERGRADUATE RESEARCH

APRIL 15, 2011  
MISSOULA, MONTANA

## PROGRAM AND ABSTRACTS



The University of  
**Montana**

**UNDERGRADUATE RESEARCH COMMITTEE:**

James McKusick (chair), Davidson Honors College  
Bill Borrie, Society and Conservation  
Tim Conley, Social Work  
Dan Doyle, Sociology  
John Hunt, English  
Marc Hendrix, Geosciences  
Keith Jakob, Accounting and Finance  
Scott Mills, Ecosystem and Conservation Sciences  
Elizabeth Putnam, Biomedical & Pharmaceutical Sciences  
James Randall, Music  
Garon Smith, Chemistry

**CONFERENCE COORDINATORS:**

Lauren Caldwell, Davidson Honors College  
Karen Kaley, Davidson Honors College

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**THANKS ALSO TO THE JUDGES AND VOLUNTEERS WHO  
HELPED MAKE THIS CONFERENCE HAPPEN!**

# **UMCUR 2011**

**The University of Montana  
Conference on Undergraduate Research**

**April 15, 2011**

**SPONSORED BY:**

Office of the Provost

Office of the Vice President for Research

The Davidson Honors College

## **UMCUR Welcome!**

We are pleased to welcome students, faculty, staff, and alumni to the tenth annual University of Montana Conference on Undergraduate Research (UMCUR), "Recognizing and Celebrating Undergraduate Scholarship." Over 125 students will present their research today, and we are delighted to celebrate your accomplishments!

This conference has been a tradition at The University of Montana since 2001. Undergraduate research is an important endeavor for both students and faculty, as it allows for mentoring and student engagement in all disciplines. In addition, many undergraduate research projects at UM are carried out with scholarship support, and for that support we are truly grateful to many private donors.

We extend special thanks to Provost Perry Brown and Vice President for Research Dan Dwyer for their support of this conference and their commitment to undergraduate research. We also extend our sincere appreciation to all faculty members who have reviewed conference proposals and mentored the students presenting at the conference. We are likewise grateful to the faculty, alumni, community members, graduate students, and undergraduates who have volunteered their time and expertise as judges and facilitators for the conference. We could not do it without you!

We trust that you will have an enjoyable day, will learn some new information, and will see that celebrating undergraduate scholarship has many benefits.

*James McKusick*

*UMCUR Director*

*Undergraduate Research Committee Chair*

*Dean, Davidson Honors College*

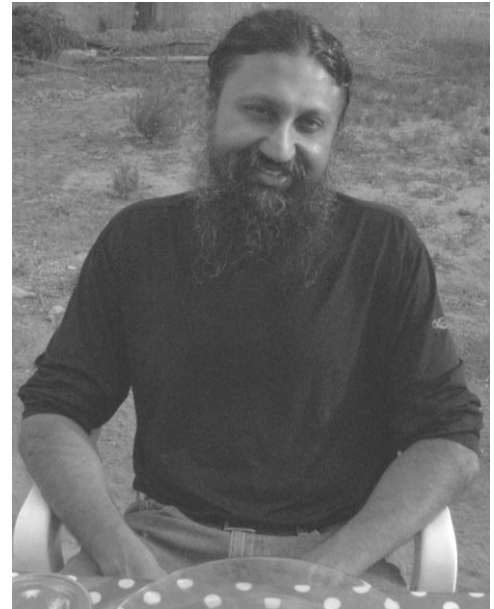


**UMCUR KEYNOTE SPEAKER:**  
**DR. BHARATH SRIRAMAN**

Professor  
Department of Mathematical Sciences  
The University of Montana

***Conceptions of Creativity: How Do  
Ideas Survive, Mutate and Propagate?***

**12:20 UC Theater  
April 15, 2011**



**Abstract:**

In this talk, different confluence theories of creativity from psychology and sociology are surveyed to understand how creativity functions at the individual, institutional and societal levels. Contemporary examples from the world of innovation, in addition to the history of science and mathematics, will be used to unpack the various constructs involved in the study of creativity, with the purpose of giving a bird's eye view of how ideas survive, mutate and propagate in academic scholarship and in industrial/private sector innovation.

**About Dr. Sriraman:**

Bharath Sriraman is Professor of Mathematics and an Affiliated Professor of Central and Southwest Asian Studies at The University of Montana. His research interests include the learning sciences (mathematical cognition), international mathematics education, interdisciplinary initiatives in math-art-science, creativity, and talent development. Dr. Sriraman has published over 300 articles, book chapters, books, and encyclopedic compilations in a wide array of disciplines, and serves on the editorial boards of a dozen journals including *The Roeper Review*, *High Ability Studies*, *Mathematical Thinking and Learning*. He is the Founding Series Editor of *Advances in Mathematics Education* (Springer) and *Advances in Creativity and Giftedness* (Sense Publishers, Rotterdam). Current books in progress include *Probabilistic Thinking* (Springer) and *Confronting Dogmatism in Gifted Education* (Routledge). Bharath also travels extensively in the Nordic world and Central Asia, is a former merchant marine, and speaks 9 languages with varying levels of fluency.

# UMCUR Schedule Overview

University of Montana  
Conference on Undergraduate Research (UMCUR)  
April 15, 2011  
UC 3<sup>rd</sup> Floor

- 8:00**                    **Registration and Poster Set-up**  
UC 3<sup>rd</sup> Floor Grand Foyer
- 8:45**                    **Welcome**  
UC Theater
- 9:00 – 11:00**        **Oral Sessions** in the Humanities, Life Sciences, Physical  
Sciences, and Social Sciences, and Creative Works  
UC 326-333
- 11:00-12:00**        **Poster Session #1**  
UC South Ballroom
- 12:20-1:30**         **Keynote Speaker: Dr. Bharath Sriraman**  
*Conceptions of Creativity: How Do Ideas Survive, Mutate,  
and Propagate?*
- 1:40-3:00**            **Oral Sessions** in the Fine Arts, Humanities, Life Sciences,  
and Social Sciences  
UC 326-333
- 3:00-4:00**            **Poster Session #2**  
UC South Ballroom
- 4:00-5:20**            **Oral Sessions** in the Life Sciences, Physical Sciences,  
and Social Sciences  
UC 326-333

## UMCUR SCHEDULE BREAKDOWN – APRIL 15, 2011

<b>8:00</b>	<b>Registration and Poster Set-up</b>	<b>UC 3<sup>rd</sup> Floor Grand Foyer</b>
<b>8:45</b>	<b>Welcome</b>	<b>UC Theater</b>

	<b>Session 1.1 UC 326 Social Sciences</b>	<b>Session 1.2 UC 327 Physical Sciences</b>	<b>Session 1.3 UC 330 Humanities</b>	<b>Session 1.4 UC 331 Life Sciences</b>	<b>Session 1.5 UC 332 Social Sciences</b>	<b>Session 1.6 UC 333 Humanities/ Creative Works</b>
<b>9:00</b>	<i>Hunger on the Isles: The Potato Famine that left Ireland Starving for Control and Scotland Suffering in the Shadows</i> <b>Tori Ainsworth</b> , History	<i>Investigating Upstream Channel Response to Dam Removal, Blackfoot River, MT</i> <b>Robert Livesay</b> Geoscience	<i>The Irish Beowulf</i> <b>Sarah Langley</b> Environmental Chemistry	<i>Muscle Morphology and Location as an Indicator of Function in the Pigeon</i> <b>Vik Weston</b> Human Biology	<i>WikiLeaks and the Age of Datajournalism</i> <b>Devin Schmit</b> Journalism	<i>The Theory and Practice of Global Justice: A Case of Child Welfare in India</i> <b>Emily Cross</b> Philosophy
<b>9:20</b>	<i>What Works and What Fails: Engaging Homeless Veterans throughout a Semester of Service Learning</i> <b>Rory Page</b> , Sociology	<i>Computational Preservation of the Blackfeet Language Using Machine Learning Algorithms</i> <b>Michael Jacobi</b> Computer Science	<i>Reading Nietzsche in James Joyce's Ulysses</i> <b>Nathan Miller</b> English	<i>The Effects of Exercise on Academic Testing</i> <b>Deirdre Coe</b> Health and Human Performance	<i>Data Mining and the Non-Profit</i> <b>Crystal Wood</b> Management Information Systems	<i>Rumi and the Nature of Symbolism</i> <b>Brian Martens</b> Liberal Studies
<b>9:40</b>	<i>Show Me the Money: Assessing Financial Contributions of Millennial Donors</i> <b>Victoria Zimmer</b> History	<i>Cholinergic Control of Neurological Function: Dissecting the Puzzling Pathways Involved in Learning, Memory, and Movement</i> <b>Kurt Stoll</b> , Human Biology	<i>Dreams, Fantasy and Historical Realities: A Comparison of Shakespeare and Calderón de la Barca</i> <b>Marissa Barnard</b> History	<i>Centaurea solstitialis from a Non-native Range are Better Competitors than Conspicifics in the Native Range</i> <b>Ryan Graebner</b> Biology	The Black Christian Dilemma: Civil Rights, Black Power and Black Theology from 1955 to 1969 <b>Adriana Ramos</b> History	<i>The Danger of Language Corrupting Thought</i> <b>Ashleen Williams</b> Political Science
<b>10:00</b>	<i>Offering A 'Menu' of Software and Case Study Options for a Group Project to Students Enrolled in the Introductory AIS Course</i> <b>Tara Kirkham</b> , Accounting	<i>Remote Sensing of Snow and Ice along the Surface and to the Bed the Greenland Ice Sheet</i> <b>Erin Johnson</b> Geosciences	<i>There Is No Good and Evil: The Dynamics of Power in Harry Potter</i> <b>Madeline McKiddy</b> English Literature	Westslope Cutthroat and Rainbow Trout Hybrids: Differences in Migration Timing and Growth <b>Maria Naccarato</b> Wildlife Biology	<i>Nail Polish &amp; Handguns: The Evolution of Women in Policing</i> <b>Brook Kolarich</b> Psychology	<i>Echoes from the Underground</i> <b>Alexandria Campbell</b> Human Biology
<b>10:20</b>	<i>MWTC Trade Missions</i> <b>Katie Spika</b> Marketing	<i>Polymer-silica Materials for Selective Metal Capture by the Sol-gel Approach</i> <b>Erik Johnston</b> Chemistry	<i>The Evolution of the Partisan Press: The Role of Editorial Endorsements in Contemporary American Politics</i> <b>Kirsten Fruit</b> , Journalism	<i>Distribution and Habitat Characteristics of Beavers (Castor canadensis) in the Upper Clarkfork River Basin</i> <b>Luke Stappler</b> Wildlife Biology	<i>Thinking About Law School: Speaking with Attorneys to Gain Insight on the Legal Profession</i> <b>Brittany Harris</b> Elementary Education	<i>International Headlines 3.0: Exploring Youth-Centered Innovation in Global News Delivery</i> <b>Jacquelyn Coffin</b> Journalism
<b>10:40</b>	<i>Sviluppo e Lingua (Development and Language)</i> <b>Rebecca Hamler</b> Psychology	<i>Energy Conservation Study of Student Computing Facilities at the University of Montana</i> <b>Clayton Anderson</b> Computer Technology	<i>The BTK Killer and the Media: The Ethics of Sharing Information with the Police</i> <b>Julia Lillegard</b> Journalism	<i>Modeled mixed conifer forest development following a mountain pine beetle outbreak</i> <b>Leo Brett</b> Resource Con	<i>Creating a New Hybrid Methodology for Software Development</i> <b>Kristian Walker</b> Computer Science	<i>Dakota Language Immersion Program</i> <b>Maranda Herner</b> Human Biology

<p><b>11:00</b></p>	<p style="text-align: center;"><b>Session 2: Posters</b> <b>UC South Ballroom</b></p> <p style="text-align: center;"><i>Noise-induced Hearing Loss in Student Musicians, <b>Christina Asbury</b>, Communicative Sciences and Disorders</i> <i>Local vs. Distal Thrust Plates as Sources of Indianola Conglomerate, East-central Utah, <b>Billy Backer</b>, Geology</i> <i>Generalization within Sound Classes during Cycles Phonological Remediation Approach, <b>Ann Bugni</b>, Communicative Sciences and Disorders</i> <i>Using Mixed Lists for Speech Discrimination Testing in Children with the Word Intelligibility By Picture Identificaton, <b>Krista Bushman</b>, Comm. Science &amp; Disorders</i> <i>Factors Underlying Vegetative Community Distribution in a Northwest Montana Fen, <b>Bridger Cohan</b>, Ecology and Organismal Biology</i> <i>The Relationship between Missoula's Downtown Businesses and the Homeless Community, <b>William Crabtree</b>, Sociology</i> <i>Measuring Vocal Jitter: Continuous Speech vs Sustained Vowels, <b>Mollie Driscoll</b>, Communicative Sciences &amp; Disorders</i> <i>The Depositional Environment(s) of the Castlegate Sandstone, Book Cliffs, East-central Utah, <b>Josh Erickson</b>, Geoscience</i> <i>Intergenerational Transmission of Child Physical Abuse, <b>Kassandra Gahagan</b>, Psychology</i> <i>The Effect of Protein Stability on an Electron Transfer Protein, <b>Matthew Goldes</b>, Biochemistry</i> <i>Formal Pace of Television over the Decades and Effects on Children's Attention, <b>Tawni Guisti</b>, Psychology</i> <i>Inhalation of Pure and Pyrolyzed Methamphetamine Effects Lung Inflammation, <b>Sarah Hamblock</b>, Environmental Chemistry</i> <i>Southward Sediment Transport of the Panther Tongue Paleodelta and its Causes, <b>Evan Hanson</b>, Geoscience</i> <i>The Role of ClpP in the Transmission of Lyme Disease Bacterium, <b>Megan Hatcher</b>, Human Biology</i> <i>Comparing the Effects of Static and Dynamic Stretching Routines on Shoulder Range of Motion and Performance, <b>Karis Hawkins</b>, Athletic Training</i> <i>The Effect of Roads on Avian Communities: Indirect Effects on Nestlings through Parental Feeding Rates., <b>Erin Johnson</b>, Biology- Ecology/Organismal</i> <i>Do Underground Chambers Protect Manduca Sexta Caterpillars From Parasitic Nematodes?, <b>Siobhan Kirkpatrick</b>, Biology</i> <i>Examining the Relationship between Socioeconomic Status and the Impact of Fibromyalgia on a Sufferer's Life., <b>Kasondra Larussi</b>, Sociology</i> <i>Stratigraphic Analysis of the Ferron Sandstone for Reconstruction of Paleoenvironmental Conditions Associated with Ferron Coals, <b>Neasa O' Connor</b>, Geosciences</i> <i>Impacts of Spotted Knapweed on Native Bee Populations of Western Montana, <b>Marisha Richardson</b>, Biology</i> <i>To Drink is to Drive: Assessing Montana's Multiple Offender Drunk Drivers for Prevention Strategies, <b>Kimberly Spurzem</b>, Social Work</i> <i>Inhibition of Stroke-Induced Activity of the Apoptotic Enzyme Caspase-3, <b>Riley St. Clair</b>, Biology</i> <i>Aeror Breather and Belief Effects on Submaximal Lifting, <b>Tim Weber and Gene White</b>, Exercise Science</i> <i>Influence of Salt Tectonics on the Chinle Formation, <b>Michelle Wolfgang</b>, Geosciences</i> <i>Maternal Sensitivity and Infant Attachment, <b>Laurel Anne Yorgason</b>, Psychology</i></p>
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<p><b>12:20-1:30</b></p>	<p style="text-align: center;"><b>Keynote Speaker: Dr. Bharath Sriraman</b> Conceptions of Creativity: How Do Ideas Survive, Mutate, and Propagate?</p>	<p style="text-align: center;"><b>UC Theater</b></p>
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	<b>Session 3.1 UC 326 Fine Arts</b>	<b>Session 3.2 UC 327 Fine Arts/ Social Sciences</b>	<b>Session 3.3 UC 330 Humanities</b>	<b>Session 3.4 UC 331 Life Sciences</b>	<b>Session 3.5 UC 332 Social Sciences</b>	<b>Session 3.6 UC 333 Social Sciences</b>
<b>1:40</b>	<i>Authenticity and What it Means to Gogol Bordello</i> <b>Shannon Soderlund</b> Music History	<i>Parents Involved in Community Schools v. Seattle School District No. 1 et al. (2007): Race-based Assignment Plan</i> <b>Brittany Savoy</b> Political Science	<i>Product Placement: Unethical Shilling, or Smart Marketing?</i> <b>Jenna Martin</b> Marketing	<i>Dietary AhR Ligands Modulate Maturation of Dendritic Cells</i> <b>Kristina Finsaas</b> Human Biology	<i>From Mudblood to Pureblood: Evaluating the Validity of Nationalism's Geographic Typologies and Hans Kohn's Dichotomy</i> <b>Nicole Allen</b> , Pol. Science	<i>Poetry at the Poverello Center: A Look at Intellectual Engagement Among the Homeless</i> <b>Jennifer Johnson</b> Sociology
<b>2:00</b>	<i>Flight: An Exploration on the Ground and in the Air</i> <b>Megan Wiltshire</b> Human Biology	<i>What is the Impact of Marketing on Trends in Mainstream Music?</i> <b>Allyson Carroll</b> Piano Pedagogy	<i>How Things Change: The Story of a Man, his Rabbits, and the Accident that Took it All Away</i> <b>Jamie Rogers</b> Creative Writing	<i>Evaluation of Three Wildland Firefighter Uniforms During Three Hours of Work in the Heat</i> <b>Kristina Pattison</b> Health and Human Performance	<i>Africa-U.S. Project Directors in HED Partnership Awards</i> <b>Marisa Griffith</b> Political Science	<i>Exploring the Relationship of Structure and Resiliency: A Study of Homeless Families at the Joseph Residence</i> <b>Sydney Drinkwalter</b> Sociology
<b>2:20</b>	<i>The Role of Music in AT&amp;T's 'Re-think Possible' Campaign</i> <b>Emily Rice</b> Music History	Ethical Issues as an Emergent Property of Ubiquitous Computing and the Role that Computer Scientists Play <b>Kristian Walker</b> Computer Science	<i>The Ways of Jossism: Characterization and Catharsis in the Whedonverse</i> <b>Hayley Botnen</b> English	<i>A Raptor-ous Education: Using Birds of Prey in Integrative Elementary Curriculum</i> <b>Kensey Baker</b> Wildlife Biology	<i>Indigenous Rights and Environmental Degradation</i> <b>Loren Guerin</b> Environmental Studies	<i>You are what you eat: Nutrition at The Poverello Center</i> <b>Aleksandra Pitt</b> Psychology
<b>2:40</b>	<i>Renegade: The Making of Digital Fanart</i> <b>Amy Kaufman</b> Media Arts	<i>Yellowstone Fire Management: An Issue Analysis Curriculum</i> <b>Kasey Austin</b> Elementary Education	<i>Corn and Systems of Global Commodification and Dominance: A Cultural Reading of Zea Mays</i> <b>Ginny Mueller</b> English Literature	<i>Parental Foraging and Care during the Fledgling Period</i> <b>Joshua Goldberg</b> History	<i>The Abject Underground: Parisian Sewers and the Urban Body, 1853-1877</i> <b>Lindsay Dick</b> History	<i>Behind the Hard Face of Homelessness</i> <b>Kirsa Shelkey</b> Sociology

<b>3:00</b>	<b>Session 4: Posters</b> <b>UC South Ballroom</b>  <i>Determining Bighorn Sheep Maternity with Molecular Genetic Techniques: A Potential Tool in the Exploration of Pneumonia Outbreaks, Mariah Childs, Biology</i> <i>Head-Group Development of Norepinephrine and Serotonin Specific Inhibitors within the Human Brain, Tyler Ellis, Biochemistry</i> <i>Glen Canyon Dam vs. Colorado River, Caleb George, Geography</i> <i>Audibility of the Cricket, Acheta domesticus, Obtained from Auditory Evoked Potentials, Bailee Guisti, Communicative Sciences and Disorders</i> <i>Juvenile Offenders: Comparing Rural and Urban Youth in Montana, Jessica Hazlett, Social Work</i> <i>Sex Determination from the Greater Sciatic Notch: A Morphometric Approach, Amelia Hessey, Anthropology</i> <i>Otitis Media and Middle Ear Effusion: Rate, Risk Factors, Costs, and Antibiotic Resistance in Montana Children, Mandi Hill, Communicative Sciences and Disorders</i> <i>17,000 Bricks, Isaac Iverson and Trevor Muller-Hegel, Design/Technology</i>					
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<b>3:00 Poster Session Cont.</b>	<p style="text-align: center;"><i>Disorganized Infants and Maternal Satisfaction</i>, <b>Austin Logan</b>, Psychology</p> <p style="text-align: center;"><i>Novel Inhibitors of L-glutamate/L-cystine Exchanger System xc-</i>, <b>Jayme Newell</b>, Pharmacy</p> <p style="text-align: center;"><i>Learning the Room: Perceptual Adaptation to Poor Room Acoustics</i>, <b>Jane Reynolds</b>, Communicative Sciences and Disorders</p> <p style="text-align: center;"><i>Emotive Responses to Naturally Occurring Auditory Stimuli: Self-Reported &amp; Physiological</i>, <b>Taylor Salmi</b>, Communicative Sciences and Disorders</p> <p style="text-align: center;"><i>Transcription Termination in Borrelia burgdorferi</i>, <b>Bryan Sawyer</b>, Human</p> <p style="text-align: center;"><i>Forensic Speaker Identification</i>, <b>Cole Smith</b>, Communicative Sciences and Disorders</p> <p style="text-align: center;"><i>The Effects of 5 Weeks of Unloaded Plyometric Training on Power Development</i>, <b>Tyson Strom</b>, Health and Human Performance</p> <p style="text-align: center;"><i>Preventing the Social Desirability Bias in Parental Competency Assessment: A Comparison of Measures</i>, <b>Julie Walsh</b>, Psychology</p> <p style="text-align: center;"><i>The Integration of Historic Periods in Costume Design</i>, <b>Staci Weigum</b>, Theatre/Dance</p> <p style="text-align: center;"><i>Do Growth Rates in Snake River Cutthroat Trout and Cutthroat Trout X Rainbow Trout Hybrids Differ?</i>, <b>Taylor Wilcox</b>, Wildlife Biology</p>
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	<b>Session 5.1 UC 326 Life Sciences/ Physical Sciences</b>	<b>Session 5.2 UC 327 Life Sciences/ Social Sciences</b>	<b>Session 5.3 UC 330 Social Sciences</b>	<b>Session 5.4 UC 331 Social Sciences</b>	<b>Session 5.5 UC 332 Social Sciences</b>	<b>Session 5.6 UC 333 Social Sciences</b>
<b>4:00</b>	<p style="text-align: center;"><i>The Effects of Alcohol Consumption on Measures of Anaerobic Performance</i> <b>Allison Harney</b> Exercise Science</p>	<p style="text-align: center;"><i>Genetic Components of Predicting Drug Adverse Reactions in the Confederated Salish and Kootenai Tribal Population</i> <b>Casey Cable</b> Human Biology</p>	<p style="text-align: center;"><i>Diamonds in the Rough</i> <b>Kirsa Shelkey</b> Sociology</p>	<p style="text-align: center;"><i>Sarah Palin and Gender Negotiation: A High-Heeled Endorsement of Hegemonic Masculinity at the 2010 National Tea Party Convention</i> <b>Julie Hamilton</b> Communication</p>	<p style="text-align: center;"><i>Constitutive Identity and the Evolution of Tribal Sovereignty</i> <b>Jacob Yerger</b> History</p>	<p style="text-align: center;"><i>K-12 Factors that Affect a Student's Decision to Obtain a Mathematics Degree</i> <b>Brittany Wolf</b> Political Science</p>
<b>4:20</b>	<p style="text-align: center;"><i>Visualization of a Neurotransmitter Switch during the Development of Hearing</i> <b>Alison Hixon</b> Psychology</p>	<p style="text-align: center;"><i>Estimated vs. Actual Residual Volume When Measuring Body Composition by Hydrostatic Weighing</i> <b>Anthony Purviance</b>, HHP</p>	<p style="text-align: center;"><i>Stars, Stripes and Strumpets: The American Campaign Against Venereal Disease During WWI</i> <b>Kayla Blackman</b> History</p>	<p style="text-align: center;"><i>Conjuring Social Control &amp; Cultural Continuity</i> <b>Joshua Kieser</b> History</p>	<p style="text-align: center;"><i>Corruption: A Cross-Section Analysis</i> <b>Jacob Allington</b> Economics</p>	<p style="text-align: center;"><i>Social Desirability Bias Effects on the Underreporting of Transphobia</i> <b>Brandon Stewart</b> Psychology</p>
<b>4:40</b>	<p style="text-align: center;"><i>Pressure-Temperature History of Precambrian Meta-Sedimentary Rocks of Yellowstone National Park</i> <b>Carly Osborne</b> Geosciences</p>	<p style="text-align: center;"><i>An Analysis of Community-Based Hospice Programs: My Personal Search for Validation of the Hospice Experience</i> <b>Katherine Adams</b> Marketing</p>	<p style="text-align: center;"><i>Why are Chronic Diseases on the Rise? What Steps Need to be Taken in Order for Health Care to Meet this New Disease Burden?</i> <b>Kayla Hoggatt</b> History</p>	<p style="text-align: center;"><i>Myopic Justice: The Effect of Expectancy Violations in Cases of Medical Neglect</i> <b>Jordan Allen</b> Psychology</p>	<p style="text-align: center;"><i>From Fur Baby to Chick Magnet: A Sociological View of Dogs and Their People</i> <b>Ariel Petersen</b> Anthropology</p>	<p style="text-align: center;"><i>Should the University of Montana Use Flash Drives to Deliver Information to Incoming Students at Orientations?</i> <b>Blake Fisher</b> Resource Conservation</p>
<b>5:00</b>			<p style="text-align: center;"><i>The Altruistic Egoist: Ethics in a Modal Realist Universe</i> <b>Scott Rezvani</b> Philosophy</p>	<p style="text-align: center;"><i>Who is the Mexican Immigrant? A Modern Look at Self-Selection from Mexico</i> <b>Jordan Rooklyn</b> Economics</p>	<p style="text-align: center;"><i>The Ethics of Invisible Journalism</i> <b>Alyssa Rabil</b> Journalism</p>	<p style="text-align: center;"><i>Créolité Exprimé en Martinique</i> <b>Ashley Mahoney</b> French</p>

# ABSTRACTS: ORAL SESSIONS

(in Alphabetical Order by Presenter's Last Name)

**AN ANALYSIS OF COMMUNITY-BASED HOSPICE PROGRAMS:  
MY PERSONAL SEARCH FOR VALIDATION OF THE HOSPICE EXPERIENCE**

**Katherine Adams**

**Session 5.2, UC 327, 4:40 PM**

The end-of-life is never easy. In addition to the physical and emotional struggles of the person nearing his/her end-of-life, family members and other loved ones also have significant emotional obstacles to overcome. Because of our cultural taboo surrounding the notion of death, people are often hesitant to talk to others about this difficult subject. As a result, many patients and families struggle to find a way to help ease their physical and emotional pain and it can be difficult for them to know what resources are available to turn to for assistance. Drawing on a combination of primary and secondary research, including articles from scientific journals, data collected from research studies, conversations with clinical professionals working in the field of hospice, as well as my own personal experiences with hospice, my research topic examines the impacts of hospice care on patients and families. Through a series of structured interviews with a hospice social worker, a hospital chaplain, and hospice nurses, physicians, and volunteers, my aim is to illuminate the spiritual, physical, and emotional care available to patients and their families at the end-of-life through hospice.

**Mentor:** Peggy Schlesinger, College of Pharmacy and Applied Health Sciences

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**HUNGER ON THE ISLES: THE POTATO FAMINE THAT LEFT IRELAND STARVING FOR CONTROL AND SCOTLAND  
SUFFERING IN THE SHADOWS**

**Tori Ainsworth**

**Session 1.1, UC 326, 9:00 AM**

It sounds almost comical to say that a potato altered the course of history. For one country, however, that statement has become an undisputed fact. The Great Potato Famine gave birth to modern Irish nationalism and proved to be a crucial rallying point during the Irish fight for independence. During this period of hunger, Scotland experienced a similar famine that failed to produce the same nationalistic sentiments from its people. Drawing from firsthand accounts such as famine diaries and newspaper articles, as well as other scholarly sources, this paper examines what factors led to the divergent paths of Ireland and Scotland following their respective famines. My research suggests that the history of British exploitation, based on religious differences and manifested in economic practices, left Ireland exceptionally vulnerable to the effects of the famine and spurred the Irish independence movement. Scottish nationalism, however, focused merely on increased autonomy rather than complete independence from Britain because the effects of the famine were minimized by Scotland's strong religious ties to England. This paper reveals the importance of religion in solidifying national identity and transcending ethnic boundaries to sustain multinational states.

**Mentor:** Robert Greene, History

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**MYOPIC JUSTICE: THE EFFECT OF EXPECTANCY VIOLATIONS IN CASES OF MEDICAL NEGLIGENCE**

**Jordan Allen and Megan E. Gesler**

**Session 5.4, UC 331, 4:40 PM**

The basic assumption of the American judicial system is that justice is blind to the physical qualities of individuals who are prosecuted and defended. However, recent research suggests that extralegal factors (i.e. gender, race, age, etc...) account for more decisions in jury cases than previously anticipated (Wayne, Riordon, & Thomas, 2001). In this proposed study, investigators seek to further examine the role that gender may play in the sentencing of defendants in cases of child abuse. Using Burgoon & Hale's (1988) Expectancy Violation Theory (EVT) as a medium for explanation, this study seeks to experimentally examine the application of socially accepted norms (i.e. women as caretakers) to the outcome of jury-trial sentencing. A scenario containing argument summaries for the prosecution and defense will be assigned a male or female perpetrator. The participant will then be asked to recommend a verdict and punishment for this act. It is hypothesized because women are socially expected to be caregivers that they will be awarded sentences more severe than men, who do not traditionally occupy the role of caregiver. The implications of this potential discovery are discussed.

**Mentor:** Christina Yoshimura, Communication Studies

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**FROM MUDBLOOD TO PUREBLOOD: EVALUATING THE VALIDITY OF NATIONALISM'S GEOGRAPHIC TYPOLOGIES AND HANS KOHN'S DICHOTOMY**

**Nicole Allen**

**Session 3.5, UC 332, 1:40 PM**

A generally unchallenged contemporary view of nationalism contends that the countries found in eastern and central Europe are defined along brutal, exclusive, ethnic lines. Conversely, western states and governments are expected to incorporate on liberal, inclusive, and positive terms. These typologies demand that countries be considered either ethnic or civic in nature based on geography, as a result, countries located in Eastern Europe maybe miscatergorized. Recent scholars of nationalism have conceptually and normatively challenged assumptions of liberal-western inclusiveness and ethnic-eastern violent exclusion most often attributed to historian Hans Kohn primaily using evaluations of public opinion data. In light of the lack of empirical evidence to support this Kohn's hypotheses, this research intends to execute a more systematic approach using an elite level analysis with European political party documents. Analyzing six geographically delineated eastern and western European states, this project develops a thematic coding system for the primary investigatory tool. Second, this research will analyze European public opinion data to provide a mass- level analysis. The data collected from these two endeavors will be evaluated to see if eastern countries express themselves in ethnic-exclusive terms and western countries according to a civic-inclusive approach as Kohn's dichotomy would suggest. In the end, the significance of this research is found in the opportunity to extend the conceptual critiques of recent authors to a systematic level that contributes to the larger discussion of nationalism typologies.

**Mentor:** Christopher Muste, Political Science

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**CORRUPTION: A CROSS-SECTION ANALYSIS**

**Jacob Allington**

**Session 5.5, UC 332, 4:20 PM**

Indonesia, a country once characterized by rampant poverty and stagnant economic growth, is now home to the largest economy in Southeast Asia. Much of Indonesia's economic success was fueled by the dramatic increase in economic growth that began in the 1970s. Surprisingly, this growth was accompanied by systemic corruption. While such an occurrence may be an anomaly, a number of economists hypothesized that corruption may actually lead to increased economic growth long before there was any real-world growth pattern to substantiate it. This view of corruption, which is known as the "corruption as grease theory," has been the subject of much debate and while most economists believe it has been disproved, it may hold true given certain conditions. Much of the previous literature attempts to evaluate the corruption as grease theory using either a case-study approach or an applied theoretical approach. My analysis is different since I conduct a cross-section analysis of corruption and growth using a large swath of countries in a variety of developmental stages in an attempt to uncover the conditions under which corruption may prove beneficial. In my model, GDP growth serves as the dependent variable and corruption serves as the key independent variable. The control variables change depending on the version of the model but pertain to one of the following categories—capital, education, geography, health, natural resources, institutions, technology, or infrastructure. Whether corruption is wholly detrimental to economic growth or partially beneficial, it continues to be a major part of global economic activity.

**Mentor:** Doug Dalenberg, Economics

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**ENERGY CONSERVATION STUDY OF STUDENT COMPUTING FACILITIES AT THE UNIVERSITY OF MONTANA**

**Clayton Anderson**

**Session 1.2, UC 327, 10:40 AM**

Energy consumption was studied in a student computer lab for the purpose of mapping out and reducing the carbon footprint created by the daily use of student lab computers. Data was collected by using four passive energy monitors to record the consumption of fifteen lab computers over a period of three weeks. The accumulated power consumption was recorded after each day of use and each week was used to measure energy consumption with a different set of power management options. These three sets consisted of using first, no power saving options, second, the default power saving options put in place by the University and third, adding increased power saving options inspired by Energy Star. This third set of options was implemented on each computer via a group policy. By using a group policy, each computer was able to automatically change its behavior depending upon whether it was in use by a student or sitting idle. When in use, a computer would only turn off the monitor and hard disk drive after ten minutes of inactivity. Once a student logs off, the computer would enter a sleep state after one minute and consume minimal amounts of energy. After the data collection was complete, it was discovered that an energy savings of approximately 37.7% was attained from the computers. This data can be used to map a carbon footprint for the Campus and aid in helping the University reach its commitment of carbon neutrality by the year 2020.

**Mentor:** Tom Gallagher, Applied Computing and Electronics

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**YELLOWSTONE FIRE MANAGEMENT: AN ISSUE ANALYSIS CURRICULUM**

**Kasey Austin**

**Session 3.2, UC 327, 2:40 PM**

This presentation will demonstrate how my experience as a tour guide in Yellowstone National park led me to create Yellowstone Fire Management, an educational program designed for sixth grade students to examine the problems, issues, players, beliefs, and values surrounding wildland fire management in Yellowstone National Park. The program incorporates concepts from scholarly articles, internet resources, and children's literature. I used multiple environmental curriculum frameworks to create the Yellowstone Fire Management curriculum. Upon finishing a hard copy of the curriculum, I published my educational program on a wiki for use by educators everywhere. This project is significant because there is currently no curriculum specifically designed for understanding fire management in Yellowstone Park. The Yellowstone Fire Management curriculum is original in its focus on Yellowstone, the scope and sequence of activities that are outlined, and its online format. Upon completion of this curriculum, students should be able to make informed decisions regarding fire policy as well as individual decisions involving their own behavior (conditions for making a campfire, building a structure near a forest, etc.). Every lesson in this curriculum applies to and lists targeted Montana Educational Standards which can be taught to students in an interesting and engaging approach. My exhibit should inspire educators and students alike in providing lessons to learn from, remember, and enjoy.

**Mentor:** Lisa Blank, Curriculum and Instruction

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**A RAPTOR-OUS EDUCATION: USING BIRDS OF PREY IN INTEGRATIVE ELEMENTARY CURRICULUM**

**Kensey Baker**

**Session 3.4, UC 331, 2:20 PM**

Birds are all around us, yet how much do you know about them? Nature education is lacking in America, and, as a result, our children grow-up with a feeling of disconnected from the world around them. Recent publications, including Richard Louv's book, Last Child in the Woods, has drawn scientific and public interest to the topic of environmental education. Much of our children's environmental education is focused worlds away instead of on local issues in their neighborhood. This has driven me to design a curriculum educating elementary school children about birds, something they see everyday. I have worked closely with several elementary school, middle school, and environmental educators to design a nine-week long curriculum focusing on raptors (birds of prey). The material discusses the evolution of birds from reptiles, what makes birds unique, and specific qualities of raptors. However, it also intertwines with everyday subjects such as mathematics, geography, art, writing, and other subjects. Students can follow a raptor that has been tagged with a satellite transmitter as it migrates to South America, all the while studying the culture of the countries the bird passes through. Students can use basic mathematics to calculate how many miles a raptor migrates in one day. They can also observe chick development from a nest camera every morning. The segment ends in a group project researching a specific raptor and writing a non-fiction information pamphlet to share with their classmates. All these activities are designed to promote interactive learning and leave children feeling connected to the world around them.

**Mentor:** Erick Greene, Biological Sciences

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**DREAMS, FANTASY AND HISTORICAL REALITIES:  
A COMPARISON OF SHAKESPEARE AND CALDERÓN DE LA BARCA**

**Marissa Barnard**

**Session 1.3, UC 330, 9:40 AM**

The playwrights of Europe contributed immensely to the flowering of cultural and artistic expression that marked the Renaissance. The most famous of these men is William Shakespeare, but his contemporary, the prolific Spanish author Pedro Calderón de la Barca, similarly lives on as one of the masters of the Spanish language. A multi-faceted man of many talents and interests, Calderón de la Barca was a Catholic priest, writer, poet, and dramatist. His work largely defined the Baroque era of Spanish comedia (theatre), a cultural phenomenon in which many aspects of Spanish society were reflected. A strictly hierarchical, highly Catholic country, rules for the theatre were just as strict as those for the rest of society. Shakespeare, meanwhile, lived in a relatively more open culture that permitted a more liberal writing style.

This study is composed of a literary analysis from a historian's perspective of the overlapping and differing influences on the work of these two great men. In particular, I examine the function of dreams and fantasy in their work in an attempt to decipher the ways in which their separate social conditions determined the use of an alternative reality within their plays. Specifically, I concentrate on Calderón de la Barca's famous *La Vida es Sueño* (Life is a Dream) and Shakespeare's *The Tempest*. Side by side, it becomes easy to see the different functions that fantasy and dreams serve in their work, but also the different functions that plays and literature served within their separate societies.

**Mentor:** Jannine Montabaun, Spanish (Modern and Classical Languages and Literatures)

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**STARS, STRIPES AND STRUMPETS:  
THE AMERICAN CAMPAIGN AGAINST VENEREAL DISEASE DURING WWI**

**Kayla Blackman**

**Session 5.3, UC 330, 4:20 PM**

I intend to show that pre-existing concerns over morality combined with scientific advancements under the auspices of wartime policy, allowing reformers to launch a repressive anti-prostitution campaign. Under no other circumstances could such a militant operation occur across all classes and geographic areas of the American nation.

**Mentor:** Anya Jabour, History

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**THE WAYS OF JOSSISM: CHARACTERIZATION AND CATHARSIS IN THE WHEDONVERSE**

**Hayley Botnen**

**Session 3.3, UC 330, 2:20 PM**

For my Senior Honors Research Project, I studied the four original television shows that Joss Whedon wrote and produced in-depth. Buffy the Vampire Slayer was the first running from 1996-2003. Angel ran from 1999-2004. Firefly ran from 2002-2003. Dollhouse was most recent, running from 2009-2010. Not only did I research the effects archetypes have on characterization, I also looked at the way Whedon uses his characterizations to provide catharsis in emotionally dense plot lines. This research shows the similarities across his television shows. While there has been friction between two groups of Whedon devotees in the past, I believe by showing the similarities in the characters this friction may be assuaged. Along with Whedon's original television episodes, Aristotle's Poetics, Caroline Myss's Sacred Contracts and Tami Cowden et al's The Complete Writer's Guide to Heroes and Heroines: Sixteen Masterpiece Archetypes were primarily used as research in this project.

**Mentor:** Casey Charles, English

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**MODELED MIXED CONIFER FOREST DEVELOPMENT FOLLOWING A MOUNTAIN PINE BEETLE OUTBREAK**

**Leo Brett**

**Session 1.4, UC 331, 10:40 AM**

Mountain pine beetle (MPB) outbreaks are large-scale disturbances which can alter the structure and successional trajectory of affected forest stands. In mid-elevation ponderosa pine /mixed-conifer communities in particular, little is known about how different levels of MPB mortality will affect successional trajectories of affected forest stands, even though this forest type comprises large percentages of the western forest landscape. These forest stands may have a unique response to MPB mortality events compared to pure pine stands, due to the significant presence of non-host (non-pine) species.

To examine the effects of MPB outbreak on this forest type, forest inventory data collected from several stands recently affected by MPB was used to run a series of 50-year simulations using the U.S. Forest Service Forest Vegetation Simulator . Each stand was "grown" for 50 years under four different scenarios: no host species mortality, observed host species mortality, double observed host species mortality, and full host species mortality.

Simulations indicated shifts in stand structure aligned along a gradient of MPB intensity and persisting through time. At 50 years, under different beetle mortality scenarios, stands showed lower tree density (trees ha<sup>-1</sup>) and decreased basal area (m<sup>2</sup> ha<sup>-1</sup>) compared to no-mortality scenarios. Non-host trees showed higher density and higher basal area compared to no-mortality scenarios. These results indicate that MPB may be a significant driver of stand structure and composition in mixed-conifer systems. By increasing understanding of the role of MPB on forest development, this information will help inform future forest management decisions involving MPB outbreaks.

**Mentor:** Andrew Larson, College of Forestry and Conservation

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**GENETIC COMPONENTS OF PREDICTING DRUG ADVERSE REACTIONS IN THE CONFEDERATED SALISH AND KOOTENAI TRIBAL POPULATION**

**Casey Cable**

**Session 5.2, UC 327, 4:00 PM**

American Indians represent a medically underserved population in terms of access to and quality of healthcare. Knowledge of the population frequencies of those who carry specific risk genotypes, making them more likely to have an adverse drug reaction, is typically based on studies in predominantly non-American Indian populations. A number of population genetic factors, such as admixture, genetic drift and migration, can skew the distribution of allele frequencies in any one ethnic or cultural group, causing an elevated proportion of individuals with the risk genotype. In this study, we assessed the variant allele frequency for 18 loci that are used to predict patient outcomes in frontline cancer chemotherapy. We collected blood samples from a group of Confederated Salish & Kootenai Tribal (CSKT) individuals and transported the samples to the University of Montana laboratories where DNA was isolated from whole blood using the QiaAMP Midi Kit from Qiagen (Valencia, CA). An aliquot of purified DNA was then shipped to the laboratory of Dr. Matt Ames at Mayo Clinic in Rochester, MN for genotyping. The results showed that several loci exhibited variant allele frequencies that were significantly different from Caucasian, or other ethnic populations, confirming that the CSKT population is genetically distinct and has a unique set of pharmacogenomic risks.

**Mentor:** Mark Pershouse, Biomedical

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**ECHOES FROM THE UNDERGROUND**

**Alexandria Campbell**

**Session 1.6, UC 333, 10:00 AM**

Friedrich Nietzsche notably referred to the Russian novelist Fyodor Dostoevsky as, “the only psychologist from whom I have anything to learn.” Dostoevsky’s ability to encapsulate the darkest and most twisted depths of the human psyche within his characters has had a profound impact on those writers operating on the periphery of society. Through research on his writing style, biography, and a close reading of his novel *Notes from the Underground* I am exploring the impact of his most famous outcast, the *Underground Man*, on the life and writing of counterculture poet, Allen Ginsberg. Specifically, I explore how his reading of Dostoevsky’s work, as well as the parallels apparent in the lives of the two writers, impacts the poem “Howl”. The *Underground Man* is present in us all, but in an exploration of both content and writing style, we can make claims as to why his appeal is so strong within the counterculture. Features including a polyphonic voice, multipartite structure, and autobiographical nature provide these two works a link to the disgusted and disenfranchised that is not present in many traditional novels. The paper affirms that Dostoevsky has had a profound influence on the geography of the *Underground* and that this has had an impact on the writers that continue to inhabit that space.

**Mentor:** David Moore, English

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**WHAT IS THE IMPACT OF MARKETING ON TRENDS IN MAINSTREAM MUSIC?**

**Allyson Carroll**

**Session 3.2, UC 327, 2:00 PM**

I propose that many aspects of mainstream music are a product not of societal trends and preferences in music, but rather of marketing techniques employed in the music industry. Marketing plays a key role in the development of artists and their music and, consequently, we can identify marketing as a major factor driving the trends of certain musical elements in mainstream music. With each new wave of mainstream artists, we can recognize certain trends arising in the musical elements of these “hit songs”, e.g., trends in use of instrumentation, use of new sound technology in recordings, melodic motives, foundation rhythms, and lyrical content. I have conducted a literature review in search of evidence that supports my thesis that the proper utilization of marketing techniques in the music industry is a highly effective manner in which to increase the popularity of musical trends in mainstream music. Existing research analyzing the factors that affect consumer behavior coupled with existing literature addressing marketing practices in the music industry support an assertion of the effectiveness of music marketing techniques on increased consumption of that music and accordingly an increased popularity of the musical elements found this music. Little research has been conducted in this new age of technology that explores the role of marketing on the increased popularity of musical trends. With the implementation of many new information technologies, marketing in the music industry has changed vastly in the recent past. A new exploration of how music is marketed to the public is necessary. By understanding the depth to which marketing affects music’s popularity, it would be possible to more effectively promote music.

**Mentor:** Jakki Mohr, Business: Marketing

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**THE EFFECTS OF EXERCISE ON ACADEMIC TESTING**

**Deirdre Coe and Carin Miller**

**Session 1.4, UC 331, 9:20 AM**

Health professionals claim that those who are active will perform better cognitively. Researchers have shown that school aged children achieve higher GPAs when meeting the Surgeon Generals Guidelines for physical activity. Questions remain about the benefit of physical activity immediately before academic tests. Our goal was to analyze immediate cognitive responses following an acute bout of exercise. In trials, 68 voluntary participants (44 females, 24 males,  $23.5 \pm 3$  years) completed both a sedentary and exercise trial, followed by a short academic test on different weeks. During the exercise trial, volunteers participated in 20 minutes of Zumba exercise and walked 5 minutes to a testing site. During the sedentary trial, participants sat for 25 minutes and listened to a collegiate lecture. For both trials, the participants completed a reading comprehension test made of 7 questions concerning 2 paragraphs of literature taken from practice GRE tests. Subjects also completed a questionnaire that included age, RPE during Zumba, food and caffeine intake, and hours of sleep. The overall test scores for the two trials were normalized to the first set of results to remove statistical error and then exercise and sedentary trials were compared with a dependent t-test with  $p < 0.05$ . Results found there was a difference between the test scores of the sedentary and exercise test groups, with the sedentary group scoring slightly above the exercise group. The t-test, however, did not yield a statistically significant difference and does not disprove the positive impact of exercise on cognitive function.

**Mentor:** Steven Gaskill, Health and Human Performance

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**INTERNATIONAL HEADLINES 3.0:  
EXPLORING YOUTH-CENTERED INNOVATION IN GLOBAL NEWS DELIVERY**

**Jacquelyn Coffin**

**Session 1.6, UC 333, 10:20 AM**

Traditional news media must innovate to maintain their ability to inform contemporary audiences. This research project analyzes innovative news outlets that have the potential to draw young audiences to follow global current events. On February 8, 2011, a Pew Research Center Poll found that 52 percent of Americans reported having heard little or nothing about the anti-government protests in Egypt. Egyptians had been protesting for nearly two weeks when this poll was conducted. The lack of knowledge about the protests was not a result of scarce media attention. In the United States, most mainstream TV news sources (CNN, FOX, MSNBC, ABC) ran headline stories on the protests by January 26, one day after the protests began. Sparked by an assignment in International Reporting J450 class, we selected 20 innovative news outlets to investigate whether they are likely to overcome the apparent disinterest of Americans, particularly the youth, in foreign news. Besides testing those news outlets for one week, we explored the coverage origins and financing of these outlets, and we are communicating with their editors and writers to best understand how and why they publish as they do. We will evaluate them, following a rubric, and categorize them based on their usefulness.

**Mentor:** Henriette Lowisch, School of Journalism

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**THE THEORY AND PRACTICE OF GLOBAL JUSTICE: A CASE OF CHILD WELFARE IN INDIA**

**Emily Cross**

**Session 1.6, UC 333, 9:00 AM**

India is among the world's most rapidly developing countries, yet it persists in holding one-third of the world's poor. Furthermore, the greatest victims of poverty in India are the children who face malnutrition and illegal labor. My project takes an empirical approach to this issue as well as a philosophical one. It first examines how rapid economic development has impacted the poor and children. The philosophical aspect of my project utilizes this empirical information to address the following question: Does a wealthy nation, namely America, have a moral obligation to help the poor in developing nations? This leads to a more puzzling question: What marks the difference between individual decency and civic responsibility, and why do Americans generally display the former but not the latter? To provide satisfactory discourse on these issues, I explore the works of Indian philosopher and economist Amartya Sen as well as Thomas Pogge, John Rawls, and the United Nations Millennium Project. In short, my research aims to create more awareness of child welfare in rapidly developing nations such as India; to determine the moral duties of wealthier countries and individuals with regard to this problem; and to illuminate a gap between decency and responsibility.

**Mentor:** Albert Borgmann, Philosophy

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**THE ABJECT UNDERGROUND: PARISIAN SEWERS AND THE URBAN BODY, 1853-1877**

**Lindsay Dick**

**Session 3.5, UC 332, 2:40 PM**

Georges-Eugene Haussmann's infrastructural reformation of Paris beginning in 1853 was not only pragmatic innovation, but also ideological evolution. Contemporary understanding of disease drew in large part on existing miasmatic theory, despite advances in medicine and Louis Pasteur's germ theory. Public hygienists of the time called for management of the urban infrastructure to protect the integrity of the city corpus and the physical and moral health of the individual citizen. In a capitalist superstructure, the protection of the worker's health is a material investment in the perpetuation of economic progress. The metaphor of Paris as body reflects the vision of capitalist bio-economics and a fear of uncontrolled waste. On the same token, the metaphor implicates the abject as a repulsive border between the symbolic surface and the repressed reality underground. Managing and repressing Paris' "bodily functions" had psychological and social consequences that were reflected in contemporary literature, as exemplified in naturalist author and social commentator Emile Zola's *L'Assommoir* (1877). Haussmann's own writings and those of contemporary French writer Emile Zola support this dual use of metaphor, as demonstrated by parallel dissection of their texts. This research is significant for its inscription of the corporal metaphor upon the modernizing city, and demonstrates that metaphor remains useful for informing our own present urban and corporal realities.

**Mentor:** Mladen Kozul, MCLL

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**EXPLORING THE RELATIONSHIP OF STRUCTURE AND RESILIENCY:**

**A STUDY OF HOMELESS FAMILIES AT THE JOSEPH RESIDENCE**

**Sydney Drinkwalter, Christopher Funston, Alexa Lawson, and Destini Carsen**

**Session 3.6, UC 333, 2:00 PM**

As a part of Poverello Inc., the Joseph Residence aims to break the generational cycle of poverty and homelessness in Missoula, Montana. For the purpose of our research, generational poverty was defined as the condition of being in poverty for two generations or longer. The Joseph Residence aims to create a stable community through offering subsidized housing, thereby allowing individuals to work towards independent living. This presentation explores how the structure, programs, and individual case management offered by the Joseph Residence impacted the program participants' development of healthy relationships, feelings of accomplishment, and sense of connection to a larger community. These factors are important to our understanding of how, when transmitted from parents to children, the likelihood of future poverty and homelessness can be reduced. Our research drew upon three sources of data: field notes, in-depth interviews, and information provided by staff. We found that the stability and structure provided by the Joseph Residence enabled families to develop the resiliency to overcome homelessness.

**Mentor:** Anne Rooks, Sociology

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**DIETARY AhR LIGANDS MODULATE MATURATION OF DENDRITIC CELLS**

**Kristina Finsaas**

**Session 3.4, UC 331, 1:40 PM**

Via the diet, humans are exposed to a multitude of anthropogenic and natural toxicants that possess immunomodulatory properties. Dendritic cells (DCs) are critical immune cells that bridge the gap between the innate and adaptive branches of the immune system. They constitutively express the aryl hydrocarbon receptor (AhR), a ligand-activated transcription factor that mediates the toxic effects of many xenobiotics. Therefore, it is important to define the impacts of dietary AhR ligands on DCs to better understand their implications on human health. We hypothesized that dietary AhR ligands, including the environmental contaminant, dioxin and the natural compounds indole-3-carbinol (I3C) and indirubin, will inhibit DC maturation. To test this hypothesis, we utilized bacterial lipopolysaccharide (LPS) to induce maturation of DC2.4 cells (a murine DC cell line) or bone marrow-derived DCs (BMDCs) and evaluated the effects of dioxin, I3C and indirubin on the expression of cell surface biomarkers including CD40, CD80 and CD86 and production of the pro-inflammatory cytokines IL-6 and TNF- $\alpha$ . In both DC2.4 cells and BMDCs all three AhR ligands decreased LPS-induced production of IL-6 and TNF- $\alpha$ . In contrast, differential effects were observed for the three dietary AhR ligands on the LPS-induced expression of cell surface molecules on both DC populations. Interestingly, following qRT-PCR analysis, upregulation of the regulatory genes IDO1, IDO2 and TGF- $\beta$ 3 was detected in LPS-stimulated BMDCs following exposure to dioxin, I3C and indirubin. Collectively, these results indicate that dietary exposure to these AhR ligands can inhibit DC maturation while inducing an immunoregulatory phenotype in these critical white blood cells.

**Mentor:** David Shepherd, Center for Environmental Health Sciences

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**SHOULD THE UNIVERSITY OF MONTANA USE FLASH DRIVES TO DELIVER INFORMATION TO INCOMING STUDENTS AT ORIENTATIONS?**

**Blake Fisher**

**Session 5.6, UC 333, 4:40 PM**

All students and parents who attend Orientation at the University of Montana (UM) are currently provided with a folder filled with paper pamphlets including an Orientation schedule, a description of meal plan options, an outline of the student conduct code, and a collection of other information submitted by multiple campus offices and departments. At many colleges across the country, this traditional approach to material distribution has taken a “greener”, or more environmentally friendly, route. Many have replaced these paper folders with flash drives. The purpose of this study is to determine if UM should also consider a switch to flash drives. Using case studies from other colleges, student surveys, and price quotes for both folders and flash drives, a recommendation concerning the potential switch will be made to UM. Case studies from Western Carolina University and Eastern Carolina University not only reveal potential challenges faced in the process of switching to flash drives, but also offer advice and ways to avoid such problems. Surveys given to random UM students evaluate the target audience’s feelings towards a switch from folders to flash drives. Comparing the price of the folders to that of flash drives reveals how cost-effective the switch could be: folder pricing is based on the actual folder, the pamphlets included, and the labor, while the price of the flash drives is based on quotes from various companies for 2GB drives with screen printing and various add-ons. With information from case studies, student surveys, and pricings, a recommendation will be made to UM regarding the switch from folders to flash drives.

**Mentor:** Karissa Drye, Admissions and New Student Services

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**THE EVOLUTION OF THE PARTISAN PRESS: THE ROLE OF EDITORIAL ENDORSEMENTS IN CONTEMPORARY AMERICAN POLITICS**

**Kirsten Fruit**

**Session 1.3, UC 330, 10:20 AM**

Objectivity, although a relatively modern concept in American journalism, has become the standard by which reporters operate in the democratic arena. Along with fairness and balance, it guides journalists in their pursuit of truth. The press began to embrace the idea of objectivity in the middle of the nineteenth century in an attempt to shuck both its partisan past and broad reliance on political parties. Instead of a zealous advocate and ally of the parties, it became a neutral and independent medium of communication, though still retaining its role on editorial pages as an opinion leader. Now, the common practice of today's press is to sift through the facts to present news that is both accurate and objective without letting bias seep into coverage. Through the in-depth examination of candidates and prominent issues in editorials, news organizations are better able to engage readers, stimulate discussion and pontificate on politics. Nonetheless, while newspaper editorial pages still voice the paper's political preferences, fewer papers today choose to endorse political candidates. This presentation will document my analysis, as chronicled in a comprehensive and well-documented research paper, of political endorsements as a means in which media outlets can participate in public affairs. By looking at the transition of the American press from a political party instrument to an autonomous disseminator of ideas and information, I argue that today's endorsements, although subtle vestiges of nineteenth century partisanship, spur public discourse and help readers navigate the sea of political hype and propaganda endemic in contemporary campaigns.

**Mentor:** Carol VanValkenburg, Journalism

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**PARENTAL FORAGING AND CARE DURING THE FLEDGLING PERIOD**

**Joshua Goldberg**

**Session 3.4, UC 331, 2:40 PM**

During the fledgling life-stage, young birds have left the nest but still depend on parents, especially for food. Research of the fledgling life-stage has been largely restricted to patterns of survival and dispersal, although, these patterns may interact with parental care and provisioning. I examined parental care behavior, particularly the division of care between parents, during this period by attaching radio transmitters to red-faced warbler (*Cardelina rubrifrons*) (n = 5) and dark-eyed junco (*Junco hyemalis*) (n = 10) parents with fledglings. I used radio telemetry to locate parents, noting parent behavior and location with a GPS unit approximately every 2 minutes during 4 to 6 hour focal observations that took place in 1-3 day intervals. I used these data to calculate the distance between fledglings and fledgling mobility. These two species demonstrated different parental care for fledglings. Red-faced warbler parents always split the brood between the male and female, such that both parents did not care for the same fledgling(s), whereas dark-eyed junco parents did not strictly divide their young. These different parental care strategies produced different patterns of fledgling dispersion as offspring aged. Red-faced warbler families tended to diverge with time as parents kept fledglings spatially separated and parent groups drifted apart, whereas dark-eyed junco family groups remained aggregated during the fledgling period with all parents and fledglings staying together in a single area. These differences in parental care behavior may affect the distance traveled by parents to obtain food to provision young. Thus, variation in parental care strategies may affect parental foraging economics, survival, and population dynamics.

**Mentor:** Thomas Martin, Division of Biological Sciences

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**CENTAUREA SOLSTITIALIS FROM A NON-NATIVE RANGE ARE BETTER COMPETITORS THAN CONSPECIFICS IN THE NATIVE RANGE**

**Ryan Graebner**

**Session 1.4, UC 331, 9:40 AM**

*Centaurea solstitialis* and *Centaurea calcitrapa* (yellow starthistle and purple starthistle) are two closely related species with highly overlapping native and non-native ranges in Spain and California, respectively. *C. calcitrapa* is naturalized but has not become invasive in California, whereas *C. solstitialis* has formed virtual monocultures in many parts of the state, decreasing both biodiversity and grazing potential. We sampled seeds from eight populations per species and region and grew plants alone and in competition with seven species of grasses from both ranges in a common garden greenhouse experiment. After 92 days plants were harvested, dried, and weighed. For both species, Californian populations were larger than Spanish conspecifics when grown with no competition. When plants were grown in competition with grasses, Californian populations of *C. solstitialis* outperformed their Spanish conspecifics, and in some cases competitors had no effect on North American *C. solstitialis* biomass. *C. calcitrapa* plants from California were consistently suppressed by competitors more than *C. solstitialis*, although plants from California tended to out-perform their Spanish conspecifics. Other studies indicate that some traits of *C. solstitialis* and *C. calcitrapa* have been selected for in their new, non-native ranges over the last two centuries. We cannot exclude potential founder effects, but our results suggest that such selection may extend to greater competitive abilities for both species in at least one non-native range. However, the invasive *C. solstitialis* demonstrated stronger competitive response to other species than the non-invasive *C. calcitrapa*, suggesting that inherent competitive abilities may contribute in part to invasiveness.

**Mentor:** Ragan Callaway, Biology

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**AFRICA-U.S. PROJECT DIRECTORS IN HED PARTNERSHIP AWARDS**

**Marisa Griffith**

**Session 3.5, UC 332, 2:00 PM**

Finding solutions to help Africa prosper and grow in this globalizing world has long been sought after. One area that has received increased support is developing higher education opportunities in Africa. In 2008, USAID announced it would provide one million dollars for planning grants for U.S. higher education institutions and their sub-Saharan African institution partners. 300 applicants applied and 33 partnerships received awards. These partnerships require dedicated individuals leading the projects, making the role of project directors crucial. My research focuses on these individuals involved in the partnerships. Each project is led by a U.S. project director and an African project director. Working with Professor Peter Koehn, we tracked down the names and emails of 46 of the 66 co-project directors, with all U.S. project directors being found. Next we created a survey that asked the project directors about their objectives for the partnership, prior relations with their partner project director, the principal initiator of each one, and other similar questions. Twenty-four project directors responded to the survey. Analysis of this data provides insight into the key roles the project directors have in the initiation of the partnership projects. Understanding their involvement may help in determining characteristics that are important for future higher education partnerships.

**Mentor:** Peter Koehn, Political Science

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**INDIGENOUS RIGHTS AND ENVIRONMENTAL DEGRADATION:**

**Loren Guerin**

**Session 3.5, UC 332, 2:20 PM**

Western society's interest in economic development has continued to expand the extraction of this gold around the world. It is essential to analyze the impacts of gold mining on human rights, international relations, and how the adverse affects can be mitigated. I examined two gold mines in Latin America—Marlin Mine in Guatemala and Yanacocha in Peru. First, I looked at the companies --their history, their social responsibility track record and any recent news of their impacts. Second, I also looked at the countries – their historical, political, and economic background, and most importantly their indigenous populations. This includes local laws surrounding water, land rights, and mineral usage as well as the historical and current events surrounding the relationship between indigenous peoples and the government. The indigenous group research includes a brief history of the tribes, but focuses primarily on the current struggles facing the indigenous peoples in regards to health, job security, and land rights. Finally, combining scientific studies, news articles, and peer reviewed, I evaluate the overall sustainability of gold mining and its future relevance.

The developing nations that are being exploited for gold use have long histories as sustainable societies. It's a grave mistake to destroy these cultures and ecologically diverse places at the expense of basic human rights. With this project I lay out several of the main issues, as well as possible solutions, and propose ways to protect human rights and sustainable indigenous cultures.

**Mentor:** Robin Saha, Environmental Studies

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**SARAH PALIN AND GENDER NEGOTIATION: A HIGH-HEELED ENDORSEMENT OF HEGEMONIC MASCULINITY AT THE 2010 NATIONAL TEA PARTY CONVENTION**

**Julie Hamilton**

**Session 5.4, UC 331, 4:00 PM**

Since making history in 2008 as the first woman listed on a Republican presidential ticket, Sarah Palin has become one of the most watched, analyzed, and controversial women in politics in recent times. Palin's political prominence enables her to potentially have a major impact on national understanding and acceptance of women in politics. Already, the implications of Palin's celebrity on the meaning and popularity of modern feminism is a topic debated among scholars and non-scholars alike. Using the definition of feminine rhetorical style advanced by Campbell (1989), this essay reveals how Palin negotiates both feminine and masculine traits and speaking styles to connect with her specific audience and be recognized as powerful without blatantly violating gender norms typically embraced by conservatives. An analysis of Palin's address at the 2010 National Tea Party Convention exemplifies Palin's negotiation of gender expectations and supports the ultimate argument that, while blending feminine and masculine speech, Palin routinely devalues the feminine in favor of hegemonic masculinity. This essay cautions that Palin's construction of "real Americans" as those who, like her and her Tea Party supporters, endorse masculine ideals as essential to good politics may hinder the recognition of women and other marginalized groups as valuable actors on the national stage.

**Mentor:** Sara Hayden, Communication

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**SVILUPPO E LINGUA (DEVELOPMENT AND LANGUAGE)**

**Rebecca Hamler**

**Session 1.1, UC 326, 10:40 AM**

With the rise in youth education programs incorporating foreign languages around the United States, researchers are interested in understanding what types of foreign language programs are most beneficial to students. In Europe, students are exposed to several languages throughout their grade school years as a result of the importance placed on multilingualism. In this cross-cultural observational study, students in Rome, Italy and students in Montana were observed while learning a new language over the course of eight months. The researcher was interested in cross-cultural language development and the importance placed on acculturation in these instructional settings. Although the main focus of this qualitative study was on the settings mentioned above, the author also explored various other foreign language teaching strategies being used in Montana during this time. By meeting with English teachers from Korea and Chinese teachers from China, the author gained insight to teaching techniques used in different cultures. The primary results gained from the study are reflected in the acculturation research. Rather than finding a main difference in language development across cultures, results are discussed in terms of the significance placed on the need to acculturate. Limitations and suggestions for further research are also discussed.

**Mentor:** Lynne Koester, Psychology

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**THE EFFECTS OF ALCOHOL CONSUMPTION ON MEASURES OF ANAEROBIC PERFORMANCE**

**Allison Harney**

**Session 5.1, UC 326, 4:00 PM**

Although alcohol is widely researched for its psychological and physiological effects on performance, past research has focused on aerobic modes. Therefore, we aimed to determine the effects of acute alcohol ingestion on tests of anaerobic performance. Twenty five subjects (13 female, 12 male,  $22 \pm 3$  yrs,  $173 \pm 12$  cm,  $70 \pm 17$  kg,  $VO_2$  max  $45 \pm 8$  ml/kg/min) were tested in a randomized crossover design, once consuming a placebo (6.4 ml/kg orange juice for females and 7.9 ml/kg for males) and once consuming 80 proof alcohol (2.6 ml/kg alcohol + 5.3 ml/kg orange juice for males and 2.1 ml/kg alcohol + 4.3 ml/kg juice for females) to achieve a 0.06% blood alcohol content as measured with a breathalyzer. Drinks were administered at 0, 15, and 30 minutes. Tests included a one repetition maximum (RM) bench press, vertical jump, two-minute crunches, and 30 second Wingate. Results indicated a significant decrease with alcohol consumption vs. placebo in average mean power ( $539 \pm 168$  vs.  $556 \pm 179$  watts, alcohol and placebo, respectively,  $p < 0.01$ ) as well as average minimum power ( $384 \pm 129$  and  $405 \pm 131$  watts, alcohol and placebo, respectively,  $p < 0.01$ ) during the Wingate. There was no difference between trials in the bench press, vertical jump, crunches, or Wingate peak power. These data suggest short duration (<15 seconds) or low intensity (i.e. crunches) activities are less influenced by alcohol than sustained high intensity activities. Further research is needed to elucidate the effect of alcohol on sustained anaerobic power.

**Mentor:** John Cuddy, Health and Human Performance

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**THINKING ABOUT LAW SCHOOL:  
SPEAKING WITH ATTORNEYS TO GAIN INSIGHT ON THE LEGAL PROFESSION**

**Brittany Harris**

**Session 1.5, UC 332, 10:20 AM**

College students interested in legal careers have few opportunities for structured career guidance. What information would be helpful to potential law school candidates? My research was designed to answer questions that pre-law students at the University of Montana might have about practicing law. I interviewed eight lawyers practicing in the Northwest. The questions focused particularly on why they decided to pursue a legal career and whether their experience after law school had been personally rewarding. Analysis of these interviews yielded the lawyers' own explanations of their motivations and experiences. Their answers complicated and challenged my assumptions about the legal profession. For example, although several lawyers interviewed were very successful financially, no lawyer expressed wanting to practice law for purely monetary reasons. I also expected individuals who entered law with a clear understanding about why they wanted to practice law to be more satisfied than those with unclear goals. Yet only one lawyer I interviewed knew exactly why he wanted to practice law when entering law school. Prospective law school students will gain insight from these interviews. These interviews provide a clearer picture of what being a lawyer entails, what to expect from three years in law school, and examples of jobs they might expect after graduation.

**Mentor:** Soazig Le Bihan, Philosophy

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**FILM PRESENTATIONS OF THE DAKOTA LANGUAGE IMMERSION SUMMER PROGRAM, 2009 AND 2010,  
HOSTED BY THE NATIVE AMERICAN WOMEN'S HEALTH EDUCATION RESOURCE CENTER IN LAKE ANDES, SD**

**Maranda Herner**

**Session 1.6, UC 333, 10:40 AM**

The Native American Women's Health Education Resource Center, a nonprofit organization on the Yankton Sioux Reservation in South Dakota led by Charon Asetoyer, orchestrates a summer program for the Dakota youth to learn traditional Dakota culture and language. I spent two summers assisting the teachers of the Dakota Language Immersion Program (DLIP) and learning the language along with the students. While introducing Dakota vocabularies and encouraging cultural exploration, this program sparks enthusiasm among the students for their heritage. The students spend six weeks each summer practicing Dakota, engaging in traditional crafts and rituals, and cultivating gardens and Native identities. Also, the students travel on weekly fieldtrips to culturally relevant locations in the area. Under the direction of Charon Asetoyer, I produced two films that show highlights of the DLIP lessons, activities, and fieldtrips. At this conference, I will present the DLIP videos and discuss how various aspects of the program influence the students and community.

**Mentor:** Stephen Neyooxet Greymorning, Native American Studies

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**VISUALIZATION OF A NEUROTRANSMITTER SWITCH DURING THE DEVELOPMENT OF HEARING**

**Alison Hixon**

**Session 5.1, UC 326, 4:20 PM**

We investigated the development of the medial nucleus of the trapezoid body (MNTB) and the lateral superior olive (LSO), two brainstem nuclei involved sound localization. Many physical and chemical cellular interactions occur in LSO and MNTB neurons during early development. Although the development of these nuclei is poorly understood, dynamic changes occur in a subset of inhibitory neurons in LSO and MNTB. Although these inhibitory neurons use the neurotransmitters GABA and glycine and are essential to the proper functioning of the auditory system, they have not yet been systematically visualized during development in auditory brainstem nuclei. We tracked the development of inhibitory neuron subtypes in LSO and MNTB using transgenic mice in which yellow fluorescent protein (YFP) or green fluorescent protein (GFP) is driven by promoters for the calcium binding protein parvalbumin (PV) or the GABA synthesizing enzyme GAD65, respectively. Using antibody labeling and fluorescent microscopy, we compared the number and distribution of fluorescent cells in LSO and MNTB prior to, during, and after the onset of hearing for each strain of mouse. Although the transition from a GABAergic to glycinergic phenotypes has been described physiologically, this is the first study that uses transgenic mice to visualize this transition. The inhibitory neurotransmitter GABA plays an important role before the onset of hearing, but glycine is important after the onset of hearing. Investigating these inhibitory neurons increases our knowledge of sound processing in the auditory system.

**Mentor:** Josh Lawrence, CSFN

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**WHY ARE CHRONIC DISEASES ON THE RISE?**

**WHAT STEPS NEED TO BE TAKEN IN ORDER FOR HEALTH CARE TO MEET THIS NEW DISEASE BURDEN?**

**Kayla Hoggatt**

**Session 5.3, UC 330, 4:40 PM**

The World Health Organization (WHO) predicted in 2008 that the number of deaths by non-communicable diseases will increase by 17% in the next ten years. To determine why chronic illness is on the rise, I am examining summaries of the Global Burden of Disease (GBD) studies for 1990, 2000, and 2004, which provide evidence-based evaluations of global health. I am exploring the trends associated with the prevalence of chronic (non-communicable) and infectious (communicable) diseases in developing countries by reviewing quantitative data provided in the GBD reports. I will discuss trends based on reasons gathered from previous studies concerning the rise of chronic diseases in the past ten years. I am gathering information from various news articles and journal publications, which have provided many reasons for the changing profile of disease burden, to provide a more comprehensive study on this subject. My preliminary research has indicated that the burden of chronic illness has deeply impacted developing countries that continue to struggle with infectious diseases. Thus, I am particularly interested in the effects that development and globalization have on the prevalence of chronic diseases as well as the continuous spread of infectious diseases. The importance of this research lies with the readiness of developing countries to take on a new burden of chronic illness. If there is to be an influx of chronic diseases in the developing world, healthcare providers must be prepared in advance with new forms of treatment and professional competencies to provide for the health of their growing populations.

**Mentor:** Peter Koehn, Political Science

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**COMPUTATIONAL PRESERVATION OF THE BLACKFEET LANGUAGE USING MACHINE LEARNING ALGORITHMS**

**Michael Jacobi**

**Session 1.2, UC 327, 9:20 AM**

Through investigating the audio features of sounds and different machine learning algorithms, we aim to develop a computational framework that automatically identifies and extracts desired sounds from audio clips of the Blackfeet language. The data acquired from this framework will be used to compile a database that will facilitate the digital preservation of the language. Many machine learning algorithms require training data to learn from, and test data to apply that knowledge on. The first step of this project was to create training data by manually identifying occurrences of a desired sound and associating them with sets of quantitative sound features. The next step is to identify a set of audio features that best characterizes the desired sound. This is accomplished through understanding and applying related research results, manual analysis of the training data, and trial and error. The quality of characterization is measured by the percentage of correctly characterized sounds, given a set of audio features and a learning algorithm. This is the first computational linguistic system applied to the Blackfeet language. If successful, similar systems can be implemented for other indigenous languages. Blackfeet is a local Montanan, Native American language that is critically endangered with only 5000 speakers in Canada and 100 in US, most of whom are elderly. Therefore, it is vitally important to preserve this language.

**Mentor:** Min Chen, Computer Science

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**POETRY AT THE POVERELLO CENTER:**

**A LOOK AT INTELLECTUAL ENGAGEMENT AMONG THE HOMELESS**

**Jennifer Johnson and Rachel Rossi**

**Session 3.6, UC 333, 1:40 PM**

In the heart of downtown Missoula, the Poverello Center (Pov) stands tall but rickety. Though the shelter serves nearly 350 low-income Missoulians a day, it offers few classes to enrich the lives of its clients. The Pov suffers from having few resources for such programs. Fortunately, one employee began a poetry workshop for the residents. As students involved with the University of Montana's Inequality and Social Justice course, "Hunger and Homelessness" we chose to focus our research on the new poetry workshop. We were particularly interested in discovering how the workshop's implementation affected the residents. Through the use of field notes, volunteering, and interviews, we tracked how access to creative classes impacted the clients. Specifically, we were interested in answering the question, "How does intellectual engagement impact the quality of life among the residents?" In order to determine this, we drew upon data we had collected in the form of field notes. By attending these workshops, interacting with the clients and volunteering, we hoped to garner an understanding of how workshops such as this change the clients' perspectives of the Pov, their sense of community and general outlook. We conducted recorded interviews with the clients about their experiences and plan on sharing our findings with the Pov in an effort to promote classes for the homeless in their new facility.

**Mentor:** Daisy Rooks, Sociology

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**REMOTE SENSING OF SNOW AND ICE ALONG THE SURFACE AND TO THE BED OF THE  
GREENLAND ICE SHEET**

**Erin Johnson**

**Session 1.2, UC 327, 10:00 AM**

Climate and altitude are the primary drivers in the distribution of snow facies, ice facies and zones on the surface of the Greenland Ice Sheet. There are three different facies: ablation, percolation, and dry-snow, and two zones, lake and dirty ice. Delineating changes in the distribution of different facies and zones on glaciers through time is critical to understanding ice sheet surface processes. I seek to understand and delineate the distribution of different facies and zones on the glacier Isunnguata Sermia in Greenland for the months of May through September in 2010. To delineate the different zones and facies, I used daily Moderate Resolution Imaging Spectroradiometer (MODIS) images for the months of May through September. I downloaded bands 1-6 at 500 meter resolution, reprojected and enhanced each image by running a principle components analysis and creating RGB color composite for each day. I found that the zones moved to higher altitudes later in the summer, with August producing the overall largest change. To investigate the ice below the surface, I used video of thirteen boreholes from June and July 2010. Within the ice, there are two zones: clean ice, and debris-laden ice near the bed. I classified the ice based on clarity of the ice, and the size and amount of debris contained within it. I found that the debris-laden ice was only found within 2 meters of the bed, none was found at the surface in the study area.

**Mentor:** Joel Harper, Geoscience

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**POLYMER-SILICA MATERIALS FOR SELECTIVE METAL CAPTURE BY THE SOL-GEL APPROACH**

**Erik Johnston**

**Session 1.2, UC 327, 10:20 AM**

Recently, sol-gel chemistry and the use of organic-inorganic hybrid materials have received much attention for use in the remediation of aqueous streams contaminated with heavy metals. Heavy metals are present in local streams from a multitude of sources and have very harmful effects on biological processes. Remediation of these streams is necessary to ensure the health of the ecosystem. There are many different methods for remediation of contaminated waters, but many are either too expensive or have insufficient selectivity for metal ions for them to be cost-effective. Silica polyamine composites (SPC) made via the sol-gel process have been investigated recently because of their high selectivity for specific metal ions. The SPC starting material is synthesized from a mixture of tetramethoxysilane (TMOS), methyltrimethoxysilane (MTMOS) and chloropropyltrimethoxysilane (CPTMOS). This material is converted to the SPC BP-1 by a reaction with the polymer polyallylamine (PAA). When BP-1 is further modified with various organic ligands, the resulting composites show high affinities for specific metal ions and have shown to selectively recover valuable metal ions up to 98% pure. Recently, batch capacities and breakthrough testing have been conducted to determine the metal capacity and the selectivity of the sol-gel composites. The composites made via the sol-gel process have comparable, and sometimes better, capacities and selectivity than commercial composites. Also, the sol-gel process is more environmentally benign than the current methods for the production of SPC and with comparable capacities the sol-gel process can be a viable candidate for the future production of SPC.

**Mentor:** Edward Rosenberg, Chemistry

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**RENEGADE: THE MAKING OF DIGITAL FANART**

**Amy Kaufman**

**Session 3.1, UC 326, 2:40 PM**

Fans are very powerful creatures; without diehard fans, *Serenity*, the movie resolution to the short-lived television show *Firefly* would never have been made. Fan power can also manifest in magnificent fanart, or art depicting characters, stories, etc. from a work not of the artist's making. On the Internet, fanart has become a staple of online art communities and commonly references shows, movies, and video games. While the majority of fanart is of questionable quality, a goodly minority features some of the most impressive art presently produced.

So what motivates me personally to create fanart? Adventurous stories and characters can stimulate powerful emotions and provide a vessel in which to pour my own creative interpretation. Exquisite fanart inspired me to become an artist. I hope to similarly influence others. With this presentation I will delve into the making of fanart with *Renegade*, my piece inspired by the video game *Jak II*. For years I have explored the techniques of digital art. As such, *Renegade* was made in Adobe Illustrator and Photoshop and predominantly exhibits digital painting. Through exposition and exhibition of progress shots I will break down the process of digital art.

Due to its derivative nature fanart is not often recognized as a viable art form, yet as with many films and books the point is not strictly originality but original reinvention. I will allow *Renegade* to speak for itself on this subject.

**Mentor:** Greg Twigg, Media Arts

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**CONJURING SOCIAL CONTROL & CULTURAL CONTINUITY**

**Joshua Kieser**

**Session 5.4, UC 331, 4:20 PM**

The institution of slavery in the southern United States attempted to fully control the lives of slaves, but many slaves actively defied this feigned standard, seeking management of their own lives. Many African Americans gained such agency through the use of conjure, also referred to as Hoodoo or "Root-Doctoring." Practitioners of conjure used charms, words, and actions to ensure their own and others' fortune or misfortune. Using conjure, both as practitioners and clients, African Americans attempted to take control of and to improve the oppressive socio-political conditions of slavery. Utilizing a number of primary sources, including interviews with practitioners and believers of conjure conducted and recorded by Harry Middleton Hyatt, this project attempts to further academic discussions of conjure led by scholars like Yvonne Chireau and Jeffrey E. Anderson. The project will relate the overarching structural continuities and specific spiritual and material contextual changes between African and African-American conjure practices to show how African Americans gained socio-political and cultural control. To do so, this project explores the belief system in which conjure functioned and compares conjure in the American context to the West and Central African context, particularly in regards to the interplay between conjure and African-American Christian experiences. Analyzing these relationships, this project further demonstrates how African Americans deliberately changed some spiritual and material aspects of conjure even while maintaining others. Both strategies resulted in greater personal agency for slaves despite oppressive realities in the 18th and 19th century American South.

**Mentor:** Tobin Shearer, African-American Studies

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**OFFERING A “MENU” OF SOFTWARE AND CASE STUDY OPTIONS FOR A GROUP PROJECT TO STUDENTS ENROLLED IN THE INTRODUCTORY AIS COURSE: AN APPLICATION STUDY**

**Tara Kirkham**

**Session 1.1, UC 326, 10:00 AM**

This study tests whether offering students a 'menu' of options for the Group Project requirement portion of the AIS course is of value to students. The menu of options for the Group Project include the choice of one of two software projects (QuickBooks or Microsoft Dynamics), or one of two intricate case studies from a major accounting academic journal (Information Technology General Controls or XBRL) or a case study from the teaching support section of a major CPA firm (Financial Statement Risk Assessment Following the COSO Framework). Surveys are administered over two semesters during one school year at one State University. Surveys are administered to all students before and after performing their chosen Group Project to determine both the student's learning experience and satisfaction with this 'Menu' approach to the Group Project. In general, the 'menu' approach to a case study option in the introductory AIS class appears to be relevant and of value to students taking this course, and potentially provides students with practical experience which the student can use to their benefit in the future in various ways. The study also documents how to use a learning management system to effectively and efficiently manage the implementation of such a 'menu' Group Project approach and the time required of the instructor to grade the Group Project submissions, including grading guidelines.

**Mentor:** Ronald Premuroso, School of Business Administration

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**NAIL POLISH & HANDGUNS: THE EVOLUTION OF WOMEN IN POLICING**

**Brook Kolarich**

**Session 1.5, UC 332, 10:00 AM**

Police officers face great challenges every day at work, ranging from frustrated citizens, angry parents, and drug abuse, to interdepartmental pressures, conflicts, and regulations. Women police officers face all of that – and more. Traditionally male dominated, police departments and the public treat women officers differently than they do men, whether intentionally or not. This historical analysis traces the journey of females in law enforcement, beginning in 1910 with the commission of the first woman police officer, up to present day women in law enforcement. The study encompasses the general span of women in law enforcement and addresses a variety of specific cases, experiences, and policies related to women in this field. Past information is examined to reveal any differences or changes in the treatment of men and women, including level of supervision, ability to be promoted, assigned responsibilities, equality policies, and perception of the public. The information collected highlights important landmarks revealing the progression of women in law enforcement. The results of this analysis reveal the true status of women in the field and the hardships they faced to reach where they are today. The analysis addresses this career by focusing on the progress women have made in the past century and will speculate where women in law enforcement will stand in the future.

**Mentor:** Gary Hawk, DHC

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**THE IRISH BEOWULF**

**Sarah Langley**

**Session 1.3, UC 330, 9:00 AM**

This project closely examines Seamus Heaney's translation of the Anglo Saxon epic, "Beowulf." Its purpose is not to understand the poem in its pre-modern context, but to know it as a work of psychological, culturally interpretive "post" art. It aims to understand Heaney's Beowulf as its own form of production independent of the medieval original via close analysis of influence in the realm of politic, culture, and linguistics, proposing answers to such rhetorical questions as "How does the Beowulf poem speak to its Irish producer/interpreter," and "To what extent has the Irish condition influenced Heaney in his interpretive translation of Beowulf?" By nature, the project explores the modern history and direction of Irish literature, extrapolating the cultural history that produced it, and veers toward understanding a tension-laced culture. Therefore, the conclusion of this project offers an in-depth way of understanding how the Irish speaks to the Beowulf poem, and how the Beowulf poem speaks to the Irish.

**Mentor:** Kathleen Kane, Irish Studies

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**THE BTK KILLER AND THE MEDIA: THE ETHICS OF SHARING INFORMATION WITH THE POLICE**

**Julia Lillegard**

**Session 1.3, UC 330, 10:40 AM**

Dennis Rader is a convicted serial killer. In 2005, he pleaded guilty to killing ten people from 1971 to 1991 in the Wichita, Kansas area. He gave himself the name "BTK," which stands for "Blind Torture Kill."

Throughout his killing career, Rader was in contact with both the police and the media. He delivered cryptic packages and notes with graphic details about his killings to the local news outlets. Such packages and information could provide valuable clues to the police in order to help track down the killer. In fact, information gathered from Rader's communication led to his identification and eventual conviction. However, the American media is supposed to serve as a watchdog, independent from the government and law enforcement. The media's relinquishment of information to the police and compliance with law enforcement could damage the media's ability to remain autonomous.

I want to use the case of Dennis Rader to explore the ethical implications of the media sharing information with the police, if and when it is acceptable, and any potential ramifications of those actions. I plan to research this topic in order to write a research paper of approximately four pages and prepare a class presentation lasting approximately 25 minutes. I will condense my presentation in order to present it at UMCUR.

**Mentor:** Denise Dowling, Journalism

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**INVESTIGATING UPSTREAM CHANNEL RESPONSE TO DAM REMOVAL, BLACKFOOT RIVER, MT**

**Robert Livesay**

**Session 1.2, UC 327, 9:00 AM**

As dam removal becomes more accepted as an effective approach to river restoration, understanding the upstream channel geomorphic response is vital. This study is being conducted to examine upstream channel evolution of the Blackfoot River (BFR) in response to an 8-meter drop in base level that was caused by the 2008 removal of the Milltown Dam. This research is testing the hypothesis that geomorphic response will be more pronounced closest to the site of the dam with more incision occurring on the bed and this response decreasing upstream. For this study, longitudinal, cross section elevation and grain size data from 13 BFR sites will be collected: seven cross sections within the area influenced by Milltown Reservoir and six cross sections upstream. To quantify net geomorphic change, two variables are being investigated: (1) the change in grain size and, (2) the adjustment of channel geometry over a three-year period (2008-2011). Preliminary observations indicate that in addition to distance from the dam other geomorphic factors such as grain size and channel confinement also drive channel response. Long-term studies of upstream channel response to dam removals are rare. Results from this study will help increase understanding of this dam removal and can be applied to future dam remediation projects.

**Mentor:** Andrew Wilcox, Geosciences

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**CRÉOLITÉ EXPRIMÉ EN MARTINIQUE**

**Ashley Mahoney**

**Session 5.6, UC 333, 5:00 PM**

Many regions of the world have known colonization and felt its repercussions. Slavery, indentured servitude, and conquest included people from around the globe, Africans, Chinese, indigenous people and their conquerors were precipitated together under the colonial model. Albert Memmi addresses the consequences of colonialism in his novel, *Portrait du colonisé, Portrait du colonisateur*. He specifically discusses the repercussion on both the colonizer and the colonized. Although there is no formulated solution to overcome the problems that rise out of colonialism, Memmi draws from history and theory he considers useful to countries wishing to transcend colonial histories. Although Memmi is an African born writer his work addressing social, political, economic, cultural, and identity crises has global implications. I have taken his words and applied them to Martinique. Martinique has a problem-ridden past. Colonialism transplanted people of different worldviews and ethnicities to a foreign territory. Although such people have been coexisting for generations, social, political, economic, and cultural discontentment is still apparent. The oppressed, colonized people have been searching to place themselves in an island governed by the descendants of French colonizers. Current inhabitants of the island and their ancestors have struggled to find and equilibrium between the past and the future in searching for an identity. A literary movement stemming from the 1980's has adjusted its priorities to address these discontentments. Authors Patrick Chamoiseau, Raphael Confiant, and Jean Bernabé wrote *Éloge de la créolité* (In praise of creole-ness) defining the movement they call 'créolité' as a movement of creativity. The authors propose creating a new future for Martinique; their objective is to transcend the aftereffects of colonialism, still present in their country, by embracing an amalgam of biological and cultural influences. A parallel exists between the words of Memmi and the words of the proponents of Créolité and is evident in both literary and the academic realms in Martinique literature. In drawing on these parallels, Créolité reflects Memmi's philosophy regarding a colonial division between the colonizer and the colonized.

**Mentor:** Christopher Anderson, French

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**RUMI AND THE NATURE OF SYMBOLISM**

**Brian Martens**

**Session 1.6, UC 333, 9:20 AM**

A presentation on the natural symbols commonly used in the poetry of Jalal al-din Rumi. Discussion of how the natural world reflects the relationship between humanity and divinity as understood by Sufi mystics.

**Mentor:** Paul Dietrich, Liberal Studies

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**PRODUCT PLACEMENT: UNETHICAL SHILLING, OR SMART MARKETING?**

**Jenna Martin**

**Session 3.3, UC 330, 1:40 PM**

Product placement refers to advertisers incorporating their product into mainstream media in such a way that the campaign is not obvious to the casual observer. For example, a company will pay for a movie character to take a refreshing sip of Diet Coke® instead of drinking from a generic “Cola” can. This craze of product placement as a marketing campaign is starting to take over the advertising world; not only is it increasing in frequency of use in popular media, but the actual placement of the “advertised” good is becoming progressively more creative. Advertisers have gotten so skilled at easing their merchandise or service into the regular content of media that most consumers are not directly aware of it. However, product placement can pose an ethical problem: Since consumers are not conscious of being advertised to, is it ethical? Should viewers be informed or be able to give consent to viewing paid product placement in the shows they watch? Using literature reviews and interviews with experts in the field, I will assess the impact product placement has on consumers, and, following a guide to business ethics, determine the ethics of shilling (marketing without knowledge or consent) in media. The idea that consumers should be able to give consent to advertisement is a novel idea, one that has not been thoroughly researched in this country. This could prove to be an important step toward a better customer relationship strategy for many companies.

**Mentor:** Jakki Mohr, Marketing

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**THERE IS NO GOOD AND EVIL: THE DYNAMICS OF POWER IN HARRY POTTER**

**Madeline McKiddy**

**Session 1.3, UC 330, 10:00 AM**

Critics such as Harold Bloom, John Pennington, Abanes and Arms have criticized the Harry Potter books for being immoral, infantile, destroying the genre of ‘high fantasy’ and being over simplistic. I argue these points with the help of scholars Gupta, Lurie and Falconer in hopes of proving that the Harry Potter is much more than a simplistic, infantile ‘low-fantasy’; rather, Rowling creates an extremely complex world with a mix of classic mythology and her own inventions which invokes very adult power dynamics. Throughout the seven Harry Potter novels, the Good and Evil binary so firmly established in the first novel gives way to a much more complex, multi-facet world of power relations. The dynamic then becomes about the balance of power, rather than the difference between good and evil. This shift between the early books’ “Good vs. Evil” giving way to the conflict between the balance of power is one of the many things which sets the Harry Potter novels apart from other Children and YA novels, as these genres generally simplify conflicts in order to prevent children from becoming confused or distressed. This play of the balance of power, both within and outside of the human soul, is what I will discuss—the allure of power, as well as the power of fear, the power of deception and the distrust it fosters and the power of love—and from these power dynamics I will discuss the true “magic” of Harry Potter.

**Mentor:** David Moore, English Literature

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**READING NIETZSCHE IN JAMES JOYCE'S ULYSSES**

**Nathan Miller**

**Session 1.3, UC 330, 9:20 AM**

James Joyce had not yet begun his most productive years of writing when he first became acquainted with the work of the philosopher Friedrich Nietzsche, a man whose deep skepticism about the traditional views of life and the world likely spoke to some of the young and aspiring writer's concerns and experiences. By the time Joyce started to write his epic novel, *Ulysses*, he possessed a well-developed and nuanced grasp of several fundamental dimensions of Nietzsche's thought: not only did he understand the concepts of the "death of God," the *Übermensch*, and the eternal recurrence, but he grasped both the way that they fit together in Nietzsche's philosophy and their larger implications. It should not be surprising, then, that these ideas find their way into Joyce's novel. In this presentation I will introduce and discuss a final research paper that illuminates the role that Nietzsche's thought plays in Joyce's *Ulysses* and argues for the value of reading *Ulysses* through a Nietzschean interpretive frame. Specifically, I will discuss the ways in which Nietzsche's ideas contribute to a new understanding of the novel's main characters, and how this understanding helps provide us with a better sense of the novel as a whole.

**Mentor:** Robert Baker, English

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**CORN AND SYSTEMS OF GLOBAL COMMODIFICATION AND DOMINANCE:**

**A CULTURAL READING OF ZEA MAYS**

**Ginny Mueller**

**Session 3.3, UC 330, 2:40 PM**

Corn's status as a critical food crop, and its location within indigenous new world cosmographies, illustrate the important sociocultural role the plant has played for millennia. However, modern society has elevated *Zea Mays* far above the status of mere plant, fashioning it into a commodity intimately connected to systems of control and capitalism. Consequently, corn has played an essential role in colonization, industrialization, and the advent of overproduction. The beliefs and literature of numerous new world cultures offer a striking comparison to corn's current position in western society. The far-reaching impacts that corn has on our socioeconomic and subsistence systems reveal a great deal about globalization, commodification, and dominance. Taken from a larger project, this multimedia presentation examines corn through a cultural studies lens, documenting the influence of this iconic foodstuff and analyzing its effects over historical and cultural boundaries.

**Mentor:** Katie Kane, English

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**WESTSLOPE CUTTHROAT AND RAINBOW TROUT HYBRIDS:  
DIFFERENCES IN MIGRATION TIMING AND GROWTH**

**Maria Naccarato**

**Session 1.4, UC 331, 10:00 AM**

Westslope cutthroat trout are a species of concern across all of their native range. It is estimated that westslope cutthroat currently occupy only 10 percent of their native range. One of the main reasons for their decline is hybridization with non-native rainbow trout. I looked at the ecological differences between hybrids and pure westslope cutthroat and rainbow trout. I have collected 200 samples over a 3 year period on the Jocko River basin in Western Montana. I will discuss the importance of migration timing in the spread of hybridization and examine whether environmental factors (stream flow and temperature), or population characteristics (size and age of fish or extent of hybridization) explain differences in migration timing for these species. I will also explore how much variation in growth rate exists across the years in relation to the extent of hybridization. Otoliths (the inner earbone of a fish) were extracted from all the samples and used to determine the age. I then back-calculated the proportional growth per year to see how much and how fast each individual was growing. I then compared this growth rate across individuals with varying degrees of hybridization to determine if hybridization is influencing growth rate. Westslope cutthroat have been petitioned for listing under the Endangered Species Act and have been repeatedly denied. Understanding what ecological differences exist between hybrids and pure westslope cutthroat and rainbow trout is an important step in developing a management strategy to deal with this threat.

**Mentor:** Lisa Eby, Biology

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**PRESSURE-TEMPERATURE HISTORY OF PRECAMBRIAN META-SEDIMENTARY ROCKS OF YELLOWSTONE  
NATIONAL PARK**

**Carly Osborne**

**Session 5.1, UC 326, 4:40 PM**

The Archean Rocks of Yellowstone National Park appear to be similar to that of the Precambrian terranes found in neighboring mountain ranges, such as the Beartooths. These Precambrian Archean rocks were sampled last summer from along the Yellowstone River, from Bear Creek near Gardiner, MT to Hellroaring Creek and north of Tower Junction within northern Yellowstone National Park in order to determine if these terranes are from the same depositional environment. The samples collected are representative of shallow regional metamorphism, and are composed primarily of biotite schists containing diagnostic metamorphic assemblages that have been termed the Jardine Metasedimentary Sequence (JMS). The metamorphic grade increases slightly across the study area, which was established based on petrology of the samples. Chlorite-biotite assemblages are more prevalent in biotite schists in the west and transition into garnet-andalusite-chlorite-biotite and garnet-staurolite-biotite in the east. Staurolite occurs in a few of the samples in varying textures. A few of the samples with varying assemblages were analyzed with an electron microprobe obtaining mineral composition data from five samples that were then inputted into the program Thermocalc to calculate average pressures and temperatures (P-T) of metamorphism across the area. Small variations in P-T were observed, ranging from 572-608° C and 4.1-5.8 kbar. The JMS along with adjacent rocks in the Garnet Hill area to the east are of anomalously low metamorphic grade compared to other rocks of the northern Wyoming Province, and the JMS may represent a separate, distinctive unit that is allochthonous within this northern part of YNP.

**Mentor:** Julia Baldwin, Geosciences

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**WHAT WORKS AND WHAT FAILS: ENGAGING VETERANS TRANSITIONING OUT OF HOMELESSNESS  
THROUGHOUT A SEMESTER OF SERVICE LEARNING**

**Rory Page and Luke W. Reyes**

**Session 1.1, UC 326, 9:20 AM**

The Valor House is a transitional housing facility for homeless veterans in Missoula, MT. In collaboration with the Veterans Administration, the Poverello Center, and Missoula Housing Authority, the Valor House works to address the multifaceted needs of America's largest homeless population: Veterans. Many residents of Valor House struggle with post-traumatic stress and other mental health issues, and live in individual one bedroom apartment units. Although residents might benefit greatly from group activities, guest speakers, and group classes their mental health issues cause many residents to be hesitant to participate. Therefore, as a nonresident, it is challenging to encourage residents to participate in such planned events. Drawing on two Valor House volunteers' experiences, this presentation examines the various methods used to encourage veterans to participate in organized activities at the Valor House, and explores the failures and successes of the methods used. We will conclude by offering suggestions about successful strategies for engaging Veterans in events such as fly fishing, bowling, financial and anger management classes, mental health seminars and AA meetings.

**Mentor:** Daisy Rooks, Sociology

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**EVALUATION OF THREE WILDLAND FIREFIGHTER UNIFORMS DURING THREE HOURS OF  
WORK IN THE HEAT**

**Kristina Pattison**

**Session 3.4, UC 331, 2:00 PM**

Wildland firefighters (WLFFs) wear fire-resistant uniforms, which differ between fire agencies in layers required. Efficient body-heat dissipation is important for the safety and performance of WLFFs who work arduously in hot environments where hyperthermia leads to exhaustion. **PURPOSE:** Evaluation of thermoregulatory effects between three WLFF uniforms during work in the heat. **METHODS:** Nine males ( $24.6 \pm 4.1$  years,  $190.0 \pm 17.1$  cm,  $81.0 \pm 7.9$  kg,  $11.2 \pm 3.5$  %body fat,  $57.4 \pm 5.4$  ml•kg<sup>-1</sup>•min<sup>-1</sup> VO<sub>2</sub>) completed three separate, three-hour trials of treadmill walking (3 mph, 4% grade) in a heat chamber ( $37 \pm .05^\circ\text{C}$ ), with a 10-minute rest period each hour. During each trial, subjects wore different uniforms (Kevlar impregnated Nomex [FSI], Nomex [FSII], and double-layered Nomex [CF]). Variables measured were skin and core temperatures, heart rate, sweat rate, thermal comfort, and rating of perceived exertion. Physiological strain index (PSI), rate of core temperature rise, and body weight changes were calculated. Results were analyzed using a Repeated Measures ANOVA; significance was set at 0.05. **RESULTS:** No significant differences were found in heart rate, weight change, or skin temperatures. PSI was significantly lower for FSI than CF ( $p=.038$ ), while FSII trended to be lower ( $p=.070$ ). Core temperatures were significantly lower during FSI and FSII than CF ( $p=0.003$ ,  $p=.044$  respectively). CF showed significantly higher rates of core temperature rise (FSI  $p=0.001$ , FSII  $p=0.005$ ). **CONCLUSION:** Increased uniform layers worn in hot environments result in increased physiological strain. Agencies requiring double layers would benefit from decreasing clothing layers to avoid physiological strain increases and decreases in work performance.

**Mentor:** Joseph Domitrovich, Health and Human Performance--Exercise Science

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**FROM FUR BABY TO CHICK MAGNET: A SOCIOLOGICAL VIEW OF DOGS AND THEIR PEOPLE**

**Ariel Petersen**

**Session 5.5, UC 332, 4:40 PM**

Since their domestication, dogs have played an important role in human society. People put them to work hunting game, herding livestock and guarding the home, and also keep them as companions. As dogs increasingly occupy a meaningful position in the lives of their owners, the startling lack of research on dog-human interaction becomes increasingly apparent.

This research discovers different ways people relate to their dogs, and the meaning dogs hold for their owners. While conducting observations, I identified and interviewed owners who exhibited an emotionally meaningful attachment to their dogs. I then used Glaser and Strauss' grounded theory approach to analyze the data. The observations and in-field interviews I collected in public, dog-friendly places allowed me to gain insight into the relationships between dogs and their people.

Owners in my study tended to adopt their dogs for a variety of reasons, including for companionship, as a replacement dog, and as a precursor to parenthood. Dogs also provided access to meaningful relationships with others, as when owners stated they often socialized with other dog people. They also described structuring their lives and everyday routines around their dogs. Through the language they used, owners conveyed a sense that their dogs were members of the family and had individual desires, preferences, and rights not unlike those we ascribe to humans. The idea that dogs possess rights similar to those of humans suggests that some dog owners hold a worldview akin to deep ecologists: that humans are equal, rather than superior, to other animals.

**Mentor:** June Ellestad, Sociology

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**YOU ARE WHAT YOU EAT: NUTRITION AT THE POVERELLO CENTER**

**Aleksandra Pitt, Rachel Rossi, Matthew R. Skuletich, and Amora R. Wilkins**

**Session 3.6, UC 333, 2:20 PM**

In association with the Poverello Center and the University of Montana's Sociology Department, our study attempted to answer the question, "Can clients at the Missoula homeless shelter meet their nutritional needs based on the FDA Food Pyramid?" Evidence was gathered by undergraduate students who volunteered a minimum of two hours a week in the following programs offered by the Pov: the daily food pantry, Food Security Program, food preparation, serving and food pick-up in the Missoula area. Given the variety of food choices that the Poverello provides to its clients, we asked, "Why do clients favor some options over others?" We were concerned with learning more about which external factors (both social and environmental as well as personal preference) influenced consumers' food choices. We gathered information from details in our field notes, which were collected while cooking, dining, and volunteering with clients. Through the detailed tracking of the donations from businesses, pantry requests, experiences serving on the line, and recipes from Chef Charlene, we believed we would find that while healthy food is available, people tend to gravitate towards highly caloric, high-in-sodium food both in the pantry and on the line. Understanding food choices of Missoula's homeless will help service providers and volunteers better serve this communities needs.

**Mentor:** Daisy Rooks, Sociology

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**ESTIMATED VS. ACTUAL RESIDUAL VOLUME WHEN MEASURING BODY COMPOSITION BY HYDROSTATIC WEIGHING**

**Anthony Purviance**

**Session 5.2, UC 327, 4:20 PM**

Residual volume (RV), the air left in one's lungs, is an important factor when calculating percent body fat (%BF) using hydrostatic (underwater) weighing and needs to be estimated accurately. Hydrostatic weighing is the gold standard for determining %BF but is often done with an estimate of RV rather than actual measurement.

**PURPOSE:** The purpose of this study is to evaluate the efficacy of estimating residual volume. **METHODS:** One hundred and forty-seven subjects (n=71 males, n=76 females) participated in this study. Height, weight in air, hydrostatic weight and RV by nitrogen washout was measured on all subjects. %BF was then calculated using the Siri equation using both measured and estimated RV values. A 2 tailed t-test was done to assess the difference between the %BF values determined when using estimated or measured RV. **RESULTS:** There was a significant difference between the two residual volume methods (Using est. RV, %BF=18.3 ± 7.4% vs. using measured RV, %BF=19.8 ± 8.0%, p<0.05). **CONCLUSION:** This data suggests that using the current equation to estimate RV when calculating %BF is not a reliable method for exact determination of %BF, but is a reasonable estimate and only over estimated by about 1.5% on average. This equation should be re-evaluated to better accommodate the current populations who are more obese than when the original Quanjer RV estimate formulas were developed.

**Mentor:** Steven Gaskill, Health and Human Performance

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**THE ETHICS OF INVISIBLE JOURNALISM**

**Alyssa Rabil**

**Session 5.5, UC 332, 5:00 PM**

In the quest to become an excellent journalist, sometimes the most basic aspects of human behavior are sacrificed. I want to examine the moral implications of asking a journalist to go into an area where people are in need and not offer any help. Is it realistic to believe that journalists are always part of the background and never interfere or play a part in the story? Do journalists become "part of the story" thereby risking the objectivity of the story as soon as they help? Does having a journalist in a disaster area have an effect on the outcome of the situation? Some argue that, in a disaster area, it is possible to devote time to helping people without that taking away from solid reporting. Others say that being a journalist is constant and that being an aid worker is not part of the job description. Is there value in experiencing the situation fully by becoming personally involved or does this always create bias that will later influence the story? I will examine this topic from a philosophical and professional perspective and support my conclusions with stories from sources who have been in this kind of ethical situation. I will speak with experienced philosophers who study theories of morality and ethics and I will closely examine the teachings of philosophers, including Kierkegaard and Nietzsche to determine whether a basic guideline for human behavior exists. I will also draw on the personal experiences of seasoned journalists and I will examine their behavior in times of crisis when people are in need. I aim to find out if humans have a basic obligation to help, and if we do not, what kind of emotional damage is done by recording, photographing, or writing about pain without stopping pain.

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**THE BLACK CHRISTIAN DILEMMA:  
CIVIL RIGHTS, BLACK POWER AND BLACK THEOLOGY FROM 1955 TO 1969**

**Adriana Ramos**

**Session 1.5, UC 332, 9:40 AM**

In 1969 James Cone, AME minister and professor of theology, published *Black Theology and Black Power* with the aim of theologically redefining the place of the Christian church in terms of black oppression. My paper aims to show how Black Theology proponents answered the black community's need for more radical empowerment after the Civil Rights Movement by articulating the necessity of spirituality to achieve liberation. I show the "dilemma" of being African American and Christian by contrasting the progress of the religiously fueled Civil Rights Movement with the emergence of militant Black Power movements in the context of continued racial violence and socio-economic injustice. In addition, I would like to raise discussion about problems and successes of Cone's published theology in terms of African-American history. I have conducted my research through the close examination of a variety of both secondary and primary historical texts, including peer-reviewed journals, contemporary and historical interviews and articles from major African-American periodicals from the 1960s. My goal with this research is to reveal the complexity of the African-American struggle for Civil Rights and highlight the historical importance of Black Theology to religion, politics, and society in the United States. I believe my access to diverse sources spanning the past fifty years, and careful observation of Black Theology and its origins, provide a more intricate perspective both to the study of United States history and to the African-American experience.

**Mentor:** Tobin Shearer, History

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**THE ALTRUISTIC EGOIST: ETHICS IN A MODAL REALIST UNIVERSE**

**Scott Rezvani**

**Session 5.3, UC 330, 5:00 PM**

In two essays, I consider a system of ethics in a universe where all possible worlds exist as concretely as our own. In this "modal realism" setting, I engage other authors to argue that only one's well-being as defined by one's own subjective experiences should be considered morally relevant to each moral agent. I next propose a system for improving the quality of these subjective experiences. Contrary to popular notions concerning egoism, I argue that love—the selfless caring about things external to oneself—is the most important pleasure for someone interested in improving their subjective experiences. Therefore, even when we are motivated completely by our own best interests, as modal realism provides us good reason to be, we still ought to care about things other than ourselves. I engage literature in both philosophy and psychology to develop this argument. My essays have important implications for philosophical questions of virtue and self-interest dating back to Plato, as well as for new moral problems arising from theories of many worlds. They are therefore relevant both to proponents of the philosophy of modal realism, as well as to general audiences interested in living a more fulfilling life.

**Mentor:** Soazig Le Bihan, Philosophy

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**THE ROLE OF MUSIC IN AT&T'S 'RE-THINK POSSIBLE' CAMPAIGN**

**Emily Rice, Thomas Turino, Peter Thwaites, and Kurner Patel**

**Session 3.1, UC 326, 2:20 PM**

AT&T's "Re-think Possible" campaign was a response to the company's image problems that developed over the last decade. Consumers complained that the company provided little customer service, poor coverage and slow coverage. AT&T's new campaign aimed to broaden and improve its brand through selling an image of the company, rather than a specific product. The new campaign relies heavily on music to sell AT&T's new image. I will discuss how music is used in two commercials in the campaign to target two separate and important demographics. My analysis of the music will draw upon ethnomusicologist Thomas Turino's theories of music and meaning to explain how advertisers effectively use music to emotionally manipulate their targeted consumers, even without selling a specific product.

**Mentor:** James Randall, Music

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**HOW THINGS CHANGE:**

**THE STORY OF A MAN, HIS RABBITS, AND THE ACCIDENT THAT TOOK IT ALL AWAY**

**Jamie Rogers**

**Session 3.3, UC 330, 2:00 PM**

On December 26th, 2009 David DelSignore struck four girls with his pick-up truck, killing two of them instantly. He was legally drunk. The ensuing court case and media coverage engaged the community in fierce debate over issues ranging from DUI laws to parenting to the role of media in the justice system.

My presentation will track the narrative of DelSignore's tragic story, from his old life as a reputable rabbit breeder and mentor to children to his current life as an inmate at Montana State Prison. Pulling from interviews, court documents, and newspaper clippings, I will tell the story of lives lost, and the tragedy that galvanized a community.

**Mentor:** Carol Van Valkenburg, Journalism

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**WHO IS THE MEXICAN IMMIGRANT? A MODERN LOOK AT SELF-SELECTION FROM MEXICO**

**Jordan Rooklyn**

**Session 5.4, UC 331, 5:00 PM**

Estimates show that over 600,000 migrants, legal and otherwise, enter into the U.S. from Mexico each year (Gathmann 2008). To understand what implications this large-scale migration has on both countries, it is important to understand the characteristics of the typical immigrant. Using data from the National Statistical Institute in Mexico, I examine gender, age, location, education and income levels of Mexican immigrants and non-immigrants between 2007 and 2010. I directly compare the characteristics of the two groups by creating distributions from kernel density estimates. The distributions illustrate the differences between the Mexican immigrant who chooses or "self-selects" to enter the U.S. and those who choose to remain in their native country.

**Mentor:** Ranjan Shrestha, Economics

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**PARENTS INVOLVED IN COMMUNITY SCHOOLS V. SEATTLE SCHOOL DISTRICT NO. 1 ET AL. (2007): RACE-BASED ASSIGNMENT PLAN.**

**Brittany Savoy**

**Session 3.2, UC 327, 1:40 PM**

The Fourteenth Amendment promises all citizens of the United States equal protection of the laws, but it's not always clear how equal protection is accomplished. In the U.S. Supreme Court case *Parents Involved in Community Schools v. Seattle School District No. 1 et al.* (2007), the districts in question were challenged for programs that allocated entry into public schools based on race in order to "balance" the composition of the student body. The Seattle School District argued that its race-based assignment plan was to prevent the unconstitutional practice of racial segregation and to assure racial diversity in schools. In a 5-4 decision the court ruled in favor of Parents Involved and found both programs unconstitutional. The study of constitutional law sheds light on how different interpretations of the Equal Protection Clause can be construed and affect the legality of something like Seattle's assignment plan. The significance of this case, which I intend to highlight, is not in the decision itself but in the differentiation between the majority and dissenting interpretations of the precedent Equal Protection case *Brown v. Board of Education* (1954). The majority in Seattle held that *Brown* completely forbade race-based admission into schools under the Fourteenth Amendment, whereas the dissent argued that *Brown* promised to make racially integrated schools available. Because a court can take the same precedent case and still come to radically different conclusions, I will in my presentation analyze the facts and reasoning of each side and conclude with which I believe to be correct.

**Mentor:** James Lopach, Political Science

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**WIKILEAKS AND THE AGE OF DATAJOURNALISM**

**Devin Schmit**

**Session 1.5, UC 332, 9:00 AM**

The whistleblower website WikiLeaks is changing world politics in profound new ways. Within the past year, the site has posted four massive information leaks, including classified war reports from Iraq and Afghanistan, as well as thousands of secret diplomatic cables. Several major newspapers have published stories based on the data in the leaks, giving the once unknown site significant exposure. For journalists, leaked information can be a double-edged sword. The U.S. Government routinely condemns the data release, claiming that it puts innocent lives and military assets in jeopardy. WikiLeaks says the opposite, claiming that the information it publishes has been verified and vetted by volunteers to avoid putting lives in danger. This conflict of interests creates tremendous responsibility for journalists—who must weigh the competing interests of disclosure in the public interest versus government secrecy. I will use the program Prezi for a presentation that will lead viewers piece by piece through a diagram that explains journalism's responsibility regarding WikiLeaks disclosures. As a whole, the diagram will move like a flowchart, illuminating journalists' decision-making process while also exploring viewpoints from past leakers, U.S. officials and media outlets. Different media outlets have handled the leaks differently. American media have been forced to tread lightly around the leaks, while foreign newspapers have used the data in its entirety. This era of "datajournalism" has created a new ethical standard in journalism—in which reporters must understand the gravity of publishing incriminating, classified data on a level that transcends international borders.

**Mentor:** Carol VanValkenburg, School of Journalism

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**BEHIND THE HARD FACE OF HOMELESSNESS**

**Kirsa Shelkey and Chad M. Hall**

The basement of the Poverello Center, familiarly known as the Salcido Center, is a communal daytime space that caters to homeless and transient folks, and really anybody in Missoula wishing to escape the elements and with no where else to go. The Center is unique in that it is non-discriminatory, even against those who may be under the influence of alcohol. Though this is a brash assumption, when the term homelessness is mentioned, a mental image of an individual with specific characterizations is often conjured along with it, and in most cases, in at least appearance, the clients of the Salcido Center play into this image. However, after having spent some time with these folks, it is apparent that these clients are people in the sense that all people are people, with faults and successes and have often found themselves in their current situations for specific reasons. In essence, our basic research question is, who are the people at the Salcido Center? What trends exist among them that they make use of the services the Sal offers, namely a communal space? We have applied these basic questions to different societal groups, as we have seen fit, in order to find more accurate information through the lens of our question. These groups include veterans, Native Americans, those with mental illness, youth and women. Through countless informal conversations, oral histories and observations, we have identified these trends in the hope of better understanding the backgrounds and needs of the population that uses the Salcido.

**Mentor:** Daisy Rooks, Sociology

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**DIAMONDS IN THE ROUGH**

**Kirsa Shelkey**

**Session 3.6, UC 333, 2:40 PM**

The research conducted in this paper examines the diamond mining permit held by Korean C & K Mining in Cameroon's Eastern Province, and the company's relationship with the government, as well as the many other actors with legitimate claims to the same land. With a complete lack of transparency in the sector, poor governmental capacity, dedication and incentives for company oversight, a high level of secrecy in terms of C & K Mining, and the complete lack of an informed and connected civil society, it is the finding of this paper that diamonds will only play into the resource curse. Furthermore, it will be the local communities that will bear the largest costs associated with diamond exploitation, as they will receive no economic benefit and will lose their land, livelihoods, and, for the indigenous Baka, their culture. Legal land ownership and property rights matter, as does good governance, but where all land resources legally belong to the state, and the state is characterized not by the people, but by a bloated crony-styled bureaucracy, the law of the land is, literally, government expropriation and re-appropriation to the entity that will garner the most economic rent. In this way, local communities have no real economic or political bargaining power. In terms of the current state of Cameroonian affairs, coexistence and universal benefit from diamonds at Mobilong are highly unlikely. Instead, what is more likely is the eruption of conflict between the various actors and the further marginalization of the land and those local communities that live off of it.

**Mentor:** Jill Belsky, College of Forestry and Conservation

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**AUTHENTICITY AND WHAT IT MEANS TO GOGOL BORDELLO**

**Shannon Söderlund**

**Session 3.1, UC 326, 1:40 PM**

Gogol Bordello is a self-proclaimed “Gypsy-punk” band. The band’s leader, Eugene Hütz, emphasizes the “realness” of his music while challenging the authenticity of other syncretic musics (such as the broadly-defined genre of “world music”). However, Hütz’s legitimacy as a Gypsy musician has been challenged by Roma (Gypsy) individuals in his home country of Ukraine.

To evaluate these contested claims of authenticity, I examine Russian Gypsy music to determine why Hütz’s reputation is in question. I then draw upon the works of James Young, a philosopher at the University of Victoria, who studies the aesthetic and moral implications of cultural appropriation. Young’s theories will serve as a background in my analysis of Gogol Bordello. While traditional definitions of music are valuable and must be considered, it is presumptuous to assume that these definitions are the only ones that matter. As information sharing increases contact between world cultures, conceptions of music as a cultural expression should be open to change.

**Mentor:** James Randall, Music

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**MWTC TRADE MISSIONS**

**Katie Spika**

**Session 1.1, UC 326, 10:20 AM**

There are many reasons why companies don’t export, including lack of market knowledge and uncertainty over foreign regulations. Trade missions are designed to help companies overcome some of these obstacles. While previous export research has focused on determinants of export success or the effectiveness of export promotion programs, this research examines factors that contribute to export success for companies participating specifically in trade missions organized by world trade centers. Through a survey administered by the author to past participants of Montana World Trade Center trade missions, this study analyzes four separate factors and their role in the success of a trade mission: prior export knowledge, market-specific knowledge, follow-up activities, and the services provided by a world trade center. The success of a mission is measured in both objective and perceptual terms, including the number of business contacts made, growth in export sales, and the degree to which a firm’s objectives for participating in the mission were met. The results of this study will indicate what services a world trade center can offer to improve the export performance of participants in trade missions. In addition, the results will allow the Montana World Trade Center to measure the value of the services it offers to its clients.

**Mentor:** Klaus Uhlenbruck, Management and Marketing

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**DISTRIBUTION AND HABITAT CHARACTERISTICS OF BEAVERS IN THE UPPER CLARK FORK RIVER BASIN**

**Luke Stapler**

**Session 1.4, UC 331, 10:20 AM**

The Upper Clark Fork River Basin (UCFRB) is the largest Superfund site in the United States; the State of Montana is now in the process of remediating the damage following 100 years of mining from Butte westward. In order to develop reclamation plans, current conditions need to be clarified. Wildlife normally found in such riparian zones can be used as indicators of current conditions and provide a useful metric for success of remediation efforts. Beavers were one species that were historically abundant in this and similar ecosystems, but have appeared to decline over the past many decades. Beavers are an important species by serving as ecosystem engineers in such riparian ecosystems. Ecosystem engineers are animals that create or modify habitats. The purpose of this study was to determine how much beaver activity there is in the UCFRB between Warm Springs and Turah, Montana, and what the environmental characteristics of beaver habitation are in the UCFRB. We identified beaver activity by floating the river and marking the GPS coordinates for each active beaver lodge. We then determined which habitat characteristics are important for beaver occurrence by comparing 7 habitat variables which described topography, vegetation, and stream characteristics at 19 active beaver lodges and 22 random sites. Using an Analysis of Variance (ANOVA) to determine which characteristics are significantly different between active and random sites, we developed a predictive model for beaver activity. This research established a baseline of beaver activity throughout the UCFRB, and it identified which habitat characteristics are associated with beaver habitation in the UCFRB. Documenting their current populations will serve as a baseline to see how restoration affects river health and the expansion of this species.

**Mentor:** Kerry Foresman, Department of Biological Sciences

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**SOCIAL DESIRABILITY BIAS EFFECTS ON THE UNDERREPORTING OF TRANSPHOBIA**

**Brandon Stewart**

**Session 5.6, UC 333, 4:20 PM**

Hill and Willoughby (2005) questioned whether self report questionnaires could accurately measure attitudes and behaviors related to transphobia. Because self report measures are susceptible to social desirability bias, it is unclear if individuals underreport transphobic attitudes and behaviors. Using an experimental design to control for social desirability bias, it is predicted that a significant difference will exist between two groups of college age participants in the reporting of transphobic attitudes and behaviors. A total of 160 undergraduate students will participate in this study, with approximately half randomly assigned to an experimental condition designed to minimize social desirability bias. A deceptive paradigm, known as the bogus pipeline will be used to incentivize participants to be truthful in their reporting of transphobia. Participants will complete a standard demographic questionnaire and the Genderism and Transphobia Scale. Previous data collected from 170 undergraduate students indicated that participants in the experimental condition reported more homophobic behaviors ( $M = 20.74$ ,  $SD = 3.67$ ) than participants in the control condition ( $M = 19.80$ ,  $SD = 2.64$ ), a difference that approached statistical significance ( $p = .082$ ). For this study, we will enhance the saliency of the experimental manipulation, and we expect to find that participants in this condition will report significantly more transphobic attitudes and behaviors. The results are expected to show that social desirability bias may influence people's reporting of transphobia. This is the first experiment to investigate the influence of social desirability bias on the reporting of transphobic attitudes and behaviors.

**Mentor:** Bryan Cochran, Psychology

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**CHOLINERGIC CONTROL OF NEUROLOGICAL FUNCTION: DISSECTING THE PUZZLING PATHWAYS INVOLVED IN LEARNING, MEMORY, AND MOVEMENT**

**Kurt Stoll**

**Session 1.2, UC 327, 9:40 AM**

**PURPOSE:** Acetylcholine (ACh) is a neurotransmitter in central and peripheral nervous systems involved in learning, memory, and movement. Previous studies have shown abnormal phenotypes, such as hyperactivity and cognitive deficits, in mice lacking specific types of acetylcholine receptors. Because of the diverse distribution of acetylcholine receptors, our ability to investigate specific neuronal pathways has been limited. One approach is to target a specific subset of cells expressing acetylcholine receptors through transgenic recombination. Using this approach, we have successfully generated a mouse line, the PV-CRE/FM1 mouse, which is deficient in M1 acetylcholine receptors on parvalbumin (PV+) positive cells, which will allow for specific investigation of acetylcholine functioning in this key subset of inhibitory cells.

**METHOD:** Utilizing state-of-the-art animal tracking software, abnormal hyperactivity and/or cognitive deficits, if present, can be detected in homozygous PV-CRE/FM1 mice compared to a wild type control group.

**ORIGINALITY:** Global M1 knockout mice have shown a number of abnormal phenotypes, including hyperactivity and cognitive deficits. With transgenic recombination, M1 receptors can specifically be eliminated from PV+ inhibitory cells, which will allow the examination of specific M1 mAChR and their effects across specific neuronal pathways.

**SIGNIFICANCE:** Understanding the neurological pathways involved is essential in targeting and treating neurological disorders such as Parkinson's disease, Alzheimer's disease, and epilepsy. Examining the PV-CRE/FM1 mice may allow for another puzzle piece to be added to the complicated pathways of the cholinergic system and bring forth innovative treatments to be implemented in patients suffering from these devastating neurological diseases.

**Mentor:** Josh Lawrence, BMED

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**MUSCLE MORPHOLOGY AND LOCATION AS AN INDICATOR OF FUNCTION IN THE PIGEON**

**Weston Vik**

**Session 1.4, UC 331, 9:00 AM**

We undertook this study to test a current hypothesis that, during locomotion, proximal, parallel-fibered muscles maximize work whereas distal, pennate muscles maximize isometric force. Using pigeons (N = 2) in different modes of flight (ascending, level, descending), we test two muscles for comparison against the pectoralis (PECT). The PECT is a large, proximally-located parallel-fibered muscle, known from previous work to be the primary source of work and power during downstroke. The scapulohumeralis caudalis (SHC) is a parallel-fibered muscle, proximal muscle that retracts and elevates the humerus. The extensor metacarpi radialis (EMR) is a small, pennate, distal forelimb muscle of the pigeon forelimb that functions in extending the wrist. We measured timing of motor-unit recruitment using electromyography and instantaneous length using sonomicrometry. Our results support the hypothesis that location and morphology of a muscle is indicative of its function. The proximal, parallel-fibered SHC underwent strains (relative length change) of 26% -30%, similar to those of the PECT (30% -38%). The distal, pinnate EMR underwent considerably less strain (11% -16%) in all modes of flight. Strain in the EMR was larger than what has been considered isometric in studies of terrestrial locomotion, which may indicate that the function of muscle is constrained in part by the substrate (air versus ground). Supported by NSF IOS-0923606 and IOS-0919799.

**Mentor:** Brett Tobalske, Division Of Biological Sciences

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**CREATING A NEW HYBRID AGILE METHODOLOGY FOR SOFTWARE DEVELOPMENT**

**Kristian Walker**

**Session 1.5, UC 332, 10:40 AM**

An Agile Methodology is a set of pre-defined steps which define the process of creating a new piece of software. These methodologies are becoming increasingly more popular over traditional ones but still have their own limitations. The purpose of this research is to examine these standards and define a new hybrid methodology which will benefit software development within today's industry. The methods used to produce this research included taking previous case studies on companies who use agile development techniques. This allowed us to look at which of their projects were unsuccessful and see which parts of the agile process caused them to fail. Also we looked at the theory and concepts associated with each agile method, in order to understand how they could be improved. The originality of this research is that although there have been many studies and papers produced on what makes up agile methodologies, little research has been produced on ways in which the core elements of these different methodologies can be integrated to produce new, more powerful standards. The significance of this research is that it opens up the field for computer scientists to expand on this research and create new methodologies.

**Mentor:** Min Chen, Computer Science

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**ETHICAL ISSUES AS AN EMERGENT PROPERTY OF UBIQUITOUS COMPUTING AND THE ROLE THAT COMPUTER SCIENTISTS PLAY**

**Kristian Walker**

**Session 3.2, UC 327, 2:20 PM**

Ubiquitous Computing is the way in which Human Computer Interaction is integrated in our day to day lives. It is one of the fastest growing areas of computer science, which currently exists within many forms and contexts in today's society. Our day-to-day lives are surrounded by ubiquitous computing, which raises certain ethical questions and dilemmas that need to be answered. The purpose of this research is to show some of the ethical issues and challenges that face not only end-users, but also computer scientists that build these systems especially as they strive to build larger systems with increased levels of integration inside our day-to-day lives. This research presents a basic framework, from which computer scientists can expand and create more solutions and develop systems which overcome these issues and dilemmas. The method used to complete this research involved looking at current examples of ubiquitous systems already integrated in our lives. By looking at these systems, and analysing the issues and lawsuits arising from these types of systems, a set of best practices has been created to be used by computer scientists to help mitigate these issues in the future. Research has been done on ubiquitous computing before in this area, however the significance of this research is that the solutions presented here consist of results based on a broad culmination of topics.

**Mentor:** Michael Cassens, Computer Science

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**THE DANGER OF LANGUAGE CORRUPTING THOUGHT**

**Ashleen Williams**

**Session 1.6, UC 333, 9:40 AM**

George Orwell, whose political writings emphasized the pervasiveness of injustice, claimed in 1984 “War is peace. Freedom is slavery. Ignorance is strength.” This research project is an analysis of the authoritarian regime governing the Kingdom of Saudi Arabia, and its policies. Orwellian political philosophy has often been equated with dystopian political theory. One can use his critique of ambiguity in language, the relationship between power and enforcement mechanism, and his view of human relationships to analyze the policies of Authoritarian states. Using Orwell’s critical approach to politics as evaluation criteria, I analyzed the use of technology, gender relations, law enforcement mechanisms and the use of language within the Kingdom. Ultimately this research sought to address the question of what the international and domestic implications are for a regime exercising policies that Orwell sought to warn mankind against.

This project focused on how elements of the Orwellian dystopian vision have seemingly reappeared in the Kingdom of Saudi Arabia. The Kingdom of Saudi Arabia’s strict interpretation of Islamic law, and its government’s pursuit of an ideal Islamic society through regulation, as well as the use of technology were used to evaluate elements of the regime. Using personal accounts of citizens from Saudi Arabia, current news articles, and primary documents provided by the Royal family, I was able to evaluate the regime and address some of the implications for its long term stability. An exploration of authoritarian ethics and dystopia has led to a better understanding of the causes for a potential revolution in the Kingdom.

**Mentor:** Ramona Grey, Political Science

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**FLIGHT: AN EXPLORATION ON THE GROUND AND IN THE AIR**

**Megan Wiltshire**

**Session 3.1, UC 326, 2:00 PM**

Cirque du Soleil, circus arts, and aerial movement are becoming more and more popular within contemporary cultures. Many dance companies, as well as theatre companies around the country are beginning to incorporate aerial movement into their movement repertoires. This last wintersession, I had the opportunity to explore and practice the art of aerial dance. Under the supervision of professional aerialist Holly Rollins, I trained for and choreographed a solo performance focused on the concept of flight and incorporating aerial dance trapeze movement. This presentation will show video footage of the performance, as well as an in-depth discussion of my process of learning this form of movement that has never been explored at the University before. With the introduction of aerial dance to the School of Theatre and Dance, it will provide an opportunity for the performers to experience another art form that is becoming prevalent in the performance world. It will give students the opportunity to acquire another skill for their resumes, as well as a chance to experience a type of performance that is happening across the country. Having Holly present and having the opportunity to work with her has been an incredible opportunity, and I'm eager to share the experience with a larger community.

**Mentor:** Ezra LeBank, Drama

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**K-12 FACTORS THAT AFFECT A STUDENT'S DECISION TO OBTAIN A MATHEMATICS DEGREE**

**Brittany Wolf**

**Session 5.6, UC 333, 4:00 PM**

Over the years, the number of students seeking a career in mathematics (and STEM fields in general – science, technology, engineering, and mathematics) has decreased in proportion to other comparable countries (US House of Representative's Committee on Education and Labor, 2009). This means that as a nation we are falling behind in the technical world, and need to start finding out why. Specifically, if it is known what happens during K-12 grades to impact (positively or negatively) a mathematics major choice, teachers, administrators, counselors, and policy makers will be able to understand what they need to do to successfully encourage students to pursue a degree/career in mathematics.

The purpose of this research is to determine different factors that affect a students' decision to pursue a mathematics degree at The University of Montana. Of particular interest are the factors relevant to K-12 education, such as curriculum, teacher's relationship with the students, participation in extracurricular math and science related activities, overall grades, etc.

Surveys were used to collect data. Anonymous surveys were given to students who enrolled in, and attended one of following mathematics courses (M 135, 136, 105, 151, 171, 326, and 429) in the spring of 2011 at The University of Montana. These different mathematics courses were chosen to target different majors – mathematics majors, elementary education majors, non-mathematics & non-education majors (Humanities, Liberal Arts, etc). Descriptive and linear regression was used in data analysis SPSS software.

**Mentor:** Ke Norman, Mathematics

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**DATA MINING AND THE NON-PROFIT**

**Crystal Wood**

**Session 1.5, UC 332, 9:20 AM**

Data mining is the process of using a scientific approach in identifying patterns from large data sets. This approach to data analysis supports customer relationship management, an organization's efforts to understand and provide enhanced service to its most important customers. Data mining is used by many organizations today and non-profit agencies have discovered the benefits to utilizing this scientific approach in their marketing efforts and projections. Drawing on existing empirical academic writings and research by UM faculty, as well as other documented research, this paper examines what data mining is and how non-profit agencies can utilize this approach in donor profiling. As a result of this analysis, the pros and cons of data mining are identified. Additionally, the relationship between how non-profit agencies use this data analysis to target fundraising opportunities and the effectiveness of this approach is examined.

**Mentor:** Jakki Mohr, SoBA: Marketing

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**CONSTITUTIVE IDENTITY AND THE EVOLUTION OF TRIBAL SOVEREIGNTY**

**Jacob Yerger**

**Session 5.5, UC 332, 4:00 PM**

As it pertains to Native Americans, the tension between the law and society has, over time, resulted in significant political and legal consequences. My paper examines the evolution of tribal sovereignty under federal law in an attempt to uncover some of the prevailing historical causes of the unique status of Native Americans under the law, and how history has played its role in determining social conditions on tribal lands. I maintain that the rhetorical construction of European self-identity contributed to the perception of native peoples as existing apart from white society in the United States from the colonial era onward. Work by several scholars of rhetoric and political discourse is presented to demonstrate how the collective self-identity of a people can be constituted through discourse, and how that discourse can determine the actions of a given people. The work of Maurice Charland, who first edified the theory of constitutive rhetoric, is given primacy in this discussion.

In the case of Europeans in North America, a discourse which promoted the primacy of the colonizing nation, combined with the hostility of Native Americans to the establishment of colonies on the Atlantic coast, led to a perception that native peoples existed at odds with civilization. Examination of US Supreme Court decisions, legislation enacted by Congress, and the experiences of Native Americans as documented by historical case study demonstrate that this attitude remained intact after Native American lands became part of the United States. Statistical data and other scholarly work suggest that this perception is partly responsible for the social conditions in which Native Americans now live.

**Mentor:** Dan Flores, History

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**SHOW ME THE MONEY: ASSESSING FINANCIAL CONTRIBUTIONS OF MILLENNIAL DONORS**

**Victoria Zimmer**

**Session 1.1, UC 326, 9:40 AM**

The millennial generation, born between the 1980's and 1990's, is an understudied population in terms of financial contributions to charitable non-profit organizations. National studies show that this generation is civically engaged despite commonly held misperceptions. As the millennial generation matures, they will become increasingly important for the viability of the nonprofit sector. This study assesses various aspects of financial contributions of Missoula millennial donors to determine how the local nonprofit community can more effectively target this population. This study uses in-depth surveys of approximately one hundred randomly selected University of Montana student millennials who are 18 years-old or older. The survey questions are designed to examine Millennial donation and communication preferences. Students were asked about their financial contributions and about their preferences for solicitation. This information will be used to compare the regional Missoula data to similar national studies. Understanding how to engage the millennial population is increasingly critical to nonprofit organizations that seek to use donor segmentation as a means of building and maintaining a donor base.

**Mentor:** Andrea Vernon, Office for Civic Engagement, Davidson Honors College

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# ABSTRACTS: POSTER SESSIONS

Poster Presenters Available 11:00am to 12:00pm and 3:00pm to 4:00pm  
UC Ballroom  
(in Alphabetical Order by Presenter's Last Name)

## NOISE-INDUCED HEARING LOSS IN STUDENT MUSICIANS

**Christina Asbury**

Only recently have a number of definitive studies been published that have provided evidence that playing of musical instruments has been linked to noise-induced hearing loss (Emmerich, Rudel, & Richter, 2008; Phillips, Henrich, & Mace, 2010; Miller, Steward, & Lehman, 2007; Phillips, Shoemaker, Mace, & Donald, 2008). Both musicians and guardians of children that play musical instruments should be informed of this as well as be offered professional counseling and an educational program of hearing conservation strategies. In the University environment there is no uniform awareness of hearing loss among both professional and student musicians. Different performance venues such as football stadiums for marching bands, performance halls, and practice rooms are used by musicians and produce different types of acoustic exposures. This study will measure the pure tone hearing thresholds of student musicians at The University of Montana. An analysis of these pure tone thresholds (the pure tones are 250 Hz, 500 Hz, 1000 Hz, 2000 Hz, 3000 Hz, 4000 Hz, 6000 Hz, and 8000 Hz, and a threshold is defined as the softest possible decibel level at which the one can detect the tone) as well as the responses on a questionnaire will be used to ascribe any hearing deficit to practice, type of instrument, years of playing, age, etc variables. Students that are given a hearing test will be apprised of any hearing loss and given counseling regarding any hearing loss that is found and hearing conservation advice. This study has been approved by The University of Montana Institutional Review Board (IRB).

**Mentor:** Al Yonovitz, Communicative Sciences and Disorders

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## LOCAL VS. DISTAL THRUST PLATES AS SOURCES OF INDIANOLA CONGLOMERATE, EAST-CENTRAL UTAH

**Billy Backer, Patrick Doyle, and Anne O'Reilly**

The Sevier orogeny was active from late Jurassic to late Cretaceous time and formed in response to eastward subduction of the Farallon Plate beneath the North American Plate. The Late Cretaceous was a time of significant synorogenic sedimentation in east-central Utah where the Indianola conglomerate is located. This conglomerate is interpreted to have been deposited during this synorogenic phase of sedimentation. We hypothesize that synorogenic sediments were deposited in response to local deformation and from deposition of coarse clastics derived from other parts of the fold-thrust belt and transport parallel to structural strike. In this study, we seek to investigate the relative importance of local vs. more distal thrust plates as the source of the synorogenic conglomerate. We anticipate that sediment derived from different parts of the fold-thrust belt will have different compositions and different paleoflow indicator directions. We expect documentation of the conglomerate clast composition and stratigraphy to reflect provenance, paleocurrent dispersal patterns and to yield information about the source of the synorogenic sediments.

**Mentor:** Marc Hendrix, Geoscience

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**GENERALIZATION WITHIN SOUND CLASSES DURING CYCLES PHONOLOGICAL REMEDIATION APPROACH**

**Ann Bugni and Christina C. Pagel**

Phonological disorders affecting production of speech sounds are prevalent in the preschool and school-aged population hindering their speech intelligibility and ability to communicate clearly. Clinicians have multiple approaches available to choose from while treating these disorders, yet research providing evidence of efficacy is not readily available. The current study specifically examined the effectiveness of the Cycles Phonological Remediation Approach by analyzing data collected from the treatment of two preschool aged children with phonological disorder. The participants were seen for treatment twice a week over a six month period. One speech sound was selected to be targeted over the course of two sessions before moving on to a target from a different speech class. The change of treatment target was not dependent on the client's success in previous sessions. A weekly test (probe) was administered involving 50 non-practiced words representing all of the sound classes. During the study 27 probes were collected over time to chart the correct productions within each sound class. The change in accuracy of untreated productions compared to the weekly selected treatment targets was examined to determine generalization within sound classes. The results of this study will provide evidence for the success of generalization during Cycles treatment and help to establish the efficacy of its use in clinical practice.

**Mentor:** Amy Glaspey, Communicative Sciences and Disorders

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**USING MIXED LISTS FOR SPEECH DISCRIMINATION TESTING IN CHILDREN WITH THE WORD INTELLIGIBILITY BY PICTURE IDENTIFICATION – REV 2 (WIPI)**

**Krista Bushman**

The Word Intelligibility by Picture Identification (WIPI) test is one of the most widely used tests of speech discrimination in children with impaired hearing. The WIPI is a closed set test with 25 picture frames. Each picture frame has six different pictures of objects familiar to children. Children hear the carrier phrase "Point to" followed by the test word (one of the six pictures). There are four independent lists. The test is normally delivered under calibrated earphones and uses a test booklet. This study is unique in the manner of test presentation and the number of lists that may be presented. The 25 test frames have been scanned and incorporated into a PowerPoint presentation. The four individual test lists are presented in this manner. In addition, four unique additional test lists have been constructed that represent a completely different ordering of the 25 words. All lists (8) are presented with the addition of white noise. The word stimuli are presented under earphones at a comfortable listening level. This noise adds a significant distortion and prevents children from scoring 100% correct. The data is analyzed by comparing the equivalency for the 8 lists. The new lists are representative of many other lists that may be constructed. This method of providing additional and equivalent lists will aid in auditory diagnosis when more than 4 lists are needed in assessments.

**Mentor:** Al Yonovitz, Communication Science and Disorders

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**DETERMINING BIGHORN SHEEP MATERNITY WITH MOLECULAR GENETIC TECHNIQUES:  
A POTENTIAL TOOL IN THE EXPLORATION OF PNEUMONIA OUTBREAKS**

**Mariah Childs**

Pneumonia epidemics are responsible for local population die-offs in bighorn sheep (*Ovis canadensis*) throughout the western United States. One reason pneumonia has such a strong, negative effect on the population growth of bighorn sheep is that lamb survival can be low for several years following the epidemic. Scientists are currently trying to stop this trend by conducting studies, such as vaccination trials, on ewe-lamb pairs. In these experiments correctly establishing maternity within the population is important. The purpose of my research project was to assess the effectiveness of genetic methods to identify the mothers of lambs. Using genetic methods could eliminate the high uncertainty of assigning maternity based on observation of ewe-lamb behavioral interactions. I worked with 40 blood DNA samples provided by Dr. Dan Walsh of the Colorado Division of Wildlife which came from the Foothills Wildlife Research Facility (FWRF) Herd. I used the polymerase chain reaction to amplify and genotype 22 microsatellite DNA loci (locations in DNA that have a high mutation rate and can thus be used to determine relatedness between individuals). Then I used a probability of exclusion formula to determine the power of the microsatellites to correctly exclude false parents. Based on literature research I established that the microsatellites would have enough power to be used in further studies if the probability of exclusion was greater than 95%. Later my genetic-based maternity assignments will be compared to those already determined for the captive herd in order to test this experiment empirically.

**Mentor:** Gordon Luikart, DBS

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**FACTORS UNDERLYING VEGETATIVE COMMUNITY DISTRIBUTION IN A NORTHWEST MONTANA FEN**

**Bridger Cohan**

Ambrose fen in the Flathead valley of Northwestern MT displays an array of vegetative community types, including carr (peat shrubland), dwarf carr and spruce swamp forest. These communities are distributed in an array of stripes and islands, all growing on a large mat of waterlogged peat moss and peat-based soil. The observed heterogeneity in vegetation is of interest because it does not appear to be linked to differences in soil moisture or elevation, factors which often strongly influence plant distribution in the region. I hypothesized that alternate environmental factors such as soil pH, bulk density or nutrient content are instead responsible for determining the distribution of the plant communities. During the spring and summer of 2010 I collected data on these variables at 9 sites across the fen, including at least 2 sites from each main community type. In addition, I measured the water content (by percentage weight) of the soil at each site, to attempt to prove or disprove my null hypothesis that soil moisture was determining community distribution. I also quantified the relative abundance of each species present at each site using quadrat surveys. The abundance of vegetation (both as individual species and as groups – e.g. sedges) at each site was then correlated with each soil variable.

No one variable explained the distribution of the plant communities in Ambrose fen, but a few interesting trends were observed. For example, increased soil solution conductivity (used as a proxy for levels of nutrient ions) was positively correlated with the percentage cover of shrubby species, with an R<sup>2</sup> value of .694. This relationship warrants further investigation to determine its true strength and to attempt to locate the source of the differences between nutrient levels at the sites. Further, any connections between soil variables and plant distribution are potentially important for conservation because the fen contains several rare species whose preferred habitat may decline or vanish if these variables shift.

**Mentor:** John Maron, Division of Biological Sciences

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**THE RELATIONSHIP BETWEEN MISSOULA'S DOWNTOWN BUSINESSES AND THE HOMELESS COMMUNITY**

**William Crabtree**

This research focuses on the relationship between homeless or residentially displaced individuals and members of the larger community, particularly business organizations. To better understand how business organizations and the homeless coexist in a community, I use a survey questionnaire distributed in person to business operators to assess specific factors relating to businesses in the downtown area of Missoula. The survey includes questions about business characteristics such as the type of business, the age of the business, and the characteristics of a business's patrons. I also examine a business's proximity to areas with higher concentrations of homeless individuals, and a business's proximity to homeless or food insecurity services. I hypothesize that these characteristics will influence how business operators perceive displaced people, the problems and resources related to homelessness, and the approach to finding solutions for homelessness. I also address other community factors such as street changes, traffic issues, various crimes, and the influence of college students on a community. A preliminary analysis of the results shows that characteristics of business organizations are correlated with preferred solutions to the issue of homelessness for a community. I explore possible suggestions for finding community-based solutions that work.

**Mentor:** Kathy Kuipers, Sociology

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**MEASURING VOCAL JITTER: CONTINUOUS SPEECH VS SUSTAINED VOWELS**

**Mollie Driscoll**

Vocal jitter is the cycle to cycle variation in the vocal output of voiced speech sounds. It is a measure that explains normal human voice quality and has been shown to be indicative of specific voice pathology. The purpose of the proposed research is to determine if using a throat microphone can allow professionals to accurately measure jitter values for conversational speech. Typically, jitter values are measured with patients sustaining an elongated vowel. In this research, participants will have a throat microphone attached to the front of their neck. The throat microphone is a small, flat circular object in the middle of a band that Velcro's around the neck. Simultaneously, the participants will speak into a microphone near their mouth. Participants will be asked to say ten isolated vowel sounds for an extended length of time. Next the participants will be asked to read a short passage. All of the above tasks will be performed with the throat microphone and the voice microphone. A computer will record vocal output during their speech tasks. The analysis will measure the vocal jitter at the level of the larynx (throat microphone) and the recorded speech (voice microphone). It is hypothesized that during phonation of the sustained vowels the fundamental frequency or jitter values will be the same or extremely similar. It is also hypothesized that during the reading passage that jitter measures will be a more realistic measure with those obtained using the throat microphone. This study is meant to contribute to literature on the study of vocal jitter measures.

**Mentor:** Al Yonovitz, Communicative Sciences & Disorders

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**HEAD-GROUP DEVELOPMENT OF NOREPINEPHRINE AND SEROTONIN SPECIFIC INHIBITORS WITHIN THE HUMAN BRAIN**

**Tyler Ellis**

The development of piperazine and isoquinoline head groups as precursors were used to create a new class of both serotonin and norepinephrine specific binding proteins which worked with both pain management as well as depression. Compounds must be reacted, purified, and checked through various spectroscopy methods, such as: Mass Spectrometry, NMR, and Thin Plate Chromatography. The methods for synthesis involve many steps of creating a reaction, letting it run, quenching said reaction, doing the work up to rid the reaction of any excess acid/base, and stripping the reaction of solvent on a Roto-vac. These compounds are synthesized as the starting point for exploration into which precursor/ligand combination which will bind most efficiently through analysis of binding assays. This was done in both rat and monkey brains, in preparation for human brain. PET imaging can be used to detect the receptor protein levels in live subjects. This shows real-time results of the synthesized drugs, allowing the question of which is more efficient, to be answered. Currently there is no "Industry standard," for serotonin specific or norepinephrine specific binding proteins, this development would allow for each to be further synthesized.

**Mentor:** John Gerders, B-Med

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**THE DEPOSITIONAL ENVIRONMENT(S) OF THE CASTLEGATE SANDSTONE,  
BOOK CLIFFS, EAST-CENTRAL UTAH**

**Josh Erickson**

The Castlegate Sandstone is located in east-central Utah and interpreted to be a deltaic deposit formed in the Cretaceous Interior Seaway between 72 Ma and 77 Ma. The seaway was formed by the tectonic loading of the Laramide orogenic belt. The Castlegate is bounded by a sharp unconformity and it is interpreted as a regressive system. As such, we hypothesize that the Castlegate will reflect an upward-shoaling series of paleo-environments. We anticipate observing upward-coarsening and upward thickening of sandstone beds and a suite of sediment structures with trace fossil constituents with overall upward shoaling. To test this hypothesis we will document the strata and sediment of the Castlegate through a series of measured sections.

**Mentor:** Marc Hendrix, Geoscience

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### **INTERGENERATIONAL TRANSMISSION OF CHILD PHYSICAL ABUSE**

**Kassandra Gahagan, Sarah Anderson, Maureen Bjerke, and Julie Walsh**

Research establishes a relationship between personal childhood history of abuse and child abuse perpetration. This study implements a multiple regression analysis of factors that may moderate this relationship. We examine parents' educational level and responses to one question on the Child Guidance Interview (CGI). The CGI proposes hypothetical situations to parents in which their child misbehaves, and requires them to describe their likely reactions. Responses are coded as "adaptive" or "maladaptive". Thirty archival clinical files on parents in western Montana were used. The archival data includes demographic information about the parents' education level. Research shows that a low level of education increases the risk for committing child abuse. However, it is unknown whether these factors increase abuse risk in parents with their own abuse histories. This study will provide information that may help reduce the intergenerational transmission of child abuse. Maladaptive responses by parents, in addition to lower education levels, may contribute to predicting child abuse in those who have a personal history of abuse. If this is shown, prevention programs targeting parents abused as children might encourage additional general education and/or target the reduction of maladaptive parental practices.

**Mentor:** Paul Silverman, Psychology

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### **GLEN CANYON DAM VS. COLORADO RIVER**

**Caleb George**

Since the construction of Glen Canyon Dam, the Colorado River ecosystem has suffered a major loss in sediment deposition. From the time of the dam's completion in 1963 to the present, a tremendous amount of scientific work has centered on examining the altered processes of sediment transport and loss in this river system. Sediment deposition is an invaluable resource to the Colorado River ecosystem. Sand and other sediments flowing into the Colorado River are a necessary component in order to maintain a healthy equilibrium for physical and biological resources. In the last two decades, controlled flooding or HFE's (High Flow Experiments) at Glen Canyon Dam have been undertaken to address this problem. High Flow Experiments have provided scientific data on the long-term ecological and hydrological impacts of damming, with specific attention to the complex relationship between natural seasonal flooding and sand deposition of related tributaries that enter the Colorado River system at various points. How effective are HFE's in addressing the problem of sediment loss in the Colorado River? And are there other approaches to adaptive management that could better conserve and restore the Colorado River ecosystem below Glen Canyon Dam? This study aims to address these questions through a survey and analysis of existing sediment deposition and loss data available through the U.S. Department of the Interior, USGS Grand Canyon Monitoring and Research Center, and published scientific journals. In addition, this study draws on data and observations that were recorded in February 2011 during a three week field campaign on the Colorado River. The overall intention is to build an understanding of the complex relationships surrounding a dam and its management and the river ecosystem in one of the most highly controlled and regulated river corridors in the world.

**Mentor:** Sarah Halvorson, Geography

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### THE EFFECT OF PROTEIN STABILITY ON AN ELECTRON TRANSFER PROTEIN

Matthew Goldes and Bruce Bowler

Proteins are macromolecules essential to all living organisms. They consist of amino acids linked together by peptide bonds. The sequence of amino acids is important because it determines structure, which determines function. The function of a protein can be altered by mutation of the amino acid sequence. Mutations can also change the stability of a protein. The protein utilized in this project, known as cytochrome c (cytc), plays a key role in electron transport and is also involved in apoptosis (programmed cell death). The active site of cytc contains a heme group and the surrounding protein matrix is referred to as the heme crevice. My project involves the mutagenesis of human to spider monkey cytc and experiments that measure changes in local and global stabilities of both proteins and three intermediates created in the mutagenesis process. Using guanidine hydrochloride denaturation followed by circular dichroism spectroscopy, we have shown that the global stabilities of human and spider monkey cytc are similar, yet previous studies indicate that human cytc has greater local stability about the heme crevice than spider monkey cytc. We predict that the changes in local stability are due to certain mutations induced into the protein sequence. Continued experiments that measure this local stability will help pin-point the residues causing changes in local stability. With this information, we can determine the effect that the change in stability has on the dynamics of each protein variant, as it relates to the function of cytc in electron transport and apoptosis.

**Mentor:** Bruce Bowler, Chemistry/Biochemistry

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### FORMAL PACE OF TELEVISION OVER THE DECADES AND EFFECTS ON CHILDREN'S ATTENTION

Tawni Guisti

Television has a significant influence in people's lives today as it is used for entertainment and educational purposes. Since television programming began being streamed, hundreds of networks have been forced to compete for viewer's attention with the use of rapid pacing. Rapid pacing has proven to be effective in getting viewer's attention. I conducted a comparison study showing mainstream sitcoms from the 1950s up to the present because I am interested in how the pace (i.e., fades, cuts, zooms) has changed. I hypothesized an upward trend of faster pace across the decades. I compared family situation comedies aired in prime time that were readily available to children when viewing with their families. The sitcoms included: I Love Lucy from the 1950s, The Dick Van Dyke Show from the 1960s, Soap from the 1970s, The Cosby Show from the 1980s, Friends from the 1990s and The Office for the most recent decade. I looked at one-minute-intervals, which included minutes 2-3, 8-9, 16-17, and 21-22, to observe data samples on the formal pacing in four episodes from each television series. The results of this study will be a contribution to the literature in the way that formal pace can interfere with attention in very young children. I have defined what attention entails for comprehension while viewing television and show how the pace of images in television may impact children's learning.

**Mentor:** Lucy Hart Paulson, Communicative Science and Disorders

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**AUDIBILITY OF THE CRICKET, ACHETA DOMESTICUS, OBTAINED FROM AUDITORY EVOKED POTENTIALS**

**Bailee Guisti**

In crickets, auditory and vibratory communication is important in reproductive behavior, agonistic interactions, detection of predators and for acoustic orientation in the environment. In the cricket, the forelegs house the specialized tibial organs that comprise the tympanal structures. Much of the information regarding the auditory sensitivity of the receptors of the foreleg is the result of study of individual receptor cells. The whole receptor population of the tympanal organ covers the frequency range from at least 2k to 70kHz. Little information is available on the neuronal and physiological properties of the brain to acoustic signals. The purpose of this study was to record auditory evoked potentials on the surface of the cricket brain, *Acheta domestica*. Electrodes were placed onto the brain of crickets and signals were amplified and averaged over the range of 100 msec. Sinusoidal stimuli covered a range between 4 kHz to 48 kHz. Waveform morphology and input-output curves for the cricket will be shown.

**Mentor:** Al Yonovitz, Communicative Sciences and Disorders

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**INHALATION OF PURE AND PYROLYZED METHAMPHETAMINE EFFECTS LUNG INFLAMMATION**

**Sarah Hamblock, Mary Buford, Briten Postma, and Andrij Holian**

The illegal psychostimulant methamphetamine (MA) is the second most widely used drug in the world and causes serious side effects including lung injury and inflammation upon the increasingly common use of MA by smoking. Although MA has been reported to produce immunomodulatory effects, little is known regarding its direct effect on alveolar macrophages (innate immune cells of the lung). In this study, the effects of MA on alveolar macrophages in Balb/c mice were studied using in vitro and ex vivo experiments. Macrophages were collected by lavage 2 h after intranasal instillation of differing doses of MA (0-10 mg/kg body weight). The doses and route of exposure were chosen to mimic MA use in humans. Ex vivo studies indicated that with increasing MA dose and bacterial lipopolysaccharide stimulation, macrophage production of IL-1 beta increased, IL-6 decreased slightly, and tumor necrosis factor-alpha was constant, and macrophage viability was unaffected. These results were consistent with increased IL-1 beta and decreased IL-6 release in vitro following MA exposure. These results support previous studies showing smoking MA increases acute lung inflammation. The grants used to support this project are R25 E5016247 and P20 RR017670.

**Mentor:** Andrij Holian, The Center for Environmental Health Sciences

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## **SOUTHWARD SEDIMENT TRANSPORT OF THE PANTHER TONGUE PALEODELTA AND ITS CAUSES**

**Evan Hanson, Zachary Holyman, Maximilian Schuberth, and Maxwell Zoellner**

The Cretaceous Panther Tongue sandstone, part of the Star Point Formation, represents a more than fifty-kilometer long, north-south regression into the shallow waters of the western interior seaway. The Panther Tongue is well exposed and studied in the Book Cliffs area, east-central Utah. Its deposits are interpreted as a southward-prograding fluvial-dominated river delta with upward coarsening parasequences. Despite the north-south oriented western shoreline of the western interior seaway, paleocurrents indicate a southward sediment transport direction. This could be explained in three ways: (1) During the early stages of filling the basin, the deposition was parallel to the orogen, but the reduction in accommodation space by initial deposition of the Panther Tongue caused the delta to avulse to the south. A change in flow direction would suggest this. (2) A north-south oriented structural high east of the delta forced a shoreline parallel flow direction because sediment transport was confined to the paleo-low inboard of the proposed high. The indicator for this scenario would be paleoflow direction that reflect consistent southward transport and sedimentary structures and ichnofacies indicative of upward shoaling. (3) The third possibility is that the Panther Tongue represents a north-south-oriented spit that was reworked during the subsequent transgression. Lagoon-like environments as well as lacustrine sediments in the basal portion of the Panther Tongue would support this hypothesis. These three paleogeographic models will be tested by measuring and analyzing several stratigraphic sections and documenting paleocurrent flow directions, sedimentary structures (i.e. flow regimes, grain size), and ichnofacies along an east-west transect within the delta lobe.

**Mentor:** Marc Hendrix, Geosciences

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## **THE ROLE OF CLPP IN THE TRANSMISSION OF LYME DISEASE BACTERIUM**

**Megan Hatcher**

As *Borrelia burgdorferi*, the bacterium that causes Lyme disease, cycles between its tick vector and its mammalian host, various outer surface lipoproteins (Osps) are produced; some of these are required for transmission from the tick to the mammal. The outer surface lipoprotein OspC is one of the transmission factors that are produced once the tick begins feeding on the host. RpoS, a sigma factor, is required for OspC to be expressed during transmission. RNA polymerase transcribes genes, the first step in gene expression; sigma factors are the subunit of RNA polymerase that determines where transcription begins. In *B. burgdorferi*, RpoS is activated to transcribe genes that are required for transmission and mammalian infection. The production of RpoS is regulated at many levels, including transcription, translation, and protein degradation. In the model bacterium *Escherichia coli* and other bacteria, RpoS is degraded by the protease ClpXP. *B. burgdorferi* has homologs of ClpXP. Therefore, we hypothesize that ClpXP is involved in degrading RpoS in *B. burgdorferi* as part of the regulation of transmission; we predict that decreased levels of ClpP in a clpP mutant will result in increased levels of RpoS and OspC. I am constructing a null mutation in the clpP gene to further analyze the role of the ClpXP protease in the transcription of OspC and transmission. To date, significant progress has been made in constructing the clpP mutant. This will be the first test of the role of a protease in regulating transmission of *B. burgdorferi* from mammal to tick.

**Mentor:** Scott Samuels, Biological Sciences

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**COMPARING THE EFFECTS OF STATIC AND DYNAMIC STRETCHING ROUTINES ON SHOULDER RANGE OF MOTION AND PERFORMANCE**

**Karis Hawkins**

Historically, it has been thought that stretching prior to exercise reduces or helps prevent injuries. Most active individuals were taught to stretch statically before and after exercise. Recent research indicates that athletes who use a dynamic warm up before their events outperform athletes who use a static stretch. However, the existing literature is inconclusive and very little research has been conducted on the upper extremity. The purpose of this study was to determine if there is a significant difference in using a dynamic or static warm up to increase shoulder range of motion and performance. This study included 16 healthy individuals (21.2 + 2.6 years) who partook in a dynamic stretching, static stretching, or control session once a week over a three week period. Prior to, and upon completion of every session, each subject performed range of motion testing and a closed kinetic chain upper extremity test (CKCUE test). The CKCUE test is a performance and functional test to assess return to play. Our results indicate that external rotation of the shoulder and the performance test both had improvements in both dynamic and static stretching routines. We anticipate that this research will be of great value to clinicians in a variety of rehabilitation settings by helping them make an informed decision in determining the appropriate mode of warm up for their patients.

**Mentor:** Valerie Moody, Health and Human Performance

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**JUVENILE OFFENDERS: COMPARING RURAL AND URBAN YOUTH IN MONTANA**

**Jessica Hazlett**

This study utilizes information from the Office of Court Administrator, State of Montana, on juvenile probationers. It is a secondary analysis of existing data gathered in the summer of 2010. Exploratory research sought to determine if there were significant differences between urban and rural Montanan youth who were on probation in Fiscal Year 2009. For the purpose of this study, an urban/rural variable was created and added to the existing data set. Urban youth were defined as coming from districts that include a city with 30,500 or more residents; rural youth were defined coming from districts with cities of less than 30,500. To date, this analysis is the only formal research comparing urban/rural differences for juveniles on probation in Montana. Results indicated that urban youth are more likely to recidivate, have a higher risk level according the Back on Track risk assessment instrument and are more likely to have a ticket for a drug related crime. Rural youth are more likely to be on informal probation, engage in criminal mischief, and have a mental health diagnosis. This information can be used by probation officers, social service programs, and the State of Montana to better understand differing risk levels in urban versus rural areas.

**Mentor:** Timothy Conley, Social Work

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**SEX DETERMINATION FROM THE GREATER SCIATIC NOTCH: A MORPHOMETRIC APPROACH**

**Amelia Hessey**

Determining sex is a critical component in the identification of skeletal remains in forensic and archaeological contexts. Unfortunately, methods used and widely accepted today, specifically visual assessments of the os coxa (pelvic bones), rely heavily on the experience of the anthropologist and the completeness of the coxal bones. Here I propose a new method of sexual determination, which will eliminate the need for experienced anthropologists and a complete pelvis. Using a 3D digitizer, three points on the greater sciatic notch are mapped, and the distances and angles between them are calculated. Quantitative analyses of these distances and angles are then used to classify the sex of unknown remains. This new method will allow a lower level of experience from the anthropologist because of the simplicity of finding the three points, capturing the 3D points, and calculating the values which will estimate male or female. Previous methods also tend to rely on the presence of multiple features of the pelvis in order to estimate sex, which can be problematic in the case of fragmentary remains. This method will allow for sex determination of more fragmentary coxal bones because the region containing the sciatic notch is the thickest portion of the pelvis, and therefore tends to survive longer in archaeological and some forensic contexts.

**Mentor:** Ashley McKeown, Anthropology

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**OTITIS MEDIA AND MIDDLE EAR EFFUSION: RATE, RISK FACTORS, COSTS, STREPTOCOCCUS PNEUMONIAE AND ANTIBIOTIC RESISTANCE IN MONTANA CHILDREN ATTENDING DAY CARE AND PRESCHOOL**

**Mandi Hill and Jozelle S. Fordyce**

Otitis Media (OM) and Otitis Media with Effusion (OME) are the most common diagnoses for children aged 2 to 5 seeking medical care. Medical visits for the treatment of OM and OME in the US accounted for 17.4% of children <2 years of age and 18.1% of children ages 2 to 5. The estimated costs of OME for children age 5 or younger in 1993 was over \$5 billion. Attendance in daycares and preschools has been identified as a risk factor for OME, increasing the incidence of OM threefold among children <2 years old. The incidence of OM and the prevalence of OME have been documented in previous studies of US children from birth to 3 and between 2 and 4 years old. The incidence, prevalence, costs and bacterial pathologies have not been studied in Montana. This proposed study presents a cost-effective, inaugural study in Montana that addresses questions related to OM in daycare and preschool centers. 200 children ages birth to 5 in Missoula, Montana will be sampled. Over a period of four months (December 2011 to March 2012) each child will be assessed for OM using tympanometry and video otoscopy every two weeks. In addition, each child will provide a nose swab for later determination of bacterial pathogens and penicillin resistance. Every two weeks parents or guardians will be contacted to determine the costs of OM treatment, including doctor's visits, medications, work days missed, etc. This research provides the background, research protocol and sample data for this study.

**Mentor:** Al Yonovitz, Communicative Sciences and Disorders

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**EXAMINING THE RELATIONSHIP BETWEEN SOCIOECONOMIC STATUS AND THE IMPACT OF FIBROMYALGIA ON  
A SUFFERER'S LIFE  
Kasondra Larussi**

An individual who has a low socioeconomic status has a greater risk of developing health problems (Alder 1994). I focus on the musculoskeletal disorder, Fibromyalgia, and hypothesize that people with lower socioeconomic status and from rural areas, will experience more severe health problems related to Fibromyalgia than those with higher socioeconomic status. Socioeconomic status is measured by one's income, occupation, and educational attainment. Data have been collected by inviting participants in Fibromyalgia online support groups to participate in an online survey. Although I have not yet completed my data analysis, I expect to find that patients with lower incomes will have less access to treatment resources, fewer opportunities for medical and emotional support, and more frustrations with adjusting to life with their disorder. By determining if one's socioeconomic status and isolation of community does affect the severity of their experience with Fibromyalgia, then programs can be designed to counteract this effect and increase the chance of treatment of the disorder.

**Mentor:** Kathy Kuipers, Sociology

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**17,000 BRICKS  
Isaac Iverson and Trevor Muller-Hegel**

Anyone in their right mind would choose bricks and steel over plywood and cheesecloth as the materials best suited for constructing a warehouse—unless, of course, that someone worked in the theatre business.

This June marks the 11th annual Prague Quadrennial—an international exhibition held every four years in Prague in which countries from around the globe gather to show off the best of theatre design. Eight students and two professors from University of Montana School of Theatre and Dance were selected to construct, ship, and facilitate the United State's exhibit for this years' exhibition, and we are two members of that production team.

Construction on the exhibit—a grungy, life-size warehouse—began in the fall of 2010. Our free time has been spent building faux brick walls (out of plywood and cheesecloth), constructing display cases and tables, painting and texturing every available surface, as well as many other numerous jobs. Over the course of the semester, we gained invaluable knowledge concerning various theatrical construction and painting techniques, as well as a deep appreciation for the value of teamwork.

In this presentation, we will provide the group with background knowledge about the Prague Quadrennial and the prestige and responsibility that comes with this project, inform them about the production process and the multiple steps involved in the construction, and explain the importance of this exhibition to ourselves, the production team, the University of Montana and the United States.

**Mentor:** Mike Monsos, School of Theatre and Dance

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**THE EFFECT OF ROADS ON AVIAN COMMUNITIES:  
INDIRECT EFFECTS ON NESTLINGS THROUGH PARENTAL FEEDING RATES**

**Erin Johnson**

Birds living in close proximity to roads have high levels of stress hormones and low reproductive success. Consequently, the presence of roads has been associated with population declines and decreased biodiversity in avian communities. Most studies have focused solely on adult birds; however, recent evidence suggests that nestlings are also susceptible to road effects. Roads affect nestling physiology, increase nest predation (e.g. nestling mortality), and increase nestling growth. These changes may be directly due to road noise/pollution, or indirectly through altered parental behavior. We investigated the effect of parental feeding rates on both hormonal and morphological patterns detected in relation to roads. Parental feeding was recorded with digital cameras, and videos were scored for total time at nest (attendance), incubation, and provisioning trips. To measure stress response, nestlings were restrained for 30 minutes and blood samples were obtained after zero, 15, and 30 minutes. We found that nestling stress response increases with male nest attendance, and male nest attendance increases close to roads. Increased nestling stress response suggests faster physiological development. Roads appear to affect nestlings indirectly by modulating paternal feeding rates. Road effects on nestlings may have long term repercussions on community success; understanding the pathways through which roads have these effects can clarify the issue and help direct management solutions.

**Mentor:** Creagh Breuner, Department of Biological Sciences

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**DO UNDERGROUND CHAMBERS PROTECT MANDUCA SEXTA CATERPILLARS FROM  
PARASITIC NEMATODES?**

**Siobhan Kirkpatrick**

At the end of their fifth instar, larvae of *Manduca sexta* (the tobacco hornworm) descend from their host plants and burrow into nearby soil where they form pupation chambers. Larvae expend significant proportions of their body mass in water and energy to form these chambers, suggesting that chambers play some important role. That role, however, remains a mystery. My research investigates the hypothesis that underground chambers protect caterpillars from entomopathogenic (insect infecting) nematode attacks either by physically protecting caterpillars from infection or by camouflaging CO<sub>2</sub> signals emitted by the caterpillars during respiration. I examined how readily nematodes infect larvae, pre-pupae, and pupae in Petri dishes and different soil conditions. In Petri dishes, larvae were more susceptible to nematode infection than pre-pupae or pupae. However, in varying soil-water concentrations, neither pupae nor larvae were infected by nematodes regardless of chamber presence or absence. To determine if chambers camouflage CO<sub>2</sub> signals emitted by *M. sexta*, making them less conspicuous to nematodes, I constructed dirt columns in sections of Plexiglass pipe, varied chamber presence, released CO<sub>2</sub> either continuously or discontinuously, and measured nematode concentrations in 1cm increments throughout the dirt. The results of this study are still under consideration. By exploring if nematodes can infect late instar *M. sexta* and if chambers mask CO<sub>2</sub> signals, at least one possibility of chamber function can be accepted or rejected. This research may also have greater societal significance. For example, to effectively use nematodes as biological control agents, their interactions with potential hosts must be well understood.

**Mentor:** Art Woods, Division of Biological Sciences

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**DISORGANIZED INFANTS AND MATERNAL SATISFACTION**

**Austin Logan**

The Strange Situation procedure introduces infants to a stranger and temporarily separates them from the parent. The infant's behavior in response is used to classify the attachment relationship to the parent. The most insecure attachment classification is called Disorganized/Disoriented (D/D). Current research implies that since mothers of D/D infants are more likely to have had attachment problems with one of their own parents; they are more likely to repeat those difficulties, thereby passing them along to their children. However, research suggests that the opposite may occur, i.e., mothers might use their experience as a source of resilience in their mothering. Sixty-eight mother-infant pairs were assessed in the Strange Situation, and of these, eight were identified as having a D/D attachment. The purpose of the present research was to analyze maternal satisfaction within this subset over the course of nine years. The responses of all mothers were evaluated for qualitative, thematic differences indicative of perceived satisfaction with their role as mother and mothering in general. Items were drawn from case histories derived from an archival data set, including questionnaires, interviews, logs and videotapes collected from pre-birth until nine years. Items and interviews from mothers of D/D infants were examined for consistent themes and meaningful differences. These themes were compared with the larger group of mothers of securely attached infants. Preliminary results suggest very little difference on explicit items, yet several thematic differences emerge with regard to challenges the parent had to overcome prior to the baby's birth.

**Mentor:** Lois Muir, Psychology

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**NOVEL INHIBITORS OF L-GLUTAMATE/L-CYSTINE EXCHANGER SYSTEM XC-**

**Jayne Newell**

The system xc- (Sxc-) antiporter is a member of the heteromeric amino acid transporter (HAT) family, which mediates the obligate exchange of extracellular L-cystine for intracellular L-glutamate. Interestingly, both sides of this exchange reaction are important in the function of the central nervous system, as the import of L-cystine is needed for the synthesis of glutathione (GSH) and oxidative protection, while the exported L-glutamate can contribute to neuronal communication, as well as neuropathology. To study the various roles of Sxc-, our group has been developing small molecules that selectively inhibit the transporter. Previous studies carried out by the Natale lab demonstrated the utility of isoxazole-hydrazone derivatives as inhibitors of Sxc-. One problem with these compounds, however, is that their innate tendency to cyclize in solution significantly reduces their potency at Sxc-. In the present work we characterize a new collection of isoxazole-hydrazone derivatives that contain an additional carbonyl group that inhibits cyclization. The inhibitory activity of these analogues was assessed by quantifying their ability to block the uptake of [3H]-L-glutamate into SNB-19 human glioblastoma cells under conditions that were selective for Sxc--mediated uptake. A subset of the compounds were found to inhibit Sxc- with an affinity comparable to the endogenous substrate L-cystine. The findings help us to further refine the structure-activity-relationships that govern binding to the Sxc- transporter.

**Mentor:** Richard Bridges, CSFN

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**STRATIGRAPHIC ANALYSIS OF THE FERRON SANDSTONE MEMBER FOR RECONSTRUCTION OF  
PALEOENVIRONMENTAL CONDITIONS ASSOCIATED WITH THE FERRON COALS**  
**Neasa O' Connor, Damien R. Setlich, Hannes Nevermann, and Thomas Jurczak**

The Ferron sandstone was deposited during Late Cretaceous (Turonian – Coniacian) time and is composed of mudstone, siltstone and sandstone deposited in fluvial-to wave-dominated deltaic and shallow marine environments. The Ferron sandstone near Ferron, UT records part of a large scale regressive marine sequence in which the sediments form generally north-northeast trending clastic wedges that project into the Western Interior Cretaceous seaway. The Ferron sandstone regressive sequence consists of a series of high frequency regressive-transgressive delta cycles, each containing a coal zone near the top. These coals are of significant economic importance in the region because they are a source of natural gas. The coals are also mined along the Wasatch front.

We hypothesise that coalbeds are associated with aggradational coastal plain settings in back-barrier/lagoonal environments, as opposed to the fluvial environments. We will test this hypothesis by examining the ichnology, sedimentology and stratigraphy through sections of the Muddy Creek locality of the Ferron sandstone and reconstructing the paleoenvironmental history. These results will determine the relationship between the coalbeds deposits and base level position.

**Mentor:** Marc Hendrix, Geosciences

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**LEARNING THE ROOM: PERCEPTUAL ADAPTATION TO POOR ROOM ACOUSTICS**  
**Jane Reynolds and Kaila Sullivan**

Proper listening conditions are essential in any learning environment. In some classrooms however, conditions are simply not suitable for teaching or learning to occur effectively. Acoustic variables such as reverberation, background noise and the material from which the walls of a classroom are constructed can play a major role in student's understanding of their teacher's voice. Poor acoustics can be the cause of significant gaps and delays in the education of children with normal hearing and are especially detrimental for children with hearing loss. The most significant benefit to hearing well in a classroom is to reduce the deleterious effects of reverberation and background noise. This may not be economically feasible in many schools. From a practical and a theoretical perspective this research is able to answer questions of how speech is understood in acoustically distorted environments. This research was undertaken to understand the perceptual adaptation of room acoustics on speech perception. A closed set children's test of speech recognition (WIPI) was presented to children 6-12 years of age under two conditions. In the first condition children were pre-exposed to a 2 minute exemplar of a children's television program (Sponge Bob Square Pants) with high reverberation and background noise. In the second condition, the same exemplar was shown and heard without acoustic distortion. All children were tested with the WIPI speech discrimination task with all words processed with reverberation and background noise. The results of adaptation will be discussed in this presentation.

**Mentor:** Al Yonovitz, Communicative Sciences and Disorders

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**IMPACTS OF SPOTTED KNAPWEED ON NATIVE BEE POPULATIONS OF WESTERN MONTANA**

**Marisha Richardson**

We compared native bees visiting native flowering plants in areas greatly impacted by spotted knapweed (*Centaurea stoebe*) with visiting rates of native bees in areas containing native flowers not greatly impacted with spotted knapweed in three sites in Western Montana in late summer. Recent decline of bee populations makes it vital to study all aspects of the ecosystem that may effect bee populations. Although spotted knapweed has been shown to be beneficial to honey bees (*Aphis mellifera*), little is known about what effects large knapweed patches, which out compete native flora, have on native bees. Three sites were sampled using pan traps, sweep netting, and observational counting. Sites infested with spotted knapweed had higher counts of honey bees and bumble bees and low to no native bees collected and observed on their florets. Contrarily, sites with high numbers of native flora contained higher numbers of native bees and less numbers of bumble bees and honey bees. These results conclude that spotted knapweed does not benefit native bee populations. These results show cause for concern for our native bee populations.

**Mentor:** John Maron, Biology

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**EMOTIVE RESPONSES TO NATURALLY OCCURRING AUDITORY STIMULI:  
SELF-REPORTED & PHYSIOLOGICAL**

**Taylor Salmi**

As an individual navigates through his or her environment, they are presented with a number of different auditory stimuli, which can affect their emotions. These emotions are important as they have implications across physiological, behavioral and cognitive domains. This study examined emotions in response to naturally occurring auditory stimuli. Specifically, it examined if self-reported valence and arousal, skin potential response, pulse rate and EEG would be modulated by the affective valence of a sound. Furthermore, this study examined if participant's self-reported and physiological responses correlated. Participants were presented with 60 sounds selected from the International Affective Digitized Sounds (IADS). Self-reported affective valence and arousal, skin potential response, pulse rate and brain potentials from the left and right side were obtained. The results of the study indicated that self-reported valence and arousal, skin potential response and pulse rate was modulated by the affective valence of the sounds. Electrical brain potentials were also effected by the by the type of sound. The unpleasant sounds elicited the greatest response in each of the physiological measures. The results of this study supported the biological significance of emotions as prescribed by dimensional theorists. The practical and theoretical implications of the results are discussed in terms of the link between emotions and psychophysiology.

**Mentor:** Al Yonovitz, Commuicative Sciences and Disorders

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## TRANSCRIPTION TERMINATION IN BORRELIA BURGENDORFERI

Bryan Sawyer

*Borrelia burgdorferi* is a bacterium in the spirochete phylum and the causative agent of Lyme disease. For any gene to be expressed, it must first be transcribed. Little attention has been devoted to transcription termination, or how transcription of a gene stops, in *B. burgdorferi*. Our aim is to better understand the nature of transcription termination in *Borrelia* by using Rho-independent (or intrinsic) terminators that have been found and characterized in the model organisms *Bacillus subtilis* and *Escherichia coli*, as well as a previously identified, but not well-characterized one, from *Borrelia*. We are fusing these three terminator sequences to antibiotic resistance genes as markers. These molecular fusions will be expressed in *B. burgdorferi* and *E. coli* and the end of the transcription will be determined using RNase protection assays. These experiments will test the ability of the three Rho-independent terminators to stop transcription. In addition to learning about the mechanism of transcriptional termination in *B. burgdorferi*, in particular which sequences are required, the terminator fusions will be useful molecular genetic tools that should prevent inadvertent effects on downstream genes while using the antibiotic resistance constructions for mutagenesis.

**Mentor:** Scott Samuels, Biology

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## FORENSIC SPEAKER IDENTIFICATION

Cole Smith

Individuals in professions such as forensic science and criminal investigation are greatly interested in the ability to identify an individual by their voice. Controversy in this area has continued for nearly five decades with states divided with regard to the merits of voice identification. The American Board of Recorded Evidence [ABRE (1999)] has established standards for the determination of identification or elimination of speakers. Digital spectrographic techniques, including formant tracking and finer descriptive measures of speech, are dramatic improvements and allow a test of the ABRE standards using improved technology embodying similar principles set forth in an aural (listening) and spectrographic (voice print) method. Ten speakers recorded synthetic sentences at two different times. All possible speaker pairs of "elimination" were presented to qualified listeners as well as equal probability of "identification." For the comparison, subjects were presented spectrograms, formant tracks, fundamental frequency, and the ability to listen to single words. Confidence ratings and determinations (elimination or identification) for each comparison word were made with the addition of added words (<20). The results will be discussed with regard to correct classification based upon the number of words required and the reduction of correct classification based upon the distorted conditions.

**Mentor:** Al Yonovitz, Communicative Science and Disorders

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**TO DRINK IS TO DRIVE:  
ASSESSING MONTANA'S MULTIPLE OFFENDER DRUNK DRIVERS FOR PREVENTION STRATEGIES**  
Kimberly Spurzem

The purpose of this research study was to perform a qualitative analysis of previously gathered data from 201 felony offender drunk drivers currently incarcerated by the Department of Corrections in Montana, in either the Montana State Men's Prison, the Montana State Women's Prison, or the Warm Springs Addiction Treatment and Change Program (WATCH) at two locations: East and West. The data for this project was collected from focus group interview dialog transcripts with individuals who had 5 or more DUI's (multiple felony offenders). This study focused on 229 pages of focus group dialog. The data was reviewed and analyzed for thematic similarities using content analysis to identify key prevention strategies as identified by offenders. The goal of completing a secondary analysis on this data was to provide a report to the Montana state legislature. The research process for this project was used to empower multiple offender drunk drivers to use their experiences and insight to advocate for their prevention ideas to better inform the legislative process. This is crucial since Montana currently has the highest fatality rate of all 50 states and the Montana legislature is currently attempting to amend the laws to reduce the amount of DUI's in the state.

**Mentor:** Timothy Conley, Social Work

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**INHIBITION OF STROKE-INDUCED ACTIVITY OF THE APOPTOTIC ENZYME CASPASE-3**  
Riley St. Clair

Stroke is the leading cause of adult disability in the United States. Ischemic stroke, the most common type, occurs when a blood vessel in the brain is blocked, depriving the affected area of oxygen and glucose, causing cell death and tissue damage. Stroke also involves delayed programmed cell death, called apoptosis, which causes further neuronal damage. The enzyme caspase-3 plays a significant role in this apoptotic process. Through inhibition of caspase-3, apoptotic-mediated tissue damage may be reduced. The unique compound PM12-18H, which was isolated from a fungus found in the Berkeley Pit (Butte, MT, USA), was selected for examination based on its ability to inhibit caspase-3. In the current study, we evaluated this compound's potential to mitigate the damaging effects of stroke. The primary goals were to determine its effectiveness as a caspase-3 inhibitor and its ability to inhibit apoptosis. A mouse neuroblastoma cell line, N2A, was subjected to oxygen and glucose deprivation for sixty minutes to simulate severe stroke-like conditions. Afterward, the cells underwent a four-hour simulated reperfusion period with oxygen and glucose in the presence of PM12-18H. To measure the effect of this compound, a caspase-3 activity assay (ApoAlert) was performed. Treatment with PM12-18H resulted in significant inhibition of caspase-3 compared to a control. In conclusion, PM12-18H can inhibit caspase-3 and future research will uncover its potential to inhibit apoptosis in stroke, ultimately leading to further investigation of caspase-3 inhibitors as a therapeutic target for stroke patients.

**Mentor:** Darrell Jackson, BMED

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## THE EFFECTS OF 5 WEEKS OF UNLOADED PLYOMETRIC TRAINING ON POWER DEVELOPEMENT

Tyson Strom

**PURPOSE:** To evaluate power development after five weeks of unloaded (bungee assisted) or no-weight added plyometric jump training. **METHODS:** Thirty-five volunteer participants (22 females, 13 males;  $24 \pm 6$  years,  $68 \pm 22$  kg,  $72 \pm 11$  cm) completed five weeks of plyometric jump training. Subjects were randomly assigned to an unloaded or a no-weight added group. A power assessment was performed pre-, mid- (week three) and post training. The power assessment consisted of a vertical jump, a series of ten repeated vertical jumps, stair runs, a 30 meter sprint, and a two footed-5 hop test for distance. Jump training was completed twice a week with at least 48 hours of rest between sessions. Each session consisted of three sets of 10 reps of plyometric jumping (either unloaded or no-weight). Statistical analysis was performed using a time x trial ANOVA, significance was set at 0.05. **ORIGINALITY:** Many studies have been performed on the effects of plyometric jumping but few have focused on bungee assisted jumping exercises. **RESULTS:** There were no group interactions for any of the five tests that were conducted during the pre-, mid-, and post assessment ( $p > 0.05$ ). **CONCLUSION:** These data suggest that there is no effect on power development when using unloaded plyometric training.

**Mentor:** Joe Domitrovich, Health and Human Performance

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## PREVENTING THE SOCIAL DESIRABILITY BIAS IN PARENTAL COMPETENCY ASSESSMENT: A COMPARISON OF MEASURES

Julie Walsh, Kylene Caquelin, Tawna Chapieski, and Sean Scullin

In the effort to prevent child maltreatment, psychologists use various measures to assess the likelihood that an adult is abusive. The most widely used measure is the Child Abuse Potential Inventory (CAP) (Milner, 1986), a 160-item questionnaire with agree/disagree response options. Its validity, however, may be limited by a social desirability bias. Parents in child abuse or custody cases may be motivated to appear favorably, and could easily "fake good" on this questionnaire. A structured interview assessment, the Child Guidance Interview (CGI) (Infant/Preschool form), is being developed to address this weakness. Using archival data, we intend to score 25 transcribed CGI interviews with both abusive and non-abusive parents. Scores will be based on responses to five questions regarding an understanding of developmental norms, as well as one question regarding maladaptive and adaptive methods of child guidance. Archived CAP scores of all participants have previously been collected and scored. Because the CGI has a more in-depth response analysis, we expect that it will identify abusers more accurately than does the CAP. If the results of our study confirm this hypothesis, we may be able to further develop the CGI into a widely used assessment measure with greater predictive validity than the CAP.

**Mentor:** Paul Silverman, Psychology

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## AEROR BREATHER AND BELIEF EFFECTS ON SUBMAXIMAL LIFTING

Tim Weber and Gene White

Breathing during resistance exercises is important to help increase performance. Makers of the Aeror Breather® claim it increases airflow in the body and overall performance during resistance exercises. PURPOSE: Our purpose was to evaluate if the Aeror Breather® device increases submaximal lifting repetitions to failure during lat pull down exercise. METHODS: Thirty-two voluntary subjects (17 females, 15 males; 76.4 kg ± 19.2 kg, 174 cm ± 9.7 cm) first completed a one repetition max test of a lat-pulldown exercise and then came in two more times to test their submaximal capacities with and without the aid of the Aeror Breather® in a randomized cross over design. Subjects performed the lat-pulldown at 65% of their 1 RM with half of those subjects using the Aeror Breather®. A dependent t-test was used to evaluate the results of the two trials. RESULTS: There was an increase in the number of repetitions subjects were able to perform with the aid of the Aeror Breather® (+0.75 ± 2.96 stdev repetitions @ 65% 1RM; p < 0.05). CONCLUSION: This data suggests that the Aeror Breather® may be beneficial and improves number of submaximal repetitions by a statistically significant 5.6%. However, further research needs to be done to evaluate the effects of the Aeror Breather® on other resistance exercises and at higher submaximal levels.

**Mentor:** Steven Gaskill, Health and Human Performance

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## THE INTEGRATION OF HISTORIC PERIODS IN COSTUME DESIGN

Staci Weigum

As productions turn away from classic Shakespeare, integrating costumes from two periods becomes more popular. This research project focuses on what makes costume integration successful. A successful integration must be visually compelling, but still give characters depth and tell the story of the play. Though I am not the first to delve into anachronistic design, there exists no research to help young designers find success.

By examining Hamlet, Romeo and Juliet, The Taming of the Shrew, and Richard III, I have pinpointed the key aspects of each production that assist the design. While my own experiences have merged Elizabethan with the 1950s, other designers have merged Elizabethan with contemporary and even a rock concert theme. By analyzing a variety of productions, connecting threads helped establish “rules” for designers.

Through this research, I have established guidelines for maintaining an anachronistic design while still telling a story. One method establishes the silhouette of one period while combining the details, such as fabric and accessories, of another period, creating an equal representation of the two. A second option creates a world blended equally of the two periods, in which it becomes timeless and unique to the world of the play. A third option assigns opposing groups to different periods, establishing visual conflict. Many more may exist, but the overall key to costume integration is to define how each period is represented. When no rules exist, there is no cohesion of ideas. Costumes help tell a story and without guidance, that story is lost.

**Mentor:** Alessia Carpoca, Theatre/Dance

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**DO GROWTH RATES IN SNAKE RIVER CUTTHROAT TROUT AND CUTTHROAT TROUT X RAINBOW TROUT  
HYBRIDS DIFFER?  
Taylor Wilcox**

Historically, non-native rainbow trout (*Oncorhynchus mykiss*; RT) have been stocked into waters across the western United States, leading to interbreeding with native cutthroat trout (*Oncorhynchus clarkii*; CT). Hybridization is a well-established conservation threat to CT persistence, but we have yet to fully understand its ecological and evolutionary consequences. One important vital rate in fishes is growth rate because it is related to survival and fecundity. The purpose of this study is to examine if growth rates differ between Snake River cutthroat trout and Snake River cutthroat x RT hybrids in the Gros Ventre River, WY. I have two alternative hypotheses. First, CT may have higher growth rates. One field study has demonstrated that hybrids are less fit than pure westslope cutthroat trout individuals. Second, hybrids have a higher growth rate. Performance studies have shown hybrids have greater swimming capabilities than CT, and that RT had a higher growth potential than CT. In 2007, fish scales and tissue samples for genetic analyses were collected. We have identified the extent of hybridization for these individuals through the presence of RT versus CT alleles at 14CHECK diagnostic microsatellite loci. I am using fish scales to estimate growth rates in approximately 50 fish from one population that ranges from pure cutthroat to first generation hybrids. Each year fish scales lay down an annulus ring, the distance between these annuli are proportional to fish growth rates. I am measuring distances between these annuli and back-calculating growth rates.

**Mentor:** Lisa Eby, Wildlife Biology

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**INFLUENCE OF SALT TECTONICS ON THE CHINLE FORMATION**

**Michelle Wolfgang, Marie Ryan, Nele Richter-Harder, Sarah Washko, and Flora Sperberg**

The Chinle formation is an Upper Triassic sedimentary deposit that stretches across the northeastern Paradox basin of Utah. Within the Chinle evidence of salt-sediment interaction during deposition is characterized by numerous angular unconformities, differences in stratigraphic thickness, and changes in fluvial facies architecture. Two major fluvial sequences are bounded by an angular unconformity that divides the Chinle into an upper and lower member. The lower member consists of isolated to multistory fluvial-channel sandstone, where as the upper member is primarily composed of graded channel sandstone grading into overbank mudstones and isolated channel-fill sandstone. The upper most Chinle represent the end of the Triassic and consists of Eolian-reworked fluvial deposits. Prior research has indicated that changes in stratigraphic architecture throughout the Chinle are marked by thickening and tilting of strata in response to fluctuating topographic relief above salt pillows and buried salt walls. We purpose that structural deformation of fluvial sediments within the Chinle can be attributed to syn-sedimentary salt tectonics. We will focus on correlations between stratigraphic sections by tracing bedding plane thickness along angular unconformities. Local salt influences on fluvial facies will be identified by mapping paleocurrent flow direction on photomosaics. Furthermore, structural deformation in fluvial sediments will illustrate the changes in accommodation space produced by salt movement.

**Mentor:** Marc Hendrix, Geosciences

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**MATERNAL SENSITIVITY AND INFANT ATTACHMENT**

**Laurel Anne Yorgason**

The current study explored the relationship between maternal sensitivity and the infant's attachment to the mother at the same point in time. Maternal sensitivity to the infant has been found to be a major factor in the development of the relationship. Archival data from a longitudinal project were used. Analyses were conducted on a sample of 66 mothers and infants recorded in the Strange Situation Procedure (SSP). These data were originally collected to assess the infant's emotional attachment to the mother. Data from SSPs were chosen due to the incremental increase in stress on the infant. This stress allowed the observer to note the baby's bids for maternal attention and the level of sensitivity in the mother's response. The observer coded the mother's sensitivity without knowledge of the previously recorded category of infant attachment to the mother. The maternal sensitivity was rated in response to infant bids for maternal attention using a 9-point Likert scale . Maternal sensitivity was used as the dependent variable and infant attachment classification (secure, resistant, avoidant, disorganized) and security of attachment (secure, insecure) were used as factors in one-way Analyses of Variance. Ratings of maternal sensitivity by overall security of attachment revealed statistical significance ( $p=.015$ ). Maternal responsiveness and sensitivity appears to be one of the most important factors contributing to attachment security. Previously, studies have measured maternal sensitivity separately from infant attachment. This study measured maternal sensitivity at the same point in time as the assessment of infant attachment.

**Mentor:** Lois Muir, Psychology

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