SOURCE 2015

PROGRAM AND PROCEEDINGS

SYMPOSIUM OF UNIVERSITY RESEARCH AND CREATIVE EXPRESSION (SOURCE)

20TH ANNUAL CONFERENCE
MAY 21, 2015

CELEBRATING 20 YEARS

OF EXCELLENCE IN RESEARCH, SCHOLARSHIP, AND CREATIVE ACTIVITIES

CENTRAL WASHINGTON UNIVERSITY
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This year, SOURCE celebrates the 20th year of annual multidisciplinary conferences dedicated to student scholarship at Central Washington University.

SOURCE is the longest-running student symposium in Washington State.

The goals of SOURCE are to:

- Celebrate the depth and diversity of scholarly inquiry and creative expression at Central Washington University.
- Offer students a professional forum in order to sharpen their presentation skills and communicate professional standards.
- Promote students’ professional development by providing evaluation and feedback on student presentations in accordance with rigorous professional expectations.
- Promote excellence in pedagogy by providing an opportunity for faculty to mentor students through all the steps involved in presenting their work, including creating a research idea, designing and conducting research, and developing and delivering a presentation.
- Create a sense of excitement about scholarship and promote life-long learning by encouraging people from within and outside the University to attend students’ presentations and learn about current developments across multiple academic disciplines.
- Foster partnerships between higher education, industry, government, and the local community by inviting representatives from diverse fields to partake in evaluating student presentations.
- Attract the attention of employers to the excellence of students at Central Washington University.
- Allow opportunities for further development of mentoring relationships and skills.
- Allow opportunities for further development of collaborative relationships and skills.
- Promote a sense of community and inclusivity by encouraging students from all disciplines to participate and by recognizing that, while facilitating students’ professional development is our priority, presentations by faculty and staff are welcome.
- Elevate student accomplishment and recognize the excellence of undergraduate and graduate research at Central Washington University.
- Recognize works of creative expression as valuable research activities with cultural significance alongside more traditional research.
- Promote entrepreneurial spirit by encouraging students to develop and exhibit their business plans.
- Educate the University, Town, and Region about the resources and work available through Central Washington University.
May 21, 2015

On behalf of everyone at Central Washington University, I extend my personal welcome to the university’s Symposium Of University Research and Creative Expression (SOURCE), which is our largest, multidisciplinary event. This year marks a significant milestone for SOURCE, which was first held 20 years ago. That event showcased the work of 23 undergraduate students. This is our emerald-anniversary SOURCE, which is the longest running university-associated student symposium in Washington State.

With almost 350 presentations scheduled this year, SOURCE gives us an opportunity to celebrate the tremendous quality, quantity, and diversity of research, scholarship, and creative achievements produced by our undergraduate and graduate students, faculty, staff, and alumni.

But SOURCE is unique from other research symposia in that it also includes local and regional community members, along with area elementary, middle, high school, and Running Start students, who are able to take advantage of this rare opportunity to present their scholarly work. We welcome all those who embody CWU’s tag line of Learn, Do, Live.

During the course of the last 20 years, SOURCE has relied upon our faculty and staff to mentor students in research, scholarship, and creative projects; the students who commit their time, energy, and intellectual curiosity to their projects; and the dedicated university personnel and student volunteers who work tirelessly behind the scenes. We are also grateful to local and regional community members who offer their invaluable professional feedback to our presenters.

As in past years, SOURCE 2015 has received key contributions from administrators, notably our Provost and Vice-President for Academic and Student Life Marilyn Levine; faculty; staff members and other volunteers; and students in CWU’s event planning program, who have selflessly provided their time and expertise. SOURCE would also not be possible without generous financial contributions from university academic and administrative units, individuals, and corporate and community sponsors.

This year’s SOURCE committee, chaired by Kara Gabriel, associate professor of psychology, can be justifiably proud of its efforts. It is through all of these contributions that SOURCE is generally regarded as among the state’s premier events of its kind.

Again, welcome to SOURCE. It is truly a community endeavor of which we can—and should—all take great pride.

Sincerely,

James L. Gaudino, PhD
President
Manastash is an annual journal of writing and art, highlighting the best creative works of Central Washington University students. All writing, poetry, art, selecting, editing, and producing is student work.

Content is solicited every fall quarter. During winter quarter, the Manastash editing class sifts through hundreds of submissions, reading and choosing the works that demonstrate the greatest craft and imagination of the CWU student body, in Ellensburg and beyond. In spring quarter, the Manastash production class organizes and formats this material, forming a printed edition.

The journal is housed in the English Department and has been published annually for more than 40 years. Lisa Norris is the current coordinator for the on campus Professional and Creative Writing Program. Xavier Cavazos is the advisor this year for both editing and production.

Please join us at SOURCE from 9:40 to 11:00 a.m. In Room 135 for the Manastash showcase, featuring readings from published writers and poets whose works are featured in this year’s issue.
The Museum of Culture & Environment in Dean Hall on the Central Washington University campus approaches our diverse and changing world with an interdisciplinary perspective, examining human life, culture, and our interaction with the environment.

Join us at SOURCE for a two different Museum Studies panel session from 11:40 to 1:00 p.m. in Room 271, and from 2:40 to 4:00 in the Theatre.

BINDING CULTURE

LIVING LANDSCAPES AND MATERIAL LIFE IN NORTHERN LUZON, PHILIPPINES

April 9 to June 13, 2015

Life in the mountainous Cordillera Central is carved into the hillsides. The ancient rice terraces are at the center of daily routine. This exhibit celebrates the artistic brilliance and technological creativity of the peoples who live there through an exploration of the baskets and textiles which form the fabric of everyday life.

MUSEUM OF CULTURE & ENVIRONMENT

AT CENTRAL WASHINGTON UNIVERSITY

The Museum of Culture & Environment at CWU is located at Dean Hall, 1200 N. D Street, Ellensburg, Washington 98926-7544.

Open Wednesday to Friday, 11:00 a.m. to 4:00 p.m. and Saturday from 10:00 a.m. to 3:00 p.m.

Visit us on Facebook: facebook.com/cwumuseum Phone: 509-963-2313 or e-mail: Museum@cwu.edu
Student
Juried
Art Show
April 30-May 21, 2015

Juried Undergraduate Student Art Exhibition
CWU Campus, Sarah Spurgeon Gallery

Reception and Awards Ceremony:
Thursday, April 30, 6:00-8:00 p.m.
Awards Ceremony begins at 7:00 p.m.

Jurors’ Talk: David Hampton and Rie Palkovic
April 23, 4:00 p.m., Randall Hall, Room 117

Free Admission • Open Weekdays, 10:00 a.m.-3:00 p.m. • Weekends, 10:00-4:00 p.m.
MEZZANINE SHOWCASE
RESEARCH OPPORTUNITIES AND SUPPORT FOR SCHOLARSHIP AT CENTRAL

Check out the following tables on the 2nd floor mezzanine bridge during SOURCE:

The Academic & Research Commons at Brooks Library

LibGuides

OneSearch

McNair Scholars Program

The Center for Excellence in Science and Mathematics Education (CESME)

Washington State Opportunity Scholarship
Congratulations to all participants of CWU SOURCE 2015!

Through a unique, public-private partnership, Washington state is helping to grow a skilled, homegrown workforce that will foster innovation, drive our economy, and fuel a brighter future.

- Nearly 1,000 Opportunity Scholarship recipients have graduated to date.
- 52% are students of color; 63% are women.
- Two-thirds of graduates are employed in their field or seeking an advanced degree in a high-demand field.
- Of graduates employed in their field of study, nearly 90% remained in Washington state.

Students pursuing a degree in science, tech, engineering, math or health care can receive up to $22,500. Application available January 2016.

Learn more at waopportunityscholarship.org
MUSICAL WELCOME

With the mentorship of Dr. John Neurohr in the Music Department, the CWU Trombone Choir will usher in the Fashion Show on the SURC Mezzanine. The CWU Trombone Choir students frequently win awards and receive recognition at auditions, music festivals, and professional engagements. Find out more at: https://www.cwu.edu/music/trombone-choir

STUDENT FASHION SHOW

The Apparel, Textiles and Merchandising program is celebrating 100 years of educating future fashion professionals at Central Washington University. During this exciting time, we are proud to present the 19th annual spring fashion show, MODE. Come see the latest trends featured in our ready-to-wear categories: Urban Jungle, Coastal Vibes, and Desert Daze. Eight student designers will be presenting their original lines that feature an array of styles, details, and textiles. Brought to you by the FCSA 381 Fashion Show Production class and original student designs created in FCSA 488 Fashion Line Development.

Featuring two shows on Saturday, May 30th, at 3:00 p.m. (doors open at 2:00 p.m.) and 7:00 p.m. (doors open at 6:00 p.m.) in the Milo Smith Tower Theater in McConnell Hall on the Central Washington University campus. A silent auction will precede each show with proceeds supporting next year’s fashion show, student field experiences, and student scholarships. For more information on the show or the 100th anniversary, please email Professor Andrea Eklund at aeklund@cwu.edu. Show details can also be found on the Apparel, Textiles and Merchandising Facebook and Instagram pages, #cwu_atm.

BUSINESS PLAN COMPETITION

The Institute for Innovation and Entrepreneurship (I4IE) Business Plan Competition and the CWU Student Business Plan Competition are generously sponsored by the Herbert B. Jones Foundation (Seattle). All CWU students were encouraged to enter a business plan in the competition. Five finalists present their oral presentations at SOURCE. The 1st place winner will receive $5,000, the 2nd place winner will receive $3,000 and the 3rd place winner will receive $2,000. The winners will be announced at the SOURCE awards ceremony on Wednesday, May 27, at noon in the SURC Pit.

PROGRAM COVER DESIGN

Senior graphic design student, Brandice Baggarley, is this year’s SOURCE poster designer under the direction of Professor Glen L. Bach in the Department of Art. The artwork for the SOURCE postcard, poster, and program cover is one of many academic service-learning projects that students undertake in Professor Bach’s curriculum. Brandice’s design represents the impact of the diverse disciplines of the academic world on the individual. Brandice is graduating from Central Washington University this spring. She is currently busy with contract design work for Mighty Tieton, after having completed an internship with them last summer.
# PROGRAM AT A GLANCE – 2015

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Room 135</th>
<th>Room 137A</th>
<th>Room 137B</th>
<th>Room 140</th>
<th>Room 201</th>
<th>Room 271</th>
<th>Room 301</th>
<th>Ballroom A</th>
<th>Theatre</th>
<th>Ballroom B/C/D</th>
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<tbody>
<tr>
<td>8:10-9:30</td>
<td>Session</td>
<td>11</td>
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<td>11:00-11:30</td>
<td>MUSICAL WELCOME &amp; FASHION SHOW on the SURC mezzanine outside the Ballrooms</td>
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*Sessions 6, 14, 22, and 31 will be live-streamed and recorded to facilitate viewing by online students*
STUDENT UNION AND RECREATION CENTER MAP
(First Floor)
ORAL PRESENTATION AND CREATIVE EXPRESSION SCHEDULE

Only authors are listed for each paper/poster. Mentors are shown in the ABSTRACT portion of this program.

SESSION 1  Room 137B
Session Chair: John Anvik

8:30-8:50  Fostering a Culture of Safety: Aviation Reporting System
McFarlane, Trenton; Turner, Patrick

Tunnell, James

9:10-9:30  Searching for Maximal Holes in Databases
Lemley, Joseph

SESSION 2  Room 201
Session Chair: Elizabeth Kerns

8:30-8:50  Leadership Before and After Hurricane Katrina
Gohl, Philip; Barclay, Hannah; Vidaurri, Elizabeth; Newby, Ryan; Arquette, Joshua

8:50-9:10  Why Are Visitor Information Centers Important for Rural Tourism?
Freeman, Madalyn

9:10-9:30  Your Home Matters
Freeman, Madalyn; Peone, Masey; Stewart, Robyn; Downing, Aubree; Caolli, Silver

SESSION 3  Room 271
Session Chair: Gary Bartlett

8:10-8:30  Show Me The Money
Neff, Austin

8:30-8:50  An Argument Against Descartes’ Vivid and Clear Ideas
Rogers, Alysia

8:50-9:10  Capabilities for Central American Minors
Madrid, Sergio

Schmit, Riley
# SESSION 4
**Room 301**

**Session Chair:** Roy Savoian (Director, I4IE)  
Bill Provaznik (Associate Director, I4IE)

<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>9:00-9:30</td>
<td>Sale Seekers</td>
<td>Schuster, Galya</td>
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<tr>
<td>9:35-10:05</td>
<td>Piefect</td>
<td>Marino, Daniel</td>
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<tr>
<td>10:10-10:40</td>
<td>Chelsea's All Girls Auto</td>
<td>Bidwell, Chelsea</td>
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<tr>
<td>10:45-11:15</td>
<td>BDS Aviation Products</td>
<td>Bates, Aiden; DeFrang, Brian; Shupe, Stephanie</td>
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<tr>
<td>11:20-11:50</td>
<td>Bare Hands Learning Resource</td>
<td>Hager, Kimberly; Phillips, Christopher</td>
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</table>

**CLOSED TO PERMIT BUSINESS PLAN COMPETITION JUDGES’ DELIBERATION**

Sponsorship for the Central Washington University Student Business Plan Competition is provided by the Herbert B. Jones Foundation (Seattle)

# SESSION 5
**Room 135**

**Session Chair:** Xavier Cavazos

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<th>Time</th>
<th>Presentation</th>
<th>Presenter(s)</th>
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</table>
| 9:40-11:00| Manastash Showcase              | Opening remarks from Manastash managing editors: Hirschey, Olivia; Hoag, Alisa; Morrow, Ebonesiah  
Manastash players (abstract listed under Manastash players): Castro, Steven; DuChene, Chelsea; Fisher, Daniel; Glenn, Kimberly; Hanberg, Claire; Haskin, DJ; Hinger, Kendra; Kulm, J. William; Lindsley, Haley; May, Karie; Morrow, Ebonesiah; Nichols, Michael; Tranchell, T.J.; Tye, Kala |

# SESSION 6
**Room 137A and online**

**Session Co-Chairs:** Cody Stoddard and Teresa Francis

https://panopto.cwu.edu/Panopto/Pages/Viewer.aspx?id=f1e22151-c32a-4129-9f98-19daa9bedabc

**SUPREME COURT PANEL**

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<tr>
<th>Time</th>
<th>Presentation</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>9:40-10:00</td>
<td>Rodriguez v. United States</td>
<td>Allison, Elizabeth</td>
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<tr>
<td>10:00-10:20</td>
<td>City of Los Angeles v. Patel</td>
<td>Brassfield, Justine</td>
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<td>10:20-10:40</td>
<td>Examining the Intersection of Sexual Orientation and the Right to Marry: Obergefell v. Hodge and Equal Protection</td>
<td>Sayre, Elizabeth</td>
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<tr>
<td>Time</td>
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<td>10:40-11:00</td>
<td><strong>Supreme Court and the Modern Death Penalty</strong></td>
<td><strong>Doctrine: Hall v. Florida and the Application of the Death Penalty</strong></td>
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<tr>
<td><strong>SESSION 7</strong></td>
<td><strong>Room 137B</strong></td>
<td><strong>The Social Business Card</strong></td>
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<tr>
<td>9:40-10:00</td>
<td><strong>Measuring the Bias of the Media's Many Voices</strong></td>
<td><strong>How Your Phone Can Make You Happy</strong></td>
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<td>10:00-10:20</td>
<td><strong>Modeling Humor Within Text: Data Mining and Visualization Strategies for Automated Joke Detection</strong></td>
<td><strong>Governmental Responsibility for Public Health: The Road Traveled and What Lies Ahead in Public Health System in China</strong></td>
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<td><strong>SESSION 8</strong></td>
<td><strong>Room 140</strong></td>
<td><strong>Geographical Analysis of People's Perceptions of a Political Campaign for County Auditor</strong></td>
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<td>9:40-10:00</td>
<td><strong>Analysis of Pollution in the Niger Delta</strong></td>
<td><strong>River Channel Migration in the Teanaway Community Forest, Washington, from 1954 to 2013</strong></td>
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<td>10:40-11:00</td>
<td><strong>Effects of Taurine and Chocolate Milk Supplementation on Body Composition and Nitrogen Excretion in Triathletes</strong></td>
<td><strong>Governmental Responsibility for Public Health: The Road Traveled and What Lies Ahead in Public Health System in China</strong></td>
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**SESSION 9**       | **Room 201**                                | **Brushing Up on Oral Health: Childhood Oral Health Education in Ellensburg** | **Bates, Lindsey; Leger, Katie; Curran, Daniel; Olsen, Casey** |
| 9:40-10:00    | **Barriers to Breast and Cervical Cancer Screenings for Underserved Women: Results from the Health Information National Trends Survey** | **Pu, Zhenghao**                                                      | **Wylie, Janelle**                            |
| 10:00-10:20   | **Effects of Taurine and Chocolate Milk Supplementation on Body Composition and Nitrogen Excretion in Triathletes** | **Pu, Zhenghao**                                                      | **Carvalho, Flavia; Pfrimer, Karina; Ferriolli, Eduardo; Freitas, Ellen** |
SESSION 10
Room 271
Session Chair: Brian Carroll

9:40-10:00  Preserving the Race: Gendered Violence in the Early Conservation Movement
            Collier, Patience

10:00-10:20 The New Radicals: Education and Literature for the Emancipation of Russian Women
             Seelye, Elizabeth

10:20-10:40 Friend or Foe: Foreign Diplomacy in 1861 Civil War America
             Moser, Robert

10:40-11:00 Manners of the City of Edo
             Takei, Hideki

SESSION 11
Ballroom A
Session Chair: Jer Loudenback

9:40-11:00  Feast Your Eyes: Performance in American Sign Language
            American Sign Language students (abstract listed under American Sign Language students):
            Alegria, Alanna; Baggarley, Kelsi; Barnett, Mishele; Beauge, Abby; Calahan, Somer;
            Clark, Micaela; Compton, Sarah; Davis, Micaiah; Erland, Sarah; Gilbert, Celia;
            Klepec, Kaitlan; Leist, Laura; Main, Stephanie; Maupin, Samuel; May, Kendall;
            McKenzie, Kelly; Nelles, Paige; Olive, Karlee; Payne, Jourdy; Pudlitzke, Caitlin;
            Rivas, Vianey; Starkenburg, Kasia; Stewart, Nathan

Interpreter services supplied by Disability Services Communication Access Program.

SESSION 12
Theatre
Session Chair: Tracy Andrews

9:40-10:00  Everything is Permitted: Redesigning Ezio from Assassin’s Creed II as a Female Character
            Baker, Ashley

10:00-10:20 Women’s Roles as Tradition-Bearers: Equality and Revitalization
            Williams, Diane

10:20-10:40 How Social Factors Limit American Access to Abortion
            Weishaar, Cheyenne

10:40-11:00 Feminism, Fantasy, and the Fourth Wave
            Blackson, Ginny

SESSION 13
Room 135
Session Chair: Michael Johnson

11:40-12:00 Adventure Girls: A Written Story
            Cziske, Elsie; Grant, Abby
12:00-12:20  The Illustrated Alphabet of Roman History  
Stephenson, Pamela; Baumgart, Eryn

12:20-12:40  The Year of the Tortoise: Original Screenplay  
Allison, Caleb

12:40-1:00  It Would Make Me Happy  
Cole, Ryan

SESSION 14  Room 137A and online  
Session Chair: Nelson Pichardo

https://panopto.cwu.edu/Panopto/Pages/Viewer.aspx?id=eaaf7343-b669-4b15-8de9-d79f9cb7c685

11:40-12:00  The Effects of Stigma on the Mentally Ill Students’ Educational Success  
Weiner, Melissa

12:00-12:20  A Panel Study of the Effects of World Labor Regime Integration on World Environmental Regime Integration in the Twentieth Century  
Clifton, Grant

12:20-12:40  Racism and Sport: Occupational Segregation in International Men’s and Women’s Soccer  
Colgan, Camille

12:40-1:00  Student Athlete Grade Point Average and Team Success  
Puntenney, Scott

SESSION 15  Room 137B  
Session Chair: Filip Jagodzinski

11:40-12:00  Object-Oriented Implementation of a Novel Mathematical Framework to Determine the Effects of Developmental Interactions on Evolutionary Responses  
Brooks, Elizabeth

12:00-12:20  Web-Tool Design for the Sciences  
Edwards, Brandon; Jones, James; Michel, Alec; Brooks, Elizabeth

12:20-12:40  Investigating Rigidity Properties and Atomic Content of Proteins  
Walling, Christian

12:40-1:00  Image Classification with Approximately Biologically Realistic Elements  
Abdul-Wahid, Sami

SESSION 16  Room 140  
Session Chair: Michael Jackson

11:40-12:00  Far-Infrared Laser Emissions of Optically Pumped Methanol Isotopologues  
Smith, Michael; Gerke, Clarissa; Barajas, Jose

12:00-12:20  Measuring Far-Infrared Laser Frequencies from Optically Pumped CH$_3^{18}$OH  
Gerke, Clarissa; Barajas, Jose
12:20-12:40  Constraining the Uplift History of the Transantarctic Mountains with Apatite Fission Tracks  
Fisher, Teo; Bauer, Nick

12:40-1:00  The Role of Magma Mixing in the 1968-2010 Eruption of Arenal Volcano, Costa Rica: Insights from Modelling of the Magma Chamber  
Adams, Jenna; Streck, Martin; Spera, Frank

SESSION 17  Room 201  
Session Chair: Dominic Klyve

11:40-12:00  A Statistical Analysis of Sunflower Growth  
Gowdey, Ashley

12:00-12:20  Stock Analysis of Hasbro  
Wold, Alex

12:20-12:40  Constant Vector Curvature in Three Dimensions  
Thompson, Albany

SESSION 18  Room 271  
Session Co-Chairs: Mark Auslander and J. Hope Amason

11:40-1:00  CULTURE AND POWER: ANTHROPOLOGICAL PERSPECTIVES

Beyond the Eyes of the Dominant: Reciprocity and Peace-Building on the Street  
Mohamed, Saeed

The Body as a Battlefield of Resistance: Cracking the Skulls of the System in a Polynesian Performance  
Molohon, Patrick

Bonds of Blood: Vampire the Masquerade as Urban Heterotopia  
Crosby, Nicolas

Managing Risk on the Street: Forging Alliances and Building Trust  
Matson, Hillary

Peace, Love, Unity, and Respect: The Moral Economy of Rave Culture  
Anderson, Brittany

SESSION 19  Ballroom A  
Session Chair: Therese Young

11:40-12:00  Site Specific Project  
White, Katelyn

12:00-12:20  Only in Memory  
Daoust, Quinci
12:20-12:40  Site Specific Project  
Turner, Marie  

12:40-1:00  Dualities  
Turner, Marie  

SESSION 20  
Session Chair: Michael Ogden  

11:40-12:00  Pit of Greed Audio Demonstration  
Durkopp, Eric; Ranniger, Johnny; Harmon, Jeff; Amort, Aaron; Morey, Alex  

12:00-12:20  Therapy  
Ranniger, Johnny  

12:20-12:40  Film and Video Studies: Promotional Video  
Durkopp, Eric; Titus, Nicholas  

12:40-1:00  Wes Anderson and Mise-en-scene  
Catlin, Evan  

SESSION 21  
Session Chair: Lila Harper  

1:10-1:30  Persuasive Processes: Acknowledging Student Agency in Assignment Prompts  
Rampa, Peter  

1:30-1:50  Snicker, Snap, and Mutter: A Corpus Survey of Sarcasm in Fiction  
Bello, Camille  

1:50-2:10  Satire of Religious Education in Lewis Carroll’s Wonderland Texts  
Sedlacek, Cameron  

2:10-2:30  Like Something Out of Stephen King  
Tranchell, T.J.  

SESSION 22  
Session Chair: Susan Lonborg  

https://panopto.cw.edu/Panopto/Pages/Viewer.aspx?id=25a35872-523a-4301-bb17-6333444a08dc  

1:10-1:30  College Students’ Perception of Rape  
Gutierrez, Laura; Moore, Dorothy  

1:30-1:50  Exercise Motivations of Older Adults  
Attaway, Laura J.  

1:50-2:10  Evaluating the Efficacy of an Eight-Week Therapeutic Horsemanship Program with PTSD- and TBI-Experiencing Military Servicepersons  
DeNoble, Gina
<table>
<thead>
<tr>
<th>Time</th>
<th>Session 22 Room 137A (continued)</th>
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<tbody>
<tr>
<td>2:10-2:30</td>
<td><strong>The Effects of Detail and Valence on False Beliefs in Lies</strong>&lt;br&gt;Polage, Danielle</td>
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</table>

**SESSION 23 Room 137B**<br>Session Chair: April Binder

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>1:10-1:30</td>
<td><strong>Will Improved Assembly Approaches Lead to Improved Biological Inferences?</strong></td>
<td>Kleyn, Olivia; Mei, Wenbin</td>
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<tr>
<td>1:30-1:50</td>
<td><strong>The Genetic and Epigenetic Basis of Trichome Production in Mimulus guttatus (Yellow Monkeyflower)</strong></td>
<td>Neuffer, Sam</td>
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<tr>
<td>1:50-2:10</td>
<td><strong>The Invasive Plant Spotted Knapweed Exudate (±)-Catechin Inhibits Native Grass Root Growth</strong></td>
<td>Seiler, Ian</td>
</tr>
<tr>
<td>2:10-2:30</td>
<td><strong>Elucidating the Hormonal Regulation of the Claudin Genes in Ovarian Cells</strong></td>
<td>Gadson, Sean</td>
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</table>

**SESSION 24 Room 140**<br>Session Chair: Dion Rivera

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>1:10-1:30</td>
<td><strong>Effect of Black Carbon Nanoparticles on Epithelial Cell Proliferation</strong></td>
<td>Beebe, Naomi</td>
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<tr>
<td>1:30-1:50</td>
<td><strong>Studies on the Mechanisms of Forced Transport of Dye through Solution Modifications to a Polymerized Surface</strong></td>
<td>Siegenthaler, James</td>
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<td>1:50-2:10</td>
<td><strong>Kinetic Characterization of an Indicating Indigotetrasulfonate Ink</strong></td>
<td>Hoene, Becca</td>
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<tr>
<td>2:10-2:30</td>
<td><strong>Total Synthesis of Clavatadine A Analogs to Produce a Viable Reversible Inhibitor for Factor Xla</strong></td>
<td>Malmberg, Christopher</td>
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</tbody>
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**SESSION 25 Room 201**<br>Session Chair: Nathan Davis

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<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tr>
<td>1:10-1:30</td>
<td><strong>Measurement of Motor Drive Characteristics for Automobile Application</strong></td>
<td>Tiffany, Elizabeth</td>
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<td>1:30-1:50</td>
<td><strong>Implementations of Cyclic Coordinate Descent (CCD) Algorithm for Inverse Kinematic Models</strong></td>
<td>Anderson, Ian</td>
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<td>1:50-2:10</td>
<td><strong>Kids in Construction (KIC): An Introduction of STEM Related Careers in Construction Management</strong></td>
<td>Plugge, Warren</td>
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<td>Time</td>
<td>Session Title</td>
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<td>2:10-2:30</td>
<td>Active Learning and Industry Collaboration: Bringing the Real World into the Classroom</td>
<td>Martin, David; Plugge, Warren</td>
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<td><strong>SESSION 26</strong> Room 271</td>
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<td></td>
<td>Session Chair: Lene Pederson</td>
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<td></td>
<td>CULTURE, COLLISION AND MEMORIALIZATION THROUGH VISUAL ANTHROPOLOGY</td>
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<td>1:10-1:30</td>
<td>Tibetan Macaque Bridging Behavior</td>
<td>Clifton, Grant</td>
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<td>1:30-1:50</td>
<td>theatre people: Representing Live Artists and Radical Hope</td>
<td>Roberts, Chelsea</td>
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<td>1:50-2:10</td>
<td>Biking in the Burg</td>
<td>King, James</td>
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<td>2:10-2:30</td>
<td>Reflections of Colonialism in Algeria: An Analysis of Four Films</td>
<td>Talbot, Jordan</td>
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<td></td>
<td><strong>SESSION 27</strong> Room 301</td>
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<td>Session Chair: Anne Cubilié</td>
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<td>1:10-1:30</td>
<td>Comics Without Panels: Alternative Approaches to Graphic Storytelling</td>
<td>Macinko, Jess</td>
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<td>1:30-1:50</td>
<td>The Perils of Command in the British Navy</td>
<td>Hanberg, Claire</td>
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<td>1:50-2:10</td>
<td>The Missing Meditatio: Leonhard Euler’s (1707–1783) Contribution to Articulatory Phonetics</td>
<td>Hirschey, Olivia</td>
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<td>2:10-2:30</td>
<td>The Guiding Factor: Music In American Cinema</td>
<td>Vidmore, Jordan</td>
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<td><strong>SESSION 28</strong> Ballroom A</td>
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<td>Session Chair: Gayla Blaisdell</td>
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<tr>
<td>1:10-1:30</td>
<td>Crossroads Recording Project: Orchestral Mentoring Program</td>
<td>Anderson, Ryan; Dopierala, Adam; Reed, Christian</td>
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<tr>
<td>1:30-1:50</td>
<td>Inspiration and Expression: How Language Revealed My Music</td>
<td>Barker, George</td>
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<tr>
<td>1:50-2:10</td>
<td>An Examination of Italian Commedia dell’Arte in Mozart’s Opera Buffa</td>
<td>Stave, Caitlin</td>
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<tr>
<td>2:10-2:30</td>
<td>Dmitri Shostakovich’s The Nose: A False-Start on Russian Avant-Garde Modernism</td>
<td>Thornton, William</td>
</tr>
</tbody>
</table>
SESSION 29  Theatre
Session Chair: Melissa Johnson

1:10-1:30  Film Comparison: La Femme infidèle (1969) and Unfaithful (2002)
Allison, Caleb

1:30-1:50  Film Music and Audience Expectations
Leshley, Lauren

1:50-2:10  Star Wars’ and Sci-Fi’s Coming of Age
Allison, Caleb

SESSION 30  Room 135
Session Chair: Jay Ball

2:40-3:00  The Intermingling of Art and Science
Willard, Alyssa

3:00-3:20  Queer Photography and the Betrayal of the Image
Kim, Philippe (Hyojung); Walton, Lauren

3:20-3:40  Banish All The World: The Contrarianism of John Osborne
Kelly, Joshua

3:40-4:00  Qui est français?: Negotiating National Identity in Alain Badiou’s Ahmed philosophe
Talbot, Jordan

SESSION 31  Room 137A and online
Session Chair: Charles Reasons

https://panopto.cwu.edu/Panopto/Pages/Viewer.aspx?id=3a36175f-9748-4306-86b6-33fec7f3e496

2:40-3:00  Does the United States’ Constitution Protect Black Males from Police Homicide?
Brown, La-James; Rommel, Chelsie; Jammeh, Njambou

3:00-3:20  A Prosperous Hispanic Population Equates to a Robust America
Zamora, Edgar

3:20-3:40  Questionable Immunity
Bertomeu, Christopher

3:40-4:00  United States of Surveillance
James, Kyle

SESSION 32  Room 137B
Session Chair: Kristina Ernest

2:40-3:00  Phthalate Esters Exacerbate Neurodegeneration in a Caenorhabditis elegans Parkinson’s Disease Model
Darley, Jacob
3:00-3:20  Water in the Diet of the Great Basin Pocket Mouse  
Skewis, Robin

3:20-3:40  A Comparison of Female-Female Bridging to Male-Male Bridging in Tibetan Macaques (Macaca thibetana)  
Clifton, Grant

SESSION 33  Room 140  
Session Chair: Blaise Dondji

2:40-3:00  Assessment of Anthelminthic Activity of Plant Extracts on Ancylostoma ceylanicum and the Development of a Toxicity Bioassay  
McCornack, Jocelyn

3:00-3:20  Detection of Leishmania Parasites via Flow Cytometry  
Wenger, Analiese

3:20-3:40  Evaluation of Trypanosoma cruzi Strains in Jalisco, Mexico  
Nguyen, Uyen; Beck, Daniel; Wenger, Analiese

SESSION 34  Room 201  
Session Chair: Jenna Hyatt

2:40-3:00  The Road Less Traveled  
Ingebretson, Josh

3:00-3:20  Library Research Guides: Adapting to User-Centered Design  
Cox, Courtney

3:20-3:40  Effectiveness of the McNair Scholars Program at Central Washington University from 1992 to 2002  
Nevar, Pamela; Buvit, Ian

SESSION 35  Room 271  
Session Chair: Lene Pederson

CULTURE, COLLISION AND MEMORIALIZATION THROUGH VISUAL ANTHROPOLOGY

2:40-3:00  For Mark  
Loud, Austin

3:00-3:20  “Look at Me, I am the Captain Now:” Media Representations of Somalis and Their Implications  
Mohamed, Saeed; Lemkus, Clint
SESSION 36  Room 301
Session Chair:  Anne Cubilié

2:40-3:00  History, Identity, and the Origins of the Israeli-Palestine Conflict
            Krienen, Maggie

3:00-3:20  Sharing the Nile: The Grand Ethiopian Renaissance Dam
            Baldwin, Matthew

3:20-3:40  Dowry Death and the Caste System in India
            Rombough, Sonya

3:40-4:00  Language and Legislation: Bilingual Education in the United States, Eighteenth Century to the Present
            Hirschey, Olivia

SESSION 37  Ballroom A
Session Chair:  Jeffrey Snedeker

2:40-3:00  A Night of Cabaret: Be The Change
            Schaffroth, Kayla

3:00-3:20  Concert Performance of Clusters by Douglas Hill
            Jarvis, Mary; Brisk, Clarissa; Green, Rosie; Hansen, Jarrett; Henkle, Jessica;
            Mortensen, Sophie; Moss, Logan; Osborne, Madeline; Smith, Naomi;
            Stephenson, Hayley

3:20-3:40  Concert Performance of Variations on a Five-Note Theme by Russell Garcia
            Jarvis, Mary; Brisk, Clarissa; Green, Rosie; Hansen, Jarrett; Hawthorne, Sierra;
            Henkle, Jessica; Mortensen, Sophie; Moss, Logan; Nash, Katherine;
            Osborne, Madeline; Phipps, Madison; Smith, Naomi; Stephenson, Hayley

SESSION 38  Theatre
Session Co-Chairs:  Mark Auslander and J. Hope Amason

2:40-3:20  Learning in Museums
            Museum Studies students (abstract listed under Museum Studies students):
            Anderson, Brittany; Seelye, Liz; Hammersberg, Barbara; Bair, Sarah;
            Bauermeister, Margaret

3:20-4:00  The ExploreCentral Mobile App: Interpreting Ellensburg through Digital Technology
            Museum Studies students (abstract listed under Museum Studies students):
            Anderson, Brittany; Bair, Sarah; Budde, Heather; Crosby, Nicolas
POSTER PRESENTATION SCHEDULE

Only authors are listed for each paper/poster. Mentors are shown in the ABSTRACT portion of this program.

UNIVERSITY CENTERS

CWU-DES MOINES
Posters on display Tuesday, May 19, 2:00-5:30 p.m. in the Higher Education Center, Bldg 29

1. Unequal Development at the Local Level: A Case Study of Lakewood, Washington
   Turner, Stefan

2. Veterans Homelessness and the Housing Environment
   Rivera-Diaz, Teodoro

3. Effects of Temporary Agencies on Poverty Change
   Ulrich-Strickland, Russell

4. An Ancient Calendar Teaches Celebrating Conscious Living
   Kaviani, Khodadad (Khodi)

5. Employing Feedback Training to Bolster the Quantity and Quality of Peer-Feedback Flowing to Student Teachers
   Hougan, Eric
POSTER PRESENTATIONS, CREATIVE WORKS, AND CONSTRUCTED OBJECTS SCHEDULE: BALLROOMS B/C/D

Only authors are listed for each paper/poster. Mentors are shown in the ABSTRACT portion of this program.

POSTER SESSION 1
Posters on display from 8:30-11:00 a.m. Presenters must be by posters during judging from 9:15-10:45

SEISMIC HAZARDS, RISK, AND RESILIENCE IN ELLENBURG

1. Assessing Earthquake Preparedness in Southern Ellensburg
   Lawrence, Brian; Ray, Marcus; Schuler, Cecelia; Vance, Taylor Dale

2. Analysis of Earthquake Hazards in Eastern Ellensburg
   Clarke, Eamonn; Boteilho, Taylor; Lippman, Kyle; Wolfs, Kristin

3. Relocating Seismicity in the 2014–2015 Sheldon, Nevada, Earthquake Swarm
   Becerra, Rebeca

4. Mitigation Strategies for Central Washington University and Surrounding Residential Areas
   Huffstetler, Amanda; Hershfeldt, David; Martoncik, Bailey; Malella, Kimberly

5. Downtown Ellensburg and Surrounding Residential Areas
   Richards, Anita; Kempf, Daniel; Ellingsen, Keanna; Mayfield, Daija; Wolitarsky, Myrinda

6. Public Knowledge of Earthquake Hazard and Perceptions of Risk and Preparedness in Ellensburg
   Hershfeldt, David; Browitt, Elisabeth; Kempf, Daniel; Martoncik, Bailey; Schuler, Cecelia

GEOLOGICAL SCIENCES

7. Analysis of Depositional Processes After the Columbia River Basalt Flows, Early Ellensburg Formation, Bettas Road, Ellensburg, Washington
   Bennett, Kassia; Rogers, Sarah; Beatty, Kimberly

8. Fluid Release from Eclogite and Its Implications, North Qaidam Ultrahigh-Pressure Terrane, Western China
   Meyer, Jake

9. Pliocene–Quaternary Extension Across the Volcanic Tableland and Black Mountain Area, Eastern California Shear Zone
   DeLano, Kevin

10. Eight Thousand Years of Sedimentation and Arroyo Formation, Hanson Creek, Yakima Training Center, Washington
    Windingstad, Levi
Geological Mapping and Analysis of Red Mountain Fault, Owens Valley, California
Larsen, Erik

Methods of Assessing Streamflow and Shallow Groundwater Interactions
Presher, Jacob; Morton, Cristopher

Identifying Sediment and Woody Debris Deposition Following Peak Flows on the Elwha River, Washington
Frenzel, Ethan; McCausland, Nick; Free, Bryon

ELLENBURG HIGH SCHOOL PROJECTS
(Abstracts for posters 14-23 are listed under “E” for Ellensburg High School students)

Willows and Soil Invertebrates at Reecer Creek, Ellensburg, Washington
Barker, Maggie; Whitney, Samantha; Dineen, Andrew

Reecer Creek Cross Sections and Stream Sedimentation
Mathis, Jamie; Butterfield, Lia

Reecer Creek Sediment Size and Embeddedness
Michel, Marcus; Gasper, Quinton; Reynolds, Thys

Black Carbon Levels Within the Ellensburg Community
Dell, Max; Garoutte, Kellen; Deffner, David

Geographical Variations in Black Carbon Around Ellensburg, Washington
Jensvold, Nate; Hagen, Jaron

Macro-Invertebrate and Water Quality Of Reecer Creek
Gylling, Travis; Charlton, Claire; Alcaraz, Daniel; Moore, Emma

Building Better Burning Bubbles
Wilson, Eric; Sumner, Sasha; Nover, Miranda; Ernest-Beck, Langdon

Optimal Wetland for Ellensburg
Davis, Logan; Summer, Star; Canterbury, Owen

Imagine Tomorrow Transportation
Ernest-Beck, Abby; Shissler, Tamzen; Hashimoto, Uhuru; Larson, Elle; Snedeker, Garrett

Expanding Environmental Awareness in Our Hispanic Community
Baldovinos, Diana; Magana, Viridiana; Sanchez, Daisy; Valera, Carmen

COMPUTER SCIENCES

Real-Time Temperature Sounding in Ellensburg
Tinedrebeoga, Iliass

ENVIRONMENTAL STUDIES

An Analysis on the Effects of Burn Severity on Organic Matter in the Snag Canyon Fire
Pygott, Hannah; Mueller, Kelsey
GEOGRAPHY
(More geography posters are presented in Poster Session 2)

    Clifton, Grant; Walsh, Megan

CHEMISTRY

27. Towards the Synthesis of Novel 1,3-Azaborines as Potential HIV-1 Protease Inhibitors
    Norris, Katherine

28. Theoretical Study of the Flame Synthesis of Titanium Dioxide Nanoparticles
    Lam, Kui Ting; DePrekel, Douglas; Ngo, Kevin; Vo, Phu; Ge, Yingbin

29. Hydrogen Peroxide Production in the Presence of Soot and Biological Electron Donors
    Barnes, Jeff

30. Mobile Air Quality Monitoring in Ellensburg During Winter 2015
    Baker, Megan; Gibbs, Kelsey; Schulte, Jill

31. Manipulating the Kinetics of Methylene Blue and Phenol Red in Thin-Film Sol Gel
    Miller, Kelsey; Langevin, Spencer

32. Development of Standard Operating Procedures (SOPs) for the Safe, Educational, and Fun Performance of Chemistry Demonstrations
    Carman, Chad

33. Synthesis and Testing of Possible Antimicrobial Agents from Breakdown Products of Lasalocid A
    Wilson, Parker; Handley, Alex; Baluca, Diana

BIOLOGICAL SCIENCES; PRIMATE BEHAVIOR & ECOLOGY

34. Leadership in the Collective Movements of Tibetan Macaques (Macaca thibetana) at Mt. Huangshan, China
    Fratellone, Gregory; Sun, Lixing; Sheeran, Lori K.; Wagner, R. Steven; Li, Jinhua

35. Seasonality as a Mediator of Range Use and Feeding Behavior on the Parasite Richness of the Saddleback Tamarins
    Banda, Krista

36. Effects of Immune Serum on Macrophage Infection with Leishmania
    Cheslock, Mercedes; Wenger, Analiese; Anderson, Heidi

37. Insect Communities: Ellensburg Upstream Versus Downstream Sites
    Balda, Michael

38. Rapid Detection of E. coli Using Flow Cytometry Immunofluorescence
    Elg, Clinton
39. The Effects of Light on ±-Catechin’s Inhibition of Idaho Fescue’s Root Growth  
   *Clark, Sarah; Seiler, Ian*

40. Seasonal Nutrient Limitation in Taneum Creek, Washington  
   *Alling, Tyler; Clark, Desiree; Awan, Samara*

41. *C. elegans*, as a Model to Study the Effects of the Antidepressant, Escitalopram, on Behavior  
   *Baird, Tykayah*

42. Effects of Excess Testosterone on 129S1 Mouse Adipose Tissues  
   *Nelson, Raegan; Yeung, Howard*

43. The Effect of Testosterone on Gene Expression in White and Brown Adipose Tissue  
   *Simianer, Courtney*

44. The Effects of Testosterone on Adipose and Uterine Tissue in a PCOS Mouse Model  
   *Wenz, Sierra*

45. Observing the Effects of Novel Flavonoid Malheuran-2 on MCF-7 Cells Using Flow Cytometric Analysis  
   *Hoffer, Dean*

46. Substrate Temperature Preference in Pygmy Short-Horned Lizards (*Phrynosoma douglasii*)  
   *Rathburn, Elizabeth; Skjerping, Elena; Westervelt, Laura*

47. Investigation of Wilson Creek Coliform Bacteria Sources Within Ellensburg City Limits  
   *Hallsson, Kristel; Elg, Clint; Macke, Josh; Smith, Tyler*

48. Comparative Effects of Supplemental Folic Acid on Normal Versus Breast Cancer Growth Rate, Viability, and Morphology  
   *Tracy, Sarah; Bernstein, Ryan; Mallory, Shannon; Weldon, Cassandra*

49. Evaluation of the Anthelmintic Activity of Plant Extracts on the Hookworm *Ancylostoma ceylanicum*  
   *Cardenas-Garcia, Brianda*

   *Crow, Hanna*

**PHYSICS**

51. Light Curve of 383 Dodona  
   *Ullery, Dylan; Fulkerson, Jordan*

52. Using Entangled Photons for Single Photon Interference  
   *Zimmerer, Nathan*

53. Creating Entangled Photons by Spontaneous Parametric Down Conversion  
   *Savisky, Blake*
54. Growth Cone Mechanics
   North, William
55. Tracking Molecular Motors Along Microtubules
   Griffin, Daniel
56. Measured Laser Frequencies from the Optically Pumped Methanol Isotopologue $^{13}$CD$_2$OD
   Freeman, Benjamin
57. Investigating the Correlation Between Inclination of Coronal Loops and Solar Flare Activity
   Mann, John-Paul
58. Origin of a Cosmic Ring in NGC 7538
   Arakawa, Jason
59. Predicting Solar Sigmoid Lifetimes Based on Shearing in the Photosphere
   Stone, Austen
60. Spherical Shell Resonance and Applications as a Model for the Human Skull
   Tangocci, Adam
61. Experimental Investigation of Nonlinear Wave Behavior in a Tensegrity Mast
   Westland, Joy

WALTER STROM MIDDLE SCHOOL SCIENCE PROJECTS
(The abstract for posters 62-63 is alphabetized under “W” for Walter Strom)
62. Tweet, Tweet ... What Do Birds Prefer to Eat?
   Jackson, Grace; Baker, Naomi; Brenden, Alyssa
63. Working with Wood
   Vaughn, David; Baker, Natalie; Warne, Austin
64. Insects in the Open and Closed Forest
   Hink, Hallee; Bierek, Elizabeth; Amick, Shiloh
65. Fly Away ... Bird Seed in Cle Elum, Washington
   Whitemarsch, Morgan; Nass, Marissa; Towne, Jacob
66. Rain Catchers
   Terrill, Grace; Howard, Ke’mesha
67. Air Temperature in Cle Elum, Washington
   Homouth, Caitlin; Palo, Wren; Valdivia, Chela
68. The Forest Belongs to Everyone
   Ireland, Kila, Ferguson, Ryan; Morrow, Aurora
69. Bird is the Word
   Abourek, Jenna; Corey, Aspen
POSTER SESSION 2 AND CREATIVE WORKS

Posters on display from 11:30 a.m.-2:00 p.m.
Presenters must be by posters during judging from 12:00-1:30

CREATIVE WORKS

MUSIC

1. No poster. Submission removed from program.

2. The Effects of Acoustics on Music Performances and Recordings
   Shelton, Katie

THEATRE

3. The Making of a Soldier
   Berry, Jackson

ART

4. The Subtleties of Soda
   Bury, Amanda; Charles, Noah

5. Revitalizing Central Washington University’s Largest Art Collection: New Photographics
   Crady, Skyler

6. The Vicissitudes of My Life Through Still Life Art
   Lupton, Alexandra

APPAREL, TEXTILES AND MERCHANDISING

7. The Common Star
   Mahr, Emma

8. She’s Awakened: Release
   Leach, Alissa

9. Vivido Déesse
   Eklund, Andrea

10. Lily of the Valley
    Wescott, Rachael

11. It Girl
    Abrams, Lauren

12. Sweet Goddess
    Villasenor, Karina

13. Lucid Dream
    Clark, Malissa
14. **Wanderlust**  
   Harris, Kaylee

15. **After Death**  
   Johnson, D’ondre

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**POSTER PRESENTATIONS**

**PHYSICAL EDUCATION, SCHOOL & PUBLIC HEALTH**

16. **Family Planning and Reproductive Health Experiences of Latina Women in a United States’ Border City**  
   Ojeda, Erika; Manzo-Casio, Margarita

17. **Central Washington University Campus Community Garden: A Mural Project**  
   Love, Angie; Soto, Blanca; Leger, Catherine; Johnson, Alex

18. **Trends in Youth Drug Behavior in Guam**  
   McCutchen, Jennifer

19. **Environmental Perceptions of Central Washington University Students**  
   Morton, Cris

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**ANTHROPOLOGY**

20. **Migrant Health Education at Broetje Orchards**  
    Baker, Megan

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**NUTRITION, EXERCISE & HEALTH SCIENCE**

21. **Cancer Survivor Rehabilitation Program: Biopsychosocial Outcomes and the Influence of Initial Fitness Levels**  
    Mulroy, Samantha

22. **The Temporal and Directional Dependencies of Sway During Ten Seconds of Single Leg Stance in Young, Healthy College Students**  
    Vanderheyden, David

23. **Cardiorespiratory Responses to High Intensity Interval Shallow Water Exercise**  
    Miller, Laura; Fisher, Mitchell; Gerrish, Heather; Roemer, Karen; D’Acquisto, Debra; D’Acquisto, Leo

24. **The Effect of Applesauce and Nonfat Yogurt as Fat Replacers in Brownies**  
    Epstein-Solfield, Alexandra; Knopp, Shelby; Wetli, Jennifer

25. **The Benefits of Adding Additional Fiber from Cellulose, White Wheat Flour Fiber, and Cottonseed to Zucchini Muffins**  
    Bottman, Lindsey; Cannon, Cassy; Nealy, Megan

26. **Acceptability of Adding Pea Powder Protein to Pumpkin Spice Muffins to Make a Good Source and Excellent Source of Protein**  
    Marzano, Jami; Johnson, Samantha; Weldon, Cassandra
27. Konjac Glucomannan as an Effective Fiber Additive in Gluten-Free Scones  
Skala, Philip; Allen, Ian; Sykes, Elijah

28. Fluid Intake and Sweat Rate During Hot Yoga Participation  
Stalder, Amanda; Campbell, Stephanie; Pritchett, Kelly

29. Nutrient Intake of Elite Canadian and American Athletes with Spinal Cord Injury  
Gerrish, Heather

30. Whole Body Fuel Use: A Preliminary Study of Carbohydrate and Fat Oxidation During Water Exercise  
Gerrish, Heather; Miller, Laura; Fisher, Mitchell; D’Acquisto, Debra

31. The Effect of Healthy Hunger-Free Kids Act on School Meals  
Ogan, Dana; Bergman, Ethan; Shaw, Emily; Englund, Tim

32. The Effects of a Vegetarian Diet on Dietary Iron Intake in Adolescent Female Endurance Athletes  
Reiley, Tucker; Gerrish, Heather; Varner, Meghan

33. Eating Behaviors Associated with Higher Risk of Chronic Disease in Youth at Guam Summer Activity Camps  
Siler, Johanna

RESOURCE MANAGEMENT; GEOGRAPHY; POLITICAL SCIENCE

34. Post-Glacial Fire and Vegetation History of Horsetail Lake in the Teanaway Area of the Central Eastern Cascades, Washington  
Ferri, Serafina; Walsh, Megan

35. Fire Regime Dynamics of Fish Lake, Blue Mountains, Oregon  
Goodner, Chris

Rushton, Zoe; Walsh, Megan

37. Geographic Information System (GIS) Cost Surface Analysis for Forager Travel: Archaeological Settlement Models, Frank Church River of No Return Wilderness, Idaho  
Saunders, Anthony

38. Mapping a Resource War: Spatial Analysis of Conflict and Minerals in the Congo Rift Valley  
Braun, Anthony

Balda, Michael; Shinn, Allison

40. Factoring Climate Change into Recreation Investment Decisions: Evidence From Hatcher’s Pass, Alaska  
Blair, Logan
41. Holocene Fire History of Green Lake, Eastern Cascades, Washington, Determined Using Macroscopic Charcoal Analysis
Pilkington, Dusty; Walsh, Megan

42. Coastal Wetlands Surrounding New Orleans, Louisiana
Meinhold, Andrew

ANTHROPOLOGY & MUSEUM STUDIES

43. Wet-Sites Artifacts: Preservation and Exhibition
Johnson, Andrew

44. Macro Analysis: In The Field Versus In The Lab Use Wear
Chenvert, Erin; Probasco, Desirae

45. Comparison of Radiometric Dating Techniques: Pacific Northwest
Brown, James

46. Comparative Morphological Analysis of Calcined Bone
Davis, David; Brown, James

47. Comparative Analysis of Tool Cut Marks on Cattle Bone
Limberg, Caitlin; Holstine, Robert

48. Statistical Testing for Patterns in the Distribution of Middle Columbia Housepit Archaeological Sites
Johnson, Matt

49. Effects of Fine-Fraction Pre-Treatment for Laser Diffraction Particle Size Analysis
Johnson, Matt; Walton, Lauren

50. Metatarsal Variation in Morphology of the Hallux in Non-Human Primates
Jager, Daniel

51. Obsidian Hydration Dating of Obsidian Lithic Fragments from the Grissom Site (45KT301)
Burris, Daniel

52. Bioarchaeology, Barbados, Eastern Caribbean: Isotopic Analyses of Teeth and Bone from Human Remains
Hansen, Tiffany

53. Analysis of Fatty Acids in Precontact Ceramics from Barbados, West Indies
Hendrix, Jillian; Troth, Kaylee; Barker, Sara; Kaminski, Amanda; Peters, Joanne; Ward, Timothy

DOUGLAS HONORS COLLEGE; POLITICAL SCIENCE; PUBLIC ADMINISTRATION

55. Humanitarian Aid for the Occupied Palestinian Territories: A Policy
Weber, Madelyne; Coryell, Brayana; Rombough, Sonya; Gerrish, Heather
56. Human Rights and the Role of Peacekeeping in the Occupied Palestinian Territories  
   Baldwin, Matthew; Hendrix, Jillian; Kleyn, Olivia; Neff, Austin; Hanberg, Claire

57. Hydropolicy in Ethiopia  
   Baldwin, Matthew

58. Higher Vocational Education and the Demands of Rapid Development in China  
   Han, Xiao

59. The Port of Liuzhou: Problems and Prospects  
   Wang, Xifang

60. Revitalization of the Urban Core in Liuzhou  
   Zeng, Huanhuan

61. Environmental Protection: Recovery and Development in Liuzhou City  
   He, Hong

62. New Thinking about Urban Growth: Liujiang County  
   Li, Lihua

63. Sustainable Local Agriculture to Support Liuzhou’s Metropolitan Complex  
   Huang, Xiaojie

64. Liuzhou’s Housing Supply: Affordable Quality Housing for Everyone  
   Zhang, Huazhi

65. Political Science Nobel Laureates  
   Prpich, Matthew; Hodgins, Jeremiah; McCullough, Tommy; Galvan, Eric

66. Bellingham Coal Trains  
   Prpich, Matthew

67. Production, Taxation, and Sale of Legalized Marijuana  
   Reid, Curtis

68. Patenting Genes: Genetically Modified Organisms (GMOs)  
   Gibbs, Kelsey

69. Analysis of the Use It or Lose It Policy  
   Wilkinson, Taylor

70. Vietnamese Migration Patterns and Public Policy  
   Nguyen, Johnny; Vo, Binh; Treadway, Jennifer
CONSTRUCTED OBJECTS AND POSTER SESSION 3
Posters on display from 2:30-5:00 p.m.
Presenters must be by posters during judging from 3:00-4:30

CONSTRUCTED OBJECTS

ENGINEERING TECHNOLOGIES, SAFETY, & CONSTRUCTION; 88.1 THE BURG

1. Victair Mistifier Gearbox  
   Bruno, Gabe; McFarlen, Casey; Skinner, Rick

2. Dump Bed Lifting Mechanism  
   Pate, Zachary

3. WakeBoard Winch  
   Christensen, Eric

4. Conversion Casting from A36 Steel to Class 40 Gray Iron  
   Nichols, Christopher

5. Pivoting Foot Pegs  
   LeBlanc, Michael

6. American Society of Mechanical Engineers (ASME) R/C Baja Car  
   Wilhelm, Nathaniel; Dowdell, Chelsea

7. A Composite Brake Rotor Assembly by Utilizing Replaceable Friction Surfaces  
   Evert, John

8. Branch Cutting Attachment  
   Hubbard, Cullen

9. Custom Glasses Cases  
   Klukas, Nikolas

10. Cell Phone in the Sky: Quadcopter for Aerial Photography  
    Zhang, Hengwei

11. Heat Transfer Capabilities of a Plate and Frame Heat Exchanger  
    Johnson, Eric

12. The Advances in Prosthetics  
    Garcia, Jose

13. Composite Snowmobile Suspension System  
    Villarma, Michael

14. MX SnowSki  
    Olson, Jordan

15. Emulsion Pressure Relief  
    Greear, Aaron
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<th>Authors</th>
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<td>Touchscreen Coding: Reversi</td>
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<td>Electric Vehicle Front Suspension</td>
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<td>Budnick, Sam; Dickson, Jeremy; Kluever, Kyle; Porter, Kevin</td>
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<td>Seat Jack</td>
<td>Worden, Justin</td>
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33. Three-Phase Motor Controller  
   Kastner, Cameron  

34. The Effectiveness of New Age Instruction  
   Purcell, Brandon; Browne, Ashley  

SCIENCE EDUCATION; EDUCATIONAL FOUNDATIONS; WORLD LANGUAGES; MATHEMATICS  

35. You Want Me to Do WHAT? Transforming Faculty Practice to Improve Student Critical Thinking  
   Kappenman-Schiller, Kristy; Kurtz, Martha; Johnson, James; Thomas, Carin  

36. Student Use of Internet Video Lectures in Physics  
   Penoyar, Patrick  

37. In Depth with Leyendo Juntos/Reading Together Workshop  
   Cardenas, Estrella M.  

38. ¡A escribir! Writing Strategies for Heritage Students at the College Level  
   Pinto, Edward  

39. Factors that Influence College Students’ Choice of a Mathematics Based Career  
   Guadarrama, Veronica  

40. Technology Usage and Relationship Satisfaction  
   Rogers, Michaela; Jaenicke, Kirsten  

FAMILY AND CONSUMER SCIENCES  

41. The Relationship Between Child Life Care and Perceptions of Pediatric Hospitalization  
   Montgomery, Lindsay  

42. Maternal Labor Force Participation and Attitudes about Work-Family Balance  
   Wold, Brittany  

43. The Educational and Job Attainment Effects of Mentoring on Central Washington University Students  
   Cummings, Reality  

LIBRARY  

44. The Medieval Screen: A Work in Progress  
   Carmen, Julie  

PRIMATE BEHAVIOR & ECOLOGY  

45. Javan Gibbons (Hylobates moloch) Vary Gesture Use by Recipient’s Attentional State at the Gibbon Conservation Center, California  
   Bell, Melanei; Sheeran, Lori; Skollár, Gabriella
46. Effects of Fluorescent and Natural Lighting on Auditory Working Memory Tasks  
   Dion, Madison

47. Student Usage and Perceptions of Digital Devices in the Classroom and While Driving  
   Larrabee, Elena; Williams, Hannah

48. Consumers’ Psychological Understanding of Nutrition Labels in Regards to Nutrition Value  
   Hardwick, Danica

49. No poster. Submission removed from program.

50. Electrophysiological and Behavioral Working Memory Differences Between Musicians and Non-Musicians  
   Richardson, Benjamin; Felke, Zach; Whorley, Grace; Medrano, Marisha; Williams, Hannah

51. Auditory Reaction Time and Behavioral Working Memory Differences Between Musicians and Non-Musicians  
   Richardson, Benjamin; Felke, Zach; Medrano, Marisha; Whorley, Grace; Williams, Hannah

52. An Investigation of the Relationship Between Childhood Maltreatment and Rape Myth Acceptance Scores  
   Waggoner, Danna

53. Understanding Bullying: An Analysis of Current Literature on Bullying and Prevention Programs  
   Olden, Hunter

54. An Evaluation of Behavioral Skills Training to Teach Assertiveness Skills to College Students  
   Warrington, Savannah; Lovett, Sadie

55. The Effects of Marijuana Decriminalization on Youth  
   Ramirez Hernandez, Nancy

56. Ethnic Cleansing in America  
   Tankersley, Hailey

57. ___ Lives Matter: Current Movements Against Police Brutality  
   Guerra, Felicity; Osborn, Joshua; Ryser, Nate; Vander Stoep, Beth; Wu, Sheena

58. Newspaper Analysis: Impact of Immigration Raid in Rural Community  
   Alcala, Ana

59. An Exploration of How Using Best Practices Curriculum with Tutoring Affects Kindergarten Literacy: A Literature Review  
   Collins, Cay
61. The Influence of Family Upbringing on the Facial Inference Process
   Pellegrini, Kara; Benner-Kenagy, Christopher; Gilbert, Meghan; Licea, Jacqueline;
   Ojeda, Jonathan; Mitchell, Jordan Segura

62. The Relationship Between Gender and Perceived Stress Levels in College Students
   Gilbert, Meghan
Image Classification with Approximately Biologically Realistic Elements

**Abdul-Wahid, Sami**

*Mentor(s): Razvan Andonie, Computer Science*

Oral Presentation, Session #15  
12:40-1:00 p.m. in Room 137B

Image classification is a well studied problem, with applications such as face recognition and natural image classification. Here, image classification is done using a neural network of spiking neurons in a feedforward hierarchy that resembles certain structures of the visual cortex. Image encoding is done first through edge detection on the image, after which an HMAX model is used to bring about degrees of scale, position, rotation, and contrast-reverse invariance. Then, a single spiking neural network layer is trained to classify the encoded image using supervised learning. Results are shown for classification of single digit handwritten numbers.

*Keywords: Machine Learning, Computational Intelligence, Artificial Spiking, Neural Network*  

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*It Girl*

**Abrams, Lauren**  
*Mentor(s): Andrea Eklund, Family and Consumer Sciences*

Poster Presentation Session #2, Creative Works, Poster #11  
11:30-2:00 p.m. in Ballroom B/C/D

Purpose: The purpose for this garment was to create a piece of clothing that a woman can wear out to a formal or social event. I wanted to make the wearer feel confident and sexy, but at the same time show her fun side. The off-shoulder strap creates a sexy and confident look and the handmade roses show the fun and romantic side of the woman. Having a bold purple color shows a more fun and confident woman.  

Process: The process of this garment started with my interests. I love roses and I wanted to do something with them. I looked on Pinterest for ideas and what I could do with my interest in roses. I started sketching and it took a few tries to get the perfect dress; after that I measured my model and started draping. Once the draping was done, I started patterning the draped garment. After flat patterning, I began to create my sample garment. With the sample garment, I fitted it on my model to see if there were any adjustments I needed to make. Adjustments were made to the pattern from the fitting. The finished garment was sewn together and roses were hand sewn on as a final touch to the garment. Techniques: The technique I used to make this garment was draping. The bodice was draped using the princess line technique. The pattern for the skirt was a flare skirt draping technique. I used French seams to assure the inside of the garment looked as clean and tidy as the outside. The straps were cut on the bias to have more stretch for ease of movement. Making the roses and applying them to the final garment was a tedious and detail-oriented process. Innovation: The innovation of this garment is the three dimensional texture and how it expresses the fun and confidence of the woman wearing the dress. Materials: Cotton fabric, polyester, a zipper, and purple threads. *This is one in a line of three garments; the entire line can be seen at the Apparel, Textiles, and Merchandising spring fashion show, May 30, at 3:00 p.m. and 7:00 p.m. in Milo Smith Theater in McConnell Hall.*

*Keywords: Roses, Draping, Handmade*
The Role of Magma Mixing in the 1968-2010 Eruption of Arenal Volcano, Costa Rica: Insights from Modelling of the Magma Chamber

Adams, Jenna; Streck, Martin; Spera, Frank
Mentor(s): Wendy Bohrson, Geological Sciences

Oral Presentation, Session #16
12:40-1:00 p.m. in Room 140

Magmatic processes, such as magma mixing (mixing of two or more magmas), control compositional diversity of magmas (less to more silica-rich), eruption style (gentle to explosive), and can potentially catalyze eruptions, making documentation of mixing events at active volcanoes important for improving eruption prediction. Thousands of cases of magma mixing have been documented, but a new computational approach documents for the first time the relative size, frequency, and location beneath the volcano of mixing events. The 1968-2010 eruption of Arenal Volcano, Costa Rica, produced lava flows that are homogenous at the whole-rock (kg) scale but highly heterogeneous at the crystal (mg) scale. The hypothesis of Streck et al. (2005) that four distinct magmatic components mixed in a shallow subvolcanic magma reservoir to produce Arenal's lavas was analyzed by the Magma Chamber Simulator, a new thermodynamic computer model (Bohrson et al., 2014). Based on several hundred simulations, model results constrain pre-mixing pressure, oxygen fugacity, temperature, and H2O contents of the four crystallization environments. Three reside 3-6 km below the surface and magmas are relatively oxidized (QFM to QFM+1) with moderate water concentrations (2-3.5 wt.%). The fourth is ~23 km below the surface with crystallization requiring oxidizing conditions (QFM+1) and H2O contents of 3-4 wt.%. Mixing simulations that best reproduce observed temperatures and lava and crystal compositions require high frequency, small volume intrusions that mix into a shallow subvolcanic magma chamber. Quantification of the size and frequency of mixing events should improve our understanding of eruption precursors, thereby improving volcanic hazard prediction.

Keywords: Magma Mixing, Thermodynamics, Eruptions

Newspaper Analysis: Impact of Immigration Raid in Rural Community

Alcala, Ana
Mentor(s): Arthur Manjarrez, Ethnic Studies and the Academic Advising Center

Poster Presentation Session #3, Poster #58
2:30-5:00 p.m. in Ballroom B/C/D

The purpose of this study was to review newspaper articles that referenced the immigration raid that occurred in Ellensburg, Washington. On January 20, 2011, federal agents arrested 14 Ellensburg area residents early on Thursday morning (4:00 a.m.) on criminal charges of manufacture and purchase of counterfeit identities and employment documents. Thirteen of those arrested were women. Content analysis was used to answer the “What?” but not the “Why?” questions. Thus, content analysis was used to describe, organize, and summarize the content of the newspaper articles and the effects on the community. This newspaper analysis revealed the themes of the immigration raid as having strong impacts on the children of the families, the children in the local schools, and the children in the greater community.

Keywords: Immigration, Newspaper Articles, Trauma
Two key determinants of stream ecosystem productivity are algal activity, the source of primary production of energy in a food web from solar radiation via photosynthesis, and heterotrophic activity, the bacterial and fungal consumers of this primary ecosystem production. Nitrogen (N) and phosphorus (P) concentrations often determine ecosystem productivity, and varying nutrient levels exist within an ecosystem seasonally. For example, during the fall, leaf input decomposes, possibly leading to different nutrient levels compared to winter, when few leaves remain in the stream. This variation can be applied to higher trophic levels via bottom up ecosystem production whereby increased primary production increases production at higher trophic levels such as fish. We used nutrient diffusing substrata to measure seasonal changes in ecosystem nutrient limitation in two sites in Taneum Creek, which has been of interest to the Yakama Nation due to their active migratory fish repopulation efforts. In the fall, we found that heterotrophic activity in Taneum Creek was co-limited by N and P at both study sites, \( p=0.006 \) upstream and \( p<0.001 \) downstream, whereas autotrophic activity was not nutrient limited. In the winter, upstream heterotrophic and downstream autotrophic production were co-limited by N and P, \( p=0.007 \) and \( p=0.019 \), respectively, but autotrophic productivity upstream and heterotrophic activity downstream were not nutrient limited. This study will continue in spring and summer for a comprehensive analysis of limiting factors to autotrophic and heterotrophic activity, which will form a better understanding of ecosystem productivity to support fisheries reintroduction.

*Keywords: Productivity, Autotrophic, Heterotrophic*

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**Film Comparison: La Femme infidèle (1969) and Unfaithful (2002)**

*Allison, Caleb*

*Mentor(s): Liahna Armstrong, English*

I will be presenting and expanding on my final paper, a film comparison, in French cinema from winter quarter of this year. When a Hollywood director remakes a foreign film, one may expect an experience that is a distant cousin, rather than a close twin, to its original. Loose ends in the narrative are tied up, moral ambiguity is reworked to depict a clear right and wrong, and patriarchal dominance is bolstered and reaffirmed to preserve the structure of American society as a whole. I will compare French director Claude Chabrol’s *La Femme infidèle* (1969) with Adrian Lyne’s Hollywood remake *Unfaithful* (2002). While Lyne manages to preserve, in part, certain French qualities of the original, in the end he cannot help but take sides, notably punishing each wrongdoer for his or her moral failings; a stance not taken by Chabrol. My presentation will include visuals via PowerPoint slides, stills and clips from the two films, excerpts from my paper, and additional arguments and insights expanded for the purposes of this talk. I will expound on the qualities characteristic of French film and those unique to Hollywood, examining the work of each director and exploring how they embody the values of their respective markets. Dr. Liahna Armstrong, my instructor in French cinema, has been my mentor throughout this process. I owe the vast broadening of my understanding in cinema studies in no small part to her thought-provoking teachings and the genuine encouragement she lavishes upon the individuals in her care.

*Keywords: Film, French, Hollywood*
Star Wars’ and Sci-Fi’s Coming of Age
Allison, Caleb
Mentor(s): Melissa Johnson, Film and Video Studies

Oral Presentation, Session #29
1:50-2:10 p.m. in the Theatre

George Lucas’ Star Wars (1977) marked a crucial turning-point in film history, reshaping how science-fiction films could and should present themselves, incorporating themes never before used in the genre, reaching an audience untouched by its predecessors, and establishing a firm and economically viable market for sci-fi films that had hitherto not existed. I will be presenting my final paper from History of Narrative Film from winter quarter of this year: “Star Wars’ and Sci-Fi’s Coming of Age.” I will explore the narrative and aesthetic elements that set Star Wars apart as a groundbreaking science-fiction film within its historical and cultural context. My presentation will include visuals via PowerPoint slides, incorporating stills and brief clips from the film where necessary, as well as a version of my essay that I have modified to fit as a verbal presentation. Professor Melissa Johnson has been my mentor throughout this process. As always, her input and support are truly invaluable. I am grateful for the opportunity to present my findings at SOURCE this year!

Keywords: Film, Science-Fiction, Star Wars

The Year of the Tortoise: Original Screenplay
Allison, Caleb
Mentor(s): Melissa Johnson, Film and Video Studies

Creative Expression Presentation, Session #13
12:20-12:40 p.m. in Room 135

The Year of the Tortoise is my most recent feature-length script, a coming-of-age comedy-drama following an angst-ridden high school student. The character embarks on a turbulent quest of self-discovery in pursuit of long-sought recognition from his peers and the heart of the one girl who, he believes, makes his life worth living. This story is the amalgamation of a decade of my own personal experiences and relationships, unified by themes of personal identity, living in the moment, and finding peace in a culture obsessed with self-promotion and personal fulfillment. I will present my work as a film pitch, exploring themes, tone, settings, characters, conflict, and narrative structure, including my inspiration for the piece and culminating with a performance of one scene in the script. Professor Melissa Johnson served as my mentor on this project, as she did for my presentation at SOURCE last year. I am indebted to her for her guidance and support, without which I would not be presenting such a complete and realized piece of my own artistic and philosophical vision this year.

Keywords: Coming-of-age, Self-discovery, Relationships

Rodriguez v. United States
Allison, Elizabeth
Mentor(s): Teresa Francis Divine, Law & Justice

Oral Presentation, Session #6
9:40-10:00 a.m. in Room 137A

Rodriguez v. United States explores the use of drug detection dogs by police officers while conducting routine stops. It examines the citizen’s interest in privacy as opposed to the benefit to police of drug detection. Rodriguez argues that his traffic stop by police was complete but was unreasonably prolonged after he denied consent to a dog sniff of his car, and that the wait for a backup officer to arrive at the
scene was beyond reasonable. The state argues that the delay was short and, therefore, the stop was reasonable. Since a drug detection dog is only trained to detect contraband, the invasion of privacy is minimal. This presentation examines both arguments that are before the Supreme Court of the United States and the implications for society.

Keywords: Drug Detection, Dog Sniff, Consent

Feast Your Eyes: Performances in American Sign Language
American Sign Language students (ASL 253 and 301 students): Alegria, Alanna; Baggarley, Kelsi; Barnett, Mishele; Beauchamp, Abby; Calahan, Somer; Clark, Micaela; Compton, Sarah; Davis, Micaiah; Erland, Sarah; Gilbert, Celena; Klepec, Kaitlan; Leist, Laura; Main, Stephanie; Maupin, Samuel; May, Kendall; McKenzie, Kelly; Nelles, Paige; Olive, Karlee; Payne, Jourdyn; Pudlitzke Caitlin; Rivas, Vianey; Starkenburg, Kazia; Stewart, Nathan
Mentor(s): Jer Loudenback, World Languages

Creative Expression Presentation, Session #11
9:40-11:00 a.m. in Ballroom A

This presentation consists of performances in American Sign Language (ASL) by students in ASL classes at Central Washington University. Group project presentations by second year students will include Millions of Cats, a classical children’s story told in ASL. The objective of the project is to develop unique creative performances by intertwining signs among a group of storytellers. Third year students will present “Individual Works Using Creative Use of Signs” in which each student developed their own individual stories using traditional ASL and creative use of signs. All projects will have a brief description about ASL as a language and its components. All performances will be voiced for the signing impaired.

Keywords: American Sign Language, Creative Process, Visual Arts

Peace, Love, Unity, and Respect: The Moral Economy of Rave Culture
Anderson, Brittany
Mentor(s): Hope Amason, Anthropology & Museum Studies

Panel Presentation, Session #18
11:40-1:00 p.m. in Room 271

Each year tens of thousands of individuals travel great distances to the largest rave event in the Pacific Northwest, located at an outdoor arena in Washington State. Social expectations at rave events such as this are forged by the rave values of peace, love, unity, and respect, referred to by ravers as PLUR. Ravers promote PLUR through the sharing of drugs, alcohol, kandi bracelets, and costumes. This presentation analyzes fieldwork from this rave in order to contemplate apparent contradictions within rave culture that are fostered when the moral economy of PLUR meets conspicuous consumption. Ravers strive for an economy outside market forces while at the same time reinforcing market economy through ticket sales, camping supplies, costumes, and original payments made for bartering material. How do participants at raves practice solidarity yet remain individual, and how are these two positions reflected in moral obligations and economy?

Keywords: Economy, Gifting, Consumption
Implementations of Cyclic Coordinate Descent (CCD) Algorithm for Inverse Kinematic Models

Anderson, Ian
Mentor(s): Nathan Davis, Engineering Technologies, Safety, & Construction

Oral Presentation, Session #25
1:30-1:50 p.m. in Room 201

The cyclic coordinate descent (CCD) algorithm is well established for use in numerically determining solutions to the inverse kinematics of manipulators. This algorithm uses progressive numerical approximations of the forward kinematic model to determine a set of joint parameters that satisfies the specified position and orientation of the end effector. This provides an easily implementable approach to solving the non-linear inverse kinematics. This paper presents the implementation of the CCD algorithm for the Mitsubishi MELFA RV-6SD Industrial Robot. The paper provides code samples to illustrate how to develop and implement the forward kinematics model commercially available numerical computing software. It then demonstrates the application and development of the CCD algorithm from the forward kinematics. Finally, the paper illustrates how to use the CCD algorithm to linearly interpolate between points within the workspace. This paper provides an introduction to the forward kinematics using the D-H parameters and its application to inverse kinematic problems. The paper does not address issues involving singular solutions, system dynamics, or workspace restrictions within the reachable space. The paper presents a series of examples that are used to develop conceptual understanding in the students. These examples are progressively constructed so that the students are re-enforcing previous concepts with each project within the course.

Keywords: Index Terms – CCD Algorithm, D-H Parameters, Forward Kinematics, Inverse Kinematics.

Crossroads Recording Project: Orchestral Mentoring Program

Anderson, Ryan; Dopierala, Adam; Reed, Christian
Mentor(s): Todd Shiver, Music; Terri Brown, Theatre Arts: Musical Theatre; Anne Cubilié, Douglas Honors College

Creative Expression Presentation, Session #28
1:10-1:30 p.m. in Ballroom A

The purpose of creating the Crossroads Recording Project is to collaborate with the phenomenal theatre talent of Seattle, to create a recording of where I am now as a artist/performer, to give back to the education programs that got me to where I am today, and to offer the world a new version of classic showtunes in an artistic format that is tangible to my scholastic endeavors in my major of musical theatre. The idea of crossroads acts as the motif for this project, to inform many of the artistic perspectives of the characters in each of these pieces. Not only will many characters intersect lives in this recording, but also all of the artists will cross paths to collaborate with each other when they all intersect together to create this artistic expression. With the profits of the sales of the album, a portion of funds will go back to the theatre education programs in Seattle, including 5th Avenue Rising Star Project and Northwest Choirs, and to Broadway Cares/Equity Fights AIDS. In my scholastic work, the exploration into these songs each develops a different moment, decision, or conflict between the characters involved. From this project, there will be an established analysis about producing a successful artistic piece of work through collaborating with other artists on a vision, developing different artistic talents in the studio, and learning how to nurture a learning process in a high stress environment of a professional recording studio.

Keywords: Showtunes, Orchestra, Recording
Origin of a Cosmic Ring in NGC 7538
Arakawa, Jason
Mentor(s): Darci Snowden, Physics; Cassandra Fallscheer, Physics

Poster Presentation Session #1, Poster #58
8:30-11:00 a.m. in Ballroom B/C/D

NGC 7538 is a high mass star forming region about 8,800 light years away. In this region, stars are being born, beginning from a large collapsing dust cloud. After the formation of the star, the burning of hydrogen in the core through nuclear fusion produces photons that outflow and exert pressure, called radiation pressure, on the gas and dust surrounding the star, forming a bubble of empty space. The research investigated an elliptical gas ring in NGC 7538, similar to these bubbles, whose source is unknown as it doesn’t have a star in the center. This research investigated whether a runaway star could have formed in or passed through the center of the ring region previously, initialized the expansion of the ring, then moved out of the region. A program was written to plot stars around the ring in three dimensions, and from the stars plotted so far, there have not been any stars that intersected the ring in the past. We will continue to consider more stars from more databases to determine if a runaway star did intersect the ring in the past.

Keywords: Physics, Star-forming Region, Astronomy

Exercise Motivations of Older Adults
Attaway, Laura
Mentor(s): Jeff Penick, Psychology

Oral Presentation, Session #22
1:30-1:50 p.m. in Room 137A

This study examined and compared the exercise motivations of older adult competitive athletes (CA) and non-competitive fitness exercisers (NCF). The findings show the strongest motivating factor for both these groups was that of enjoyment. Health ranked high for both groups. Competition as motivation ranked high for the CA and was not significant for the NCF group. The motivation of stress management ranked evenly across both groups. Social recognition ranked lowest in both groups with the NCF group displaying the lowest score. There were 103 participants in this study.

Keywords: Exercise, Motivations, Older Adults
Depression is one of the most commonly diagnosed mental disorders in the world, and the use of antidepressant drugs to help with the effects associated with depression continues to rise. Depression is associated with low levels of serotonin (5-HT) in the neuronal synapses of the brain. Escitalopram (brand name Lexapro) is an widely used antidepressant and functions as a selective serotonin reuptake inhibitor (SSRI), which increases levels of 5-HT at the synapse. While the acute effects of escitalopram are known, the effects of long-term use of escitalopram, which results in continuous elevation of 5-HT, have not yet been fully studied. We have chosen the roundworm, *C. elegans*, as a model to examine the long-term effects of escitalopram treatment. Acute 5-HT treatment slows locomotion in worm. Upon chronic 5-HT treatment, the worm will recover their speeds back to levels similar to that of untreated animals. This is a behavior termed adaptation. In *C. elegans*, food serves as a stimulus that releases 5-HT into the synapses of the worm causing them to slow; escitalopram enhances this slowing on food, which is expected of a drug that inhibits reuptake of 5-HT. We have begun studies to examine whether or not the chronic or long-term treatment of escitalopram also causes adaptation. In addition, we will test mutant worms that are defective in adaptation to 5-HT to see if they are also defective in adaptation to escitalopram. These studies could provide insight into the genes involved in cellular pathways that could be linked to depression.

**Keywords:** Depression, Antidepressants, Adaptation

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This project throws female archetypes in videogames away by turning one of the most popular male characters into a believable, playable female character. Fueled by research in history, costume design and construction, Ezio Auditore from Ubisoft’s *Assassin’s Creed: II* is redesigned as Ezia Auditore. In this game, Ezio loses his brothers and father to a conspiracy against his family. In his acts of vengeance against his enemies, Ezio learns of the Assassin Order his father was secretly part of and their battle with the Templars. Research for this project breaks down into three parts: videogame, history, and costume. The videogame section looks into the world of the franchise. Who is Ezio? Who are the Assassins? What is his life like in Renaissance Italy? The history section focuses on the differences between the lives of men and women. What was the late 15th century like? What was life like for an Italian lady at this time? Lastly, the costume section looks specifically at how women presented themselves. What were women wearing? How did they style their hair? These pieces culminate into the final question: How will the implementation of research change Ezio, his costume, and how the game is played? Using this, Ezio turns into Ezia, a woman assassin of the Renaissance who enacts her vengeance while masquerading as a courtesan to get close to her enemies. She faces a loss in status with the loss of the men in her family, but a gain in independence as she finds freedom through the Assassins. Her costume design contains the original spirit of Ezio while embracing the fashion of Italian women in the late 15th century. The entire project culminates in a final realized costume that explores the character’s design, movement, and functionality.

**Keywords:** Costume, Video Games, History
Migrant Health Education at Broetje Orchards

Baker, Megan

Mentor(s): Tracy Andrews, Anthropology & Museum Studies

Poster Presentation Session #2, Poster #20
11:30-2:00 p.m. in Ballroom B/C/D

Although it is recognized that there is a gap in health education in migrant and other under-served populations, very few programs have been established to address this problem. This research is important because it highlights areas in which health education is lacking and provides suggestions on how to address these issues. The purpose of the research was to assess the health education program present in the migrant community living in the Vista Hermosa community at the Broetje Orchards in Prescott, Washington, and to compare it to other migrant and agricultural communities. The Vista Hermosa Community is a unique case study because the Broetje family established this community for their migrant workers in 1988. Along with supplying housing, the family also provides a schooling system, daycare, and a health education program for their employees. The public health committee was established in hopes of increasing the availability of health education materials available to the community. The public health committee and members of the Broetje family were interviewed to assess the current health education available in the Vista Hermosa Community. More than half of the community has attended either one or both of the previous health fairs offered by the public health committee, thus it is important to consider the content and scope of education materials provided for participants.

Keywords: Migrant Health, Health Education, Anthropology

Mobile Air Quality Monitoring in Ellensburg During Winter 2015

Baker, Megan; Gibbs, Kelsey; Schulte, Jill

Mentor(s): Anne Johansen, Chemistry

Poster Presentation Session #1, Poster #30
8:30-11:00 a.m. in Ballroom B/C/D

Ambient particulate matter smaller than 2.5 µm in diameter (PM 2.5) has been shown to correlate with serious health issues such as pulmonary and cardiovascular disease, as well as asthma. In recent years, air quality in Ellensburg has exceeded the national 24-hr average of 35 µg/m³ during winter months as well as during wild fire events, yet continuous air quality monitoring for the Ellensburg area is limited to a single monitoring site on top of the Hal Holmes Community Center. The purpose of this Department of Ecology funded research was to further characterize the sources and geographic distribution of PM in Ellensburg during colder evenings in January through March of 2015. To this end, three different types of instruments were placed in a vehicle and a set track of ~16 miles was driven five times over the course of one evening to obtain air quality data in the area. Instruments consisted of two Environmental Protection Agency-approved portable nephelometers (for PM2.5), one aethelometer (for black carbon), and two microaethelometers (for personal monitoring of black carbon). Geographic information system (GIS) mapping tools and statistical software programs will be used to analyze the data geographically, temporally, and comparatively to identify hotspots. Results from this research will aid in understanding causes of poor air quality in Ellensburg and, thus, be used to mitigate against further deterioration of our air as well as to increase awareness of air quality issues in our community.

Keywords: Air Quality, Environmental Chemistry, Black Carbon
Eastern Washington Wildfires: Tracking Land Recovery in the Colockum Tarps Wildfire Area

Balda, Michael; Shinn, Allison
Mentor(s): Jennifer Lipton, Geography

Poster Presentation Session #2, Poster #39
11:30-2:00 p.m. in Ballroom B/C/D

Eastern Washington State has seen an increase in wildfire activity because of policies of fire suppression and changing climate. The Colockum Tarps wildfire started on July 27, 2013, in Malaga, Washington, due to a water pump malfunction. After ignition, the fire quickly moved south-southwest and burned a total area of 80,408 acres of grasslands and forest. We combined fieldwork and geospatial analysis of aerial photography and satellite imagery to examine vegetative recovery within the fire area. Using ArcGIS and PCI Geomatica, we analyzed 2013 National Agricultural Imaging Program (NAIP) images and a wildfire perimeter shapefile from the Bureau of Land Management. We used Landsat 8 data from 2013, 2014, and 2015 provided by United States Geological Survey–Earth Explorer. We also used aerial photos from 2013 and burn perimeter maps provided by the Department of National Resources to obtain pre- and post-fire vegetation conditions. We used DNR Inciweb reports to see daily weather conditions and to monitor fire growth. LANDSAT 8 imagery were processed for a change detection analysis and a Normalized Burn Ratio (NBR) analysis. We also conducted fieldwork at the site of the fire. Lastly, we analyzed the datasets to evaluate overall change and burn severity to identify recovery. Using air photo techniques, we found that climatic factors have the biggest impact on wildfire growth. Using remote sensing analysis, we found that there was a significant amount of regrowth of vegetation between the months of August and October 2013 in the grassland areas, but slow regrowth in forested areas.

Keywords: Wildfire, Analysis, Recovery

Insect Communities: Ellensburg Upstream Versus Downstream Sites

Balda, Michael
Mentor(s): Clay Arango, Biological Sciences

Poster Presentation Session #1, Poster #37
8:30-11:00 a.m. in Ballroom B/C/D

Urban stream syndrome occurs when an urban area affects a stream system. Stream burial is common in urban systems, and burial blocks incoming light, potentially affecting available food resources and, in turn, affecting the insect communities. I tested for changes to the stream ecosystem as a result of urbanization by measuring insect community parameters upstream and downstream of buried sites in the three creeks in Ellensburg, Washington, that are affected by urban stream syndrome. I measured chlorophyll on rocks, total suspended sediments (TSS), fine benthic organic matter (FBOM), ammonium, and phosphorus to relate to insect communities characteristics. I hypothesized that there would be an overall significant difference between insect communities in the upstream and downstream sites. Each creek was tested at two sites, with an upstream and a downstream testing location, totaling twelve sample sites. To find the significance of the data, a paired t-test was used to find any significance between the upstream and the downstream sites. I found no significant difference in chlorophyll, FBOM, or TSS between the upstream and downstream sites, $p = 0.92$, $p = 0.47$, and $p = 0.50$, respectively. However, I did find higher phosphorus concentrations upstream of a buried stream segment compared to downstream, $p = 0.048$, implying net phosphorus uptake in the buried reach. The identification of the individual insects within their respected communities will show whether or not burial is affecting these communities.

Keywords: Insects, Water, Burial
Human Rights and the Role of Peacekeeping in the Occupied Palestinian Territories

Baldwin, Matthew; Hendrix, Jillian; Kley, Olivia; Neff, Austin; Hanberg, Claire

Mentor(s): Anne Cubilié, Douglas Honors College

Poster Presentation Session #2, Poster #56
11:30-2:00 p.m. in Ballroom B/C/D

This presentation represents a draft policy paper addressing the well-known documented patterns of human rights abuses occurring in Israel and the Occupied Palestinian Territories. The draft policy paper seeks a solution to the entrenched conflict through the effective use of peacekeeping forces in the region, under the authority of the Responsibility to Protect principle. Peacekeeping, and its role in furthering humanitarian causes and fostering an environment of sustainable peace in the Occupied Palestinian Territories, are examined.

Keywords: Israel, Palestine, Peacekeeping

Hydropolicy in Ethiopia

Baldwin, Matthew

Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #2, Poster #57
11:30-2:00 p.m. in Ballroom B/C/D

The Ethiopian Growth and Transformation Plan was a five-year plan put forward by the Ethiopian Government to modernize, stabilize, and drastically improve the quality of life for everyone in Ethiopia. The plan was centrally focused on encouraging foreign investment opportunities, and undertook many large scale development projects. To accomplish this plan, Addis Ababa attempted to pursue grand power-generating abilities and to become a hydropower juggernaut in the region, as well as secure energy resources with membership in the East African Power Pool. This presentation evaluates how Ethiopia’s developmental and intergovernmental efforts have helped in achieving the desired growth and transformation.

Keywords: Hydropolitics, Nile, Ethiopia

Sharing the Nile: The Grand Ethiopian Renaissance Dam

Baldwin, Matthew

Mentor(s): Anne Cubilié, Douglas Honors College

Oral Presentation, Session #36
3:00-3:20 p.m. in Room 301

With construction of Africa’s largest hydroelectric power station, the Grand Ethiopian Renaissance Dam (GERD), beginning in 2011 and slated for completion in 2017, Ethiopia has catapulted itself to a position of power in the Blue Nile Basin. Located forty-five kilometers from Sudan’s border, the dam is to be the largest hydroelectric power station throughout all of Africa, eclipsing Egypt’s Aswan Dam with more than twice the electricity output which will be delivered throughout Ethiopia and sold to neighboring countries. However, the construction of the GERD represents a significant departure from past water sharing agreements between states in the Blue Nile Basin, which have traditionally heavily favored Egypt. Remnants of British and Italian colonialism and regional power dynamics have long stymied Ethiopia’s use of the Nile. However, within the last decade, intergovernmental organizations and shifting power dynamics of the region have paved the way for Ethiopia’s rise to being a dominant power along the Nile, a reshaping of how resources can be managed, and enabled development of the GERD.

Keywords: Nile River, Water Politics, Ethiopia
Seasonality as a Mediator of Range Use and Feeding Behavior on the Parasite Richness of the Saddleback Tamarins

**Banda, Krista**

*Mentor(s): Gabrielle Stryker, Biological Sciences*

Poster Presentation Session #1, Poster #35
8:30-11:00 a.m. in Ballroom B/C/D

This study aims to investigate which intestinal parasites are found in the Peruvian Amazon’s tamarins and how seasonality influences parasite richness and prevalence. Previous studies have shown a positive trend between moist environments and numbers of intestinal parasite. The mantled howler monkeys of Costa Rica living in La Selva, a wetter habitat, had greater intestinal parasite infections than their counterparts at La Pacifica, a drier habitat. Unlike howler monkeys, tamarins are smaller primates and must engage in a foraging strategy called traplining that requires them to gather small amounts of food in many places along a long route. Tamarins have large home ranges, between 30 to 120 hectares, relative to their body size. Peruvian seasonal changes may inhibit range use and feeding ecologies. It can affect what vegetation is available and the density of insects found in a given habitat. This study focuses on the degree to which seasonality mediates the relationships between feeding behavior and parasite richness found in saddleback tamarins in the Los Amigos Field Site in Puerto Maldonado, Peru. Fecal samples will be collected in collaboration with Field Projects International from the populations, $n=4$, and labeled with their individual ID number, sex, approximate age, date of collection, time of collection, and collector. I will follow groups of tamarins noting the feeding behaviors along with their global positioning system (GPS) coordinates. Fecal samples will be collected, read, and analyzed using fecal flotation, fecal sedimentation, and polymerase chain reaction (PCR) in the Parker Lab in the University of Missouri-St. Louis.

*Keywords: Seasonality, Parasites, Primates*

Inspiration and Expression: How Language Revealed My Music

**Barker, George**

*Mentor(s): Laurie Moshier, World Languages*

Creative Expression Presentation, Session #28
1:30-1:50 p.m. in Ballroom A

This project is a musical response to a simple class assignment. Second-year German students were asked to analyze the syntactic and semantic elements of the poem “Vergnügungen” by German poet Bertolt Brecht. Following their analysis, students were asked to write their own poem; maintaining the form but not the content of the original Brecht poem. Through the poems, which speak of the pleasures of life, the viewer can observe the expression of diverse character traits, as well as common themes through each poem. When viewed collectively, the poetry exhibits the development of an individual through various stages in life. This observation formed the basis for a musical project, taking the spirit of the poetry and translating it into musical form. Specifically, the piece draws from three of the poems that were representative of the whole body of poetry. Each poem exhibited characteristics peculiar to three phases of life: childhood, adolescence, and adulthood. The composition, drawing from the language of the poems, produces an auditory likeness of the development of an individual from youth through adolescence, to adulthood, emphasizing the differences in each stage through tempo and mode (i.e., shifting from major key to minor). While illustrating the differences in each phase of life, the piece emphasizes the unchanging and eternal aspects of an individual’s character through the use of repetition in chord structure and thematic development. The author will give an oral presentation of the project, and follow with a performance on the piano of the resulting piece.

*Keywords: Composition, Music, Translation*
Hydrogen Peroxide Production in the Presence of Soot and Biological Electron Donors

Barnes, Jeff
Mentor(s): Anne Johansen, Chemistry; Dan Hinz, Chemistry

Poster Presentation Session #1, Poster #29
8:30-11:00 a.m. in Ballroom B/C/D

The detrimental effects of carbonaceous nanoparticles emitted from fuel combustion are well known, but their underlying chemical mechanisms are not. Particle toxicity is generally thought to stem from the \textit{in vivo} production of reactive oxygen species (ROS), but the details remain tenuous. Here, experiments were carried out to investigate the production of hydrogen peroxide (H$_2$O$_2$), an ROS, as a function of soot characteristics and redox-active iron content in the presence of biological electron donors. At biologically representative concentrations, results show that the presence of soot is essential in the continuous production of H$_2$O$_2$ at concentrations on the order of hundreds of nM and that a small redox-active pool of iron may be responsible for the conversion of H$_2$O$_2$ to a more potent ROS, hydroxyl radical (OH). Further investigation on the role of particle characteristics is underway. Data from this study are likely to lead to a better understanding of the reactivity and transformation of carbonaceous particles in a variety of settings.

\textit{Keywords: Soot, Nanoparticle, Hydrogen Peroxide}

BDS Aviation Products

Bates, Aiden; DeFrang, Brian; Shupe, Stephanie
Mentor(s): Jason Underhill, Aviation

Business Plan Competition, Oral Presentations, Session #4
10:45-11:15 a.m. in Room 301

BDS Aviation Products is focused on creating products concentrating on aviation safety and recovery for modern operators of heavy technologically advanced equipment. BDS provides planning, installation, and maintenance for the products we offer to our valued customers. Our products offer both time and economical savings as well as provide a sense of comfort knowing there would be a quicker recovery process in the unfortunate case of an aircraft accident.

\textit{Keywords: Business Plan Competition, Aviation Safety, Aviation Products}
Brushing Up on Oral Health: Childhood Oral Health Education in Ellensburg
Bates, Lindsey; Leger, Katie; Curran, Daniel; Olsen, Casey
Mentor(s): Tishra Beeson, Physical Education, School & Public Health

Oral Presentation, Session #9
9:40-10:00 a.m. in Room 201

The intent of this service learning project was to develop and execute a health promotion strategy that would improve dental health behavior of first-grade students. The objectives of our promotion were as follows: to survey existing oral health behaviors; teach the importance of dental health; explain the effects of healthy and unhealthy snacks on dental health; teach proper brushing techniques; facilitate positive attitudes towards healthy behavior; present a fun, age-appropriate curriculum; provide tools to support a sustainable change in health behavior; and assess program efficacy. We met our objectives by first creating an interactive and age-appropriate curriculum for the first grade pilot class to which we presented, \( n = 70 \). We then surveyed the pre-existing dental habits of these students by using a “heads down, hands up” method, in an attempt to eliminate peer influence on student responses. Next, we presented information on the importance of good, consistent dental habits, and healthy snacking. We demonstrated proper brushing techniques, gave the students toothbrushes and toothpaste, and guided them through practicing the techniques they had just learned. We closed our presentation by re-surveying the students and found that they had a significant increase in skills and knowledge. Not only did our data indicate that our health promotion strategy was effective, but the fact that we were asked to come back and present to three additional classes spoke to the overall success of this presentation.

Keywords: Community, Health, Education

Relocating Seismicity in the 2014–2015 Sheldon, Nevada Earthquake Swarm
Becerra, Rebeca
Mentor(s): Walter Szeliga, Geological Sciences

Poster Presentation Session #1, Poster #3
8:30-11:00 a.m. in Ballroom B/C/D

Since mid-July 2014, an earthquake swarm has been occurring in northwestern Nevada approximately 250 km north of Reno. Seismicity rates in the swarm slowly increased over a four month span culminating in a number of mid-magnitude 4 earthquakes in early November, 2014. Since that time, seismicity rates have slowed and, as of early April, the swarm now totals more than 4,500 earthquakes. The earthquake swarm is occurring in a region of the western basin and range that has seen very little historical seismicity, but is dominated by extensional features typical of the region. Focal mechanisms for the largest earthquakes show normal faulting but hypocenters appear to be poorly aligned with local tectonic structures. In order to assign these earthquakes to a regional structure, we relocated a total of 155 earthquakes using a joint hypocentral determination method. For the six largest earthquakes, we manually picked absolute P and S wave arrival times. In addition, we performed waveform cross-correlation on 153 earthquakes to get differential travel times. We then performed a joint hypocentral determination using both of our absolute and relative travel time catalogs. We found that the earthquake swarm is rupturing the normal faults bounding the western edge of the Sheldon Plateau. In addition, we found many highly correlated waveforms from earthquakes spanning the duration of the earthquake swarm, suggesting that the same regions of the fault are rupturing repeatedly.

Keywords: Basin and Range Seismicity, Earthquake Swarm, Earthquake Relocation
Effect of Black Carbon Nanoparticles on Epithelial Cell Proliferation
Beebe, Naomi
Mentor(s): Anne Johansen, Chemistry; April Binder, Biology

Oral Presentation, Session #24
1:10-1:30 p.m. in Room 140

Black carbon (BC) nano particles (NPs) have been shown to reduce cell proliferation leading to cell death, and they have been implicated in adverse health effects to the cardiovascular system. While the exact mechanisms of action are unknown, it is generally accepted that their role in the production of reactive oxygen species (ROS) is the main cause of these detrimental effects. Here, cell toxicity assays are performed to better understand the underlying mechanisms and relevant particle characteristics. Particles used in this study are derived from the combustion of fossil fuels, and are being characterized for surface area, surface speciation, and trace metal content. The cell proliferation assay, MTS, is applied to quantify the effects of the BC NPs on C10 cells, which are type II mouse lung epithelial cells. Preliminary data show a decrease in cell viability as the concentration of particles increases. Assays will also be performed on cells exposed to BC NPs with ferrous iron (Fe(II)) and anthraquinone (AQ), as results from previous studies correlated increased disruption of the electron transport chain with these two NP constituents in collected aerosol samples. Results from this work will complement data currently obtained on the generation of hydrogen peroxide in the presence of these particles in biologically relevant medium and allow us to better understand underlying mechanisms of cell disruption and what particle characteristics are key players in this process.

Keywords: Nanoparticle, Toxicity, Cellular

Javan Gibbons (*Hylobates moloch*) Vary Gesture Use by Recipient’s Attentional State at the Gibbon Conservation Center, California
Bell, Melanei; Sheeran, Lori; Skollár, Gabriella
Mentor(s): Lori Sheeran, Primate Behavior & Ecology

Poster Presentation Session #3, Poster #45
2:30-5:00 p.m. in Ballroom B/C/D

Gestural communication of large-bodied apes has been extensively studied, however data on small-bodied ape communication are less common. We explored gestures used in communication by captive Javan gibbons (*Hylobates moloch*) housed at the Gibbon Conservation Center in Santa Clarita, California. We hypothesized that a sender gibbon’s gesture modality would vary with the recipient gibbon’s attentional state. We predicted that senders would be equally likely to use all gesture modalities (i.e., tactile, visual, actions, and facial expressions) when the recipient was attending or facing the sender, but would be biased toward tactile gestures and actions when the recipient was non-attending or oriented away from the sender. We collected data from three gibbon groups, n=10 individuals, using all-occurrences sampling and an ethogram to score behaviors from digital video recordings. Occurrences of gestures through the four modalities were recorded during a gibbon’s attempt to interact with another group member. We observed 1,143 interactions over 20 days. When all data were aggregated, gibbons used visual gestures, t(18)=2.79, p=0.01, and facial expressions, t(18)=2.60, p=0.02, significantly more when the recipient was attending and used tactile gestures, t(17)=2.47, p=0.02, significantly more when the recipient was non-attending. There was no significant difference in the actions modality, t(18)=0.82, p= 0.43. These data show that Javan gibbons used gestures that are appropriate to the recipient’s attentional state in three out of the four modalities.

Keywords: Gestural Communication, Attentional State, Gibbons
Snicker, Snap, and Mutter: A Corpus Survey of Sarcasm in Fiction  
Bello, Camille  
Mentor(s): Loretta Gray, English

Oral Presentation, Session #21  
1:30-1:50 p.m. in Room 135

This study aims to determine how sarcasm is communicated in written discourse. Writing sarcastically is challenging for essentially two reasons: 1) loss of paralinguistic cues, such as behavior and intonation, as a marker; and 2) because sarcasm has no standard grammaticalized form. Sarcasm is differentiated from irony. To gather data, a search string was conducted on the Corpus of Contemporary American English (COCA) using the word “sarcastically” in the category of fiction. A total of 287 items resulted from the search. The hypothesis was that, in addition to the use of the word “sarcastically”, there would also be additional lexical information present used to convey sarcasm. It is this information that was analyzed. Lexical items from this search string were found to fit into nine categories of the proposed quasi-tense “the sarcastive” by author John Haimen, a leading researcher on the topic of sarcasm. The categories, or sarcasm cues, are as follows: hyperbole, sneers and laughter (out of context), ironic repetition of fresh talk, flattening, enantiosemantic phrases, hyperformality/register, manner of speaking verbs, repetition, and syntactization. It was found that hyperbole was the most frequent cue for sarcasm, followed by flattening, manner of speaking verbs, enantiosemantic phrases, hyperformality, repetition, sneers and laughter (out of context), ironic repetition of fresh talk, and syntactization. After a review of the literature, it became quite clear that the study of the pragmatic field of sarcasm is one that is emerging, but that is particularly lacking in clear standards and definitions.

Keywords: Sarcasm, Irony, Pragmatics

Analysis of Depositional Processes After the Columbia River Basalt Flows, Early Ellensburg Formation, Bettas Road, Ellensburg WA  
Bennett, Kassia; Rogers, Sarah; Beatty, Kimberly  
Mentor(s): Breanyn MacInnes, Geological Sciences

Poster Presentation Session #1, Poster #7  
8:30-11:00 a.m. in Ballroom B/C/D

The Columbia River Basalt (CRB) flows ~15 million years ago flattened the topography of central Washington and altered the environments of existing river systems. The goal of our project is to understand how the local fluvial system responded to the CRB flows and eventually evolved into the environment we live in today by analyzing the laterally extensive outcrop at Bettas Road, which is an excellent example of sediment deposition immediately after a flood basalt event. Via hand sample and thin section analysis as well as published CRB flow maps, we confirmed that the base layer of the outcrop was of the Grande Ronde CRB flow, which indicates that the sediments deposited directly atop the basalt are the earliest of the Ellensburg Formation. We hypothesized that the first sediments deposited after the basalt would be fine-grained due to the unchannelized nature of the flattened topography, and that volcanic debris flows would dominantly be fine-grained and hyper-concentrated. We further predicted that, as rivers developed channels, the grain size would become larger and the volcanic debris flows would be dominantly coarser-grained lahars. To test these hypotheses, we mapped the 930 meter long outcrop, identified sedimentary facies, and performed grain-size analyses using a point-count method as well as sieves and a Mastersizer. Our results indicate that the grain size of both the fluvial and volcanic sediments generally coarsened upwards, as the fluvial system was not able to transport coarse-grained sediment immediately after the CRB flows but gradually evolved to transport larger material via mature channels.

Keywords: Columbia River Basalt, Ellensburg Formation, Environmental Evolution
The Making of a Soldier
Berry, Jackson
Mentor(s): Scott Robinson, Theatre

Poster Presentation Session #2, Creative Works, Poster #3
11:30-2:00 p.m. in Ballroom B/C/D

Using their original film and audio recordings, writings, and photography, this work is a composite documentary of two specific soldiers’ experiences, one in World War II and the other in Vietnam, as they corresponded back and forth using audio cassette tapes to relay their thoughts toward life, war, and what the future held.

Keywords: War, Family, Learning.

Questionable Immunity
Bertomeu, Christopher
Mentor(s): Charles Reasons, Law & Justice

Oral Presentation, Session #31
3:20-3:40 p.m. in Room 137A

Do military personnel have more restrictions on use of deadly force than domestic police? When you put on a uniform for work, and carry a sidearm, the public places great trust in the decisions you will make. Military personnel and police officers are afforded this trust, in which they are expected to do their jobs appropriately. What happens when one or the other breaks this trust and uses deadly force in the accomplishment of their jobs? It seems, in most cases, police officers are afforded qualified immunity when it comes to fatal shooting incidents, whereas military personnel are not afforded the same consideration. Do police officers experience more autonomy, while military personnel experience more bureaucracy? Do we expect more control over deadly use of force from our military personnel versus what we expect out of our police officers? These questions will be explored through statutes, case law, regulations, and recent incidents. With events happening in many departments and United States’ forces still deployed overseas, it is important to address these questions. Through education and understanding, a possibility for effective change can take place.

Keywords: Deadly Force, Immunity, Culpability

Chelsea’s All Girls Auto
Bidwell, Chelsea
Mentor(s): KeKe (CoCo) Wu, Management

Business Plan Competition, Oral Presentations, Session #4
10:10-10:40 a.m. in Room 301

Buying a car has become a rite of passage in our country, as well as a necessity of everyday life. However, while everyone needs a car, not everyone enjoys the process of purchasing a car. For many women, buying cars is stressful and uncomfortable due to pushy, overbearing car salesmen. I can speak to the frustrations felt by women around the country, and aim to change all of that now. My objective is to create a more comfortable, respectful car-buying experience for women. Chelsea’s All Girls Auto is a car dealership designed for women and run by women, providing a safe haven for women to turn to when they find themselves in need of a new vehicle.

Keywords: Business Plan Competition, Car-Buying, Customer Service
Feminism, Fantasy, and the Fourth Wave
Blackson, Ginny
Library

Oral Presentation, Session #12
10:40-11:00 a.m. in the Theatre

Fourth Wave Feminism is an evolving theoretical construct deeply based in activism outside the traditional avenues used by prior generations. This session will examine how this new generation of feminism is influenced by, and reflected in, contemporary Young Adult Fantasy novels by authors like Tamer Pierce and Melinda Lo.

Keywords: Feminism, Library Science, Young Adult Literature

Factoring Climate Change Into Recreation Investment Decisions: Evidence From Hatchers Pass, Alaska
Blair, Logan
Mentor(s): Jennifer Lipton, Geography

Poster Presentation Session #2, Poster #40
11:30-2:00 p.m. in Ballroom B/C/D

Winter sports infrastructure brings general welfare to communities as well as potential economic growth. However, it is known that average snow cover in northern hemispheres has reduced by 10 percent since the mid-1960s (Folland, 2001). Employing Landsat data and remote sensing techniques such as the normalized difference snow index (NDSI), this research examines snow cover change in Hatchers Pass, Alaska, over a 28-year period. Results reveal that snow cover has dropped as much as 47 percent between 1986 and 2014 suggesting that, in addition to traditional cost benefit analysis, site specific environmental change studies should be considered when evaluating winter recreation investment.

Keywords: Remote Sensing, Natural Resource Management, Economics

The Benefits of Adding Additional Fiber from Cellulose, White Wheat Flour Fiber, and Cottonseed to Zucchini Muffins
Bottman, Lindsey; Cannon, Cassy; Nealy, Megan
Mentor(s): David Gee, Nutrition, Exercise & Health Science

Poster Presentation Session #2, Poster #25
11:30-2:00 p.m. in Ballroom B/C/D

The number one cause of death in America is cardiovascular disease. To combat this, individuals can consume food products to increase their fiber intake to the recommended 25 grams per day. If a product contains at least 2.5 grams of fiber per serving, a company can claim that it is a good source of fiber. This experiment, conducted in February of 2015, aimed to increase fiber consumption by creating a good-source-of-fiber muffin without altering the taste. To do this, part of the whole wheat and all-purpose flour in the recipe were replaced with one of three International Fiber Corporation fiber powders. The powders used were White Wheat Fiber (WWF), Powdered Cellulose (FFC), and Cotton Seed (BVF). No significant differences, \( p<0.05 \), were subjectively determined between any of the three fibers compared to the control, BVF: \( n=32 \), WWF: \( n=32 \), FFC: \( n=60 \). Objective testing, \( p>0.05 \), \( n=18 \) for all tests/muffin types, showed a significant difference in mean penetration force between the control muffins compared to all three variable muffin types. Adding white whole wheat fiber and cotton seed fiber resulted in a softer muffin than the control, while powdered cellulose resulted in a harder muffin. There were no significant differences, \( p<0.05 \), \( n=18 \) for all tests/muffin types, in percent moisture content and mean withdrawal force between the variable muffins and the control muffins. Therefore, one can conclude that all three fibers create acceptable replacement muffins that are a good source of fiber.

Keywords: Fiber, Muffin, Cellulose
The Fourth Amendment of the United States Constitution was established to protect citizens from unlawful search and seizure conducted by the government. Over the years, government investigations into closely regulated businesses have been an issue argued in numerous venues. The courts have ruled that businesses such as hotels do not have an exclusive expectation of privacy because the benefit of randomly searching motel/hotel registries has helped society by fighting crimes such as prostitution and sex trafficking. There is a conflicting opinion of the Sixth and Ninth Circuit Courts of California that determines whether hotels are protected under the Fourth Amendment. In *City of Los Angeles v. Patel*, it will be determined whether hotels have an expectation of privacy per the Fourth Amendment by the Supreme Court of the United States. I will discuss impact of the court’s decision whether warrantless searches of hotel registries are a violation of the Fourth Amendment.

*Keywords: Fourth Amendment, Right to Privacy, Unlawful Searches*

The international community has placed more awareness of conflict minerals since the Sierra Leone Civil War. Despite the large amount of market and consumer attention placed specifically on diamonds since the war, there are other minerals mined in Africa that have become increasing categorized as conflict minerals. In the East Africa Rift Valley, between the Democratic Republic of the Congo, Uganda, Rwanda, and Burundi, a mineral rich region has been the location of many conflicts over the past 25 years. The question of whether minerals extracted in this region are being used by conflict actors to fund their rebellions has not been answered, yet little attention has been paid despite the possibility that minerals found in everyday life, such as tin and copper, could be integral to over two decades of bloodshed. This research will utilize ArcGIS and Statistix to analyze reports of attacks on civilian populations between 2010 and 2014 by conflict actors. Incidents of violence against civilians will be further analyzed to spatially correlate attacks with mining locations to determine whether minerals being extracted from mines in the region can be classified as conflict minerals.

*Keywords: Resource, Conflict, Correlation*

Quantitative genetics is the study of complex biological traits, or traits controlled by more than one gene. Traditional quantitative genetic models use the (co)variances of traits to predict evolution in response to selection. However, traits often result from nonlinear interactions between developmental factors. Because of this, traditional models may not accurately predict evolutionary dynamics. With an updated
mathematical framework, we have developed a program that will determine the extent to which the developmental architecture of traits affects the evolutionary response of a given species. To date, we have developed an object-oriented program in Java as well as C++ that is highly adaptable, easily permitting future extensions to the code base. The program's infrastructure allows for increasingly complex levels of developmental interaction through the incorporation of a class hierarchy that refines and increases the flexibility of the code. This programming structure will readily interface with a web-based tool that accepts user supplied functions for particular biological systems that can then be seamlessly integrated into the source code. The completed program will allow users to test hypotheses about how the developmental interactions among multiple traits affect their (co)variances and subsequent evolutionary trajectories.

*Keywords: Object-Oriented Programming, Quantitative Genetics, Evolutionary Developmental Biology*

**Comparison of Radiometric Dating Techniques: Pacific Northwest**

*Brown, James*

*Mentor(s): Steven Hackenberger, Anthropology & Museum Studies; Patrick McCutcheon, Anthropology and Museum Studies*

Poster Presentation Session #2, Poster #45  
11:30-2:00 p.m. in Ballroom B/C/D

Radiometric dating is problematic in non-midden sites of the Pacific Northwest. Charcoal is ubiquitous in the forest soils and unburned bone readily dissolves. This fact impedes development of regional chronologies and understanding of the process of resource intensification that was so important to development of Northwest cultures. To alleviate this deficiency, DirectAMS and Central Washington University undertook research to demonstrate the validity of alternatives to traditional radiocarbon dating of charcoal and bone, by using radiocarbon dating of calcined bone and luminescence dating. Calcined bone (i.e., bone burned in excess of 600°C) survives well in archaeological sites with acidic soils that are common to archaeological contexts along the Northwest Coast and has been found in the Old World to provide accurate radiocarbon dating. Luminescence dating can be applied to fire-cracked rock, which is common, particularly in food processing features. We developed a protocol for comparing calcined bone and luminescence dates with charcoal dates, taking all from the same features contexts. The comparison of the radiocarbon dating of charcoal and calcined bone to the luminescence dating of fire-cracked rock identifies the differences in the events that each medium dates and their association with the cultural activity associated with the cooking features. Results were compared for seven sites, demonstrating the validity of this approach to solving the region’s dating dilemma.

*Keywords: Radiocarbon Dating, Thermoluminescence Dating, Archaeology*

**Does the United States’ Constitution Protect Black Males from Police Homicide?**

*Brown, La-James; Rommel, Chelsie; Jammeh, Njambou*

*Mentor(s): Charles Reasons, Law & Justice*

Oral Presentation, Session #31  
2:40-3:00 p.m. in Room 137A

This will entail a thorough analysis of the Fourth and Fourteenth Amendments and the extent to which they protect Black males from police homicide. Historical analysis of the pre-constitution treatment of Black or African American individuals will set the stage for a post-constitutional analysis. Major cases will be discussed and analyzed in the context of contemporary police homicides in the United States.

*Keywords: Constitution, Homicide, Black/African-American Males*
Victair Mistifier Gearbox

Bruno, Gabe; McFarlen, Casey; Skinner, Rick

Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #1
2:30-5:00 p.m. in Ballroom B/C/D

The current global population is 7.2 billion. It is projected to increase by one billion over the next 12 years. There is only five percent of usable farming land left on earth. Food is a resource that humans must consume daily. These facts undeniably lead to a shortage of food in the future. It is essential to mankind’s survival that farming becomes more efficient and sustainable. This provided the motivation to design a more efficient transmission for the Victair Mistifier which is an orchard and vineyard sprayer. Victair Mistifiers are designed, engineered, and manufactured by H.F. Hauff Company in Yakima, Washington. The Hauff Company’s commitment to manufacturing the best sprayer on the market, accompanied with the desire to address sustainable farming, are the driving forces behind this project. The scope of the project is to design, develop, and test a gearbox that optimizes the overall function of the sprayer. The gearbox simplifies the overall design of the sprayer, by replacing 19 major components with only eight. This design decreases material costs, increases manufacturability, and decreases assembly time. The gearbox receives power from the tractor’s power take-off (PTO) via the input shaft. It transmits the power through machine elements to two shafts that will power fans. The fans will spin in opposite directions at an equal, desired rotational speed. The transmission will be enclosed in an engineered metal casted housing. The gearbox design was proven, by the prototype, to perform to specifications while maintaining an oil temperature of less than 90 degrees Celsius.

Keywords: Mechanical Design, Sustainable Farming, Lean Manufacturing

Solar Evaporative Air Handler

Budnick, Sam; Dickson, Jeremy; Kluever, Kyle; Porter, Kevin

Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #26
2:30-5:00 p.m. in Ballroom B/C/D

The purpose of any engineering project is to anticipate a need and meet that need through prediction analysis and design. More than 70 percent of the nation’s energy is consumed by building infrastructure such as heating, ventilating, air conditioning (HVAC) systems, electrical, etc. HVAC systems use boilers to generate hot water or steam to heat buildings and evaporative chillers to provide air conditioning, much like the central plant here on campus. The project included the construction of a solar collector that will heat water to 140°F in order to run it through a heat exchanger that can have air passed over it. An evaporative chiller was also designed to harness the latent heat of vaporization to chill a heat exchanger that can then have water passed through it. The circulation pump and any temperature sensors will be powered by a photovoltaic array so that no electricity is needed to power the device. The air from the ducted fan can then be passed over this heat exchanger in order to generate hot air for a room, and the same for the cold air with cold water. Testing will consider input and output water temperature, as well as input and output air temperature, in order to compare the changes and develop a value for efficiency. Initial testing has found that heating water to 140°F can provide enough load in a heat exchanger to provide 85°F leaving air temperature. Water that has been cooled to 40°F by the evaporative chiller can provide a leaving air temperature of 55°F.

Keywords: Solar, Cooling, HVAC
Obsidian Hydration Dating of Obsidian Lithic Fragments from the Grissom Site (45KT301)

**Burris, Daniel**

*Mentor(s): Patrick McCutcheon, Anthropology & Museum Studies*

Poster Presentation Session #2, Poster #51  
11:30-2:00 p.m. in Ballroom B/C/D

Obsidian Hydration Analysis (OHA) measures the hydration layer on obsidian artifacts. The thicker the hydration layer, the longer since the tool was made. OHA can be used to test hypotheses about changes through time in past trade and exchange systems at the Grissom site (45KT301) in Kittitas County. A sample of the sourced obsidian, \( n=35 \), from the Grissom site was analyzed and sent off for OHA measurements. The results show that the range of hydration rim thickness are consistent with human occupation over the last 3,000 years. There was no visible correlation between the artifact type and the hydration rim thickness. Of the seven sources of obsidian artifacts that were analyzed, two sources have hydration rim thicknesses only greater than two microns. There were four sources with hydration rim thicknesses only less than two microns. A single source had hydration rim thicknesses both greater and less than two microns. If we assume that hydration rim thickness is at least, in part, a function of time, obsidian source diversity increased through time. These results may show that only one source was being used consistently through time at the Grissom site, while two sources were abandoned, and four new sources were utilized instead. The geographical distances from the Grissom site to the sources also increases over time, showing expansion of resource utilization, a result in contrast to conclusions made in other studies on changing obsidian source diversity.

*Keywords: Archaeology, Obsidian, Trade*

The Subtleties of Soda

**Bury, Amanda; Charles, Noah**

*Mentor(s): Stephen Robison, Art*

Poster Presentation Session #2, Creative Works, Poster #4  
11:30-2:00 p.m. in Ballroom B/C/D

Soda firing is an atmospheric ceramic firing process during which soda which usually consists of sodium bi-carbonate, also known as soda ash, is introduced into the kiln near peak temperature. Soda ash is most commonly mixed with hot water and sprayed directly into the kiln. Once subjected to the heat of the kiln, it vaporizes and bonds with the surfaces of the pots to form a sodium-silicate glaze. The award of the C. Farrell Scholarship in spring 2014 and fall 2014 provided the funds necessary to build a new wood-burning soda kiln and the opportunity for exploration and research of this firing method. The newly constructed kiln, located within the ceramics facilities on the Central Washington University Ellensburg campus, was built during spring of 2014. During the fall of 2014, investigation of this new type of firing technique and how utilitarian vessels lend their form to this process was conducted. The culmination of the award period ended in an exhibition featuring my utilitarian work that is representational of the soda-fired aesthetic. This construction and research provided me with beneficial exploration in areas of kiln construction and the utilization of the aesthetics of soda firing, creating a foundation of knowledge about applying those surface aesthetics to current and future artwork.

*Keywords: Ceramics, Utility, Atmospheric Firing*
In Depth with Leyendo Juntos/Reading Together Workshop
Cardenas, Estrella M.
Mentor(s): Susana Flores, Educational Foundations & Curriculum

Poster Presentation Session #3, Poster #37
2:30-5:00 p.m. in Ballroom B/C/D

This qualitative research project consists of an observation of Leyendo Juntos: en camino de la cuna a la Universidad/Reading Together from the Crib to the University, an interactive workshop that promotes early literacy development and bilingualism for bicultural Latino families. It also consists of a 1.5 hour focus group interview regarding children’s literacy development in the home with three parents whose children attend elementary schools in Yakima, Washington. In our interviews, we learned that these parents engaged in bilingual Spanish and English language and literacy learning activities like reading, conversing, telling stories, and singing. We also learned that the parents support that educational systems and curricula should adapt to best fit the needs of bicultural/bilingual children and their families. Furthermore, the participants expressed that more effective lines of communication between the educators and the parents were desired and, if attained, would foster stronger support networks for the children; thus, further encouraging their success in school and, potentially, leading to high school graduation and university enrollment.

Keywords: Biculturalism, Bilingualism, Biliteracy

Evaluation of the Anthelmintic Activity of Plant Extracts on the Hookworm Ancylostoma ceylanicum
Cardenas-Garcia, Brianda
Mentor(s): Blaise Dondji, Biological Sciences

Poster Presentation Session #1, Poster #49
8:30-11:00 a.m. in Ballroom B/C/D

Hookworm is among the most common and important tropical diseases in the world. This parasitic nematode feeds on human blood upon reaching the small intestine. Previous studies have confirmed resistance to available drugs, rendering it necessary to develop new treatments. Although necessary, research and production of possible treatments has been neglected in the past because drug development for impoverished areas does not result in a sufficient amount of profit. Earlier projects within Dr. Blaise Dondji’s lab have shown that plant natural products cause mortality of adult hookworm ex vivo. The plants Dalea ornata, Oemlaria cerasiformis, and Eucalyptus globulus have already shown efficacy; adult worms have demonstrated either significant decreases in motility or an increase in mortality. Now, the active components of the plants extracts that are effective must be identified. The goal of this project is to assess the anthelmintic effects of natural plant extracts for activity against Ancylostoma ceylanicum in the animal model host, the Syrian hamster (Mesocricetus auratus). If an effective fraction is discovered, identifying the active ingredients of the fraction and testing their anthelmintic effects can help develop new potential control tools to help reduce the health burden that results from soil-transmitted nematodes such as Ancylostoma ceylanicum.

Keywords: Parasite, Hookworm, Plants
Development of Standard Operating Procedures (SOPs) for the Safe, Educational and Fun Performance of Chemistry Demonstrations

Carman, Chad

Mentor(s): Tim Sorey, Chemistry

Poster Presentation Session #1, Poster #32
8:30-11:00 a.m. in Ballroom B/C/D

Chemical demonstrations have played a large part in creating interest in the CWU Chem Club (CWU SA-ACS) and drawing in new members. Although the nature of demos are fun, these various phenomena lead to a variety of serious hazards that must be well understood to perform in a safe manner. To ensure safety is our top priority, our club devised a three-part demonstration standard operating procedure (demo-SOP) that includes: (1) chemical preparation in the stockroom; (2) chemical presentation in front of the audience; and (3) differentiated learning that explains the demonstration at a K-8 or 9-12 level that align with Next Generation Science Standards (NGSS). This three-part demo-SOP provides an excellent quick guide for safely preparing and delivering the demo, the equipment needed, how to properly dispose of the chemical waste, and an age-appropriate explanation of the chemistry involved so that the performed demonstrations are as safe and informative as they are fun!

Keywords: Chemistry, Demonstrations, SOP

The Medieval Screen: A Work in Progress

Carmen, Julie

Library

Poster Presentation Session #3, Poster #44
2:30-5:00 p.m. in Ballroom B/C/D

The purpose is to design a medieval screen to answer the question: “Will people be inspired to study history and fiber art when presented with colorful embroidered patches displayed on a screen?” The screen project is a work in progress I am creating to display images from a thirteenth century manuscript in a different art medium to induce inspiration and curiosity about this period of time. The poster will describe the work in progress, the different materials used to create a medieval screen, and how the screen has developed over fifteen years. It will discuss the importance of the codices, represented musical instruments, and weaving and embroidery stitch used in that time. It will also discuss the significance of these rare books to the humanities and the educational and esthetic purposes for these embroidered patches. The images are from painted pictures from specific manuscripts, and are interesting to many just as they are. However, displaying these images in bright new colors with the texture of fiber offers a new experience to viewers. In addition, the social implication of these images is powerful as it depicts three different religious cultures, Christian, Judaism, and Muslim, in the courts of Portugal playing music together.

Keywords: Fiber Art, Medieval Screen, Musical Instruments
**Effects of Taurine and Chocolate Milk Supplementation on Body Composition and Nitrogen Excretion In Triathletes**

**Carvalho, Flavia; Pfrimer, Karina; Ferriolli, Eduardo; Freitas, Ellen**

*Mentor(s): Kelly Pritchett, Nutrition, Exercise & Health Science*

Oral Presentation, Session #9  
10:40-11:00 a.m. in Room 201

Chocolate milk has been suggested to be an effective post-exercise recovery beverage due to the ideal carbohydrate-to-protein ratio, while taurine supplementation may increase energy expenditure and favor carbohydrate metabolism. Therefore, research examining the combination of taurine with chocolate milk after exercise on insulin action in order to favor carbohydrates’ metabolism regulation, assist with muscle recovery, and prevent protein catabolism is warranted. The purpose of this study was to evaluate the effects of taurine and chocolate milk supplementation on body composition and nitrogen excretion in triathletes. A double-blind, crossover study was conducted with 12 male triathletes, age 25 to 35 years. Three grams of taurine and 400 ml of chocolate milk (TAUchoc) or a placebo (400 ml of chocolate milk; CHOC) was ingested post-exercise for eight weeks. A two week washout period was implemented between trials. Body composition was measured using the deuterium labeled-water method and 24-hour urinary nitrogen excretion was measured using the chemiluminescent method before and after eight weeks of training and supplementation with TAUchoc or CHOC. An ANOVA suggested TAUchoc during the eight weeks resulted in a significant, \( p = 0.029 \), reduction in urinary nitrogen excretion by 33 percent, while CHOC provided significant reductions in body weight, PRE: 77.4 ± 2.4 kg and POST: 76.5 ± 2.3 kg, \( p=0.034 \), and body fat percentage, PRE: 17.8 ± 1.2 percent and POST: 15.5 ± 1.5 percent, \( p=0.036 \). In conclusion, the addition of taurine to post-exercise chocolate milk consumption prevented protein catabolism, while chocolate milk alone resulted in a more favorable body composition.

*Keywords: Taurine, Chocolate Milk, Body Composition*

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**Wes Anderson and Mise-en-scene**

**Catlin, Evan**

*Mentor(s): Melissa Johnson, Film and Video Studies*

Video and Creative Expression Presentation, Session #20  
12:40-1:00 p.m. in the Theatre

This short documentary gives the audience a small lesson in film’s most basic concept: mise-en-scene. The documentary compares Wes Anderson’s second film, *Rushmore*, to his three newest films: *Fantastic Mr. Fox, Moonrise Kingdom*, and *The Grand Budapest Hotel*. The documentary explores how Anderson and his team use sound, lighting, colors, and screen orientation to give their audience a feeling of excitement and wonder. This documentary marks the first time I had ever tackled such a project. I had to learn how to use a multitude of hardware and software on top of the creation of the documentary itself. This allowed me to strengthen my abilities as a filmmaker. The voiceover audio was recorded with a Blue Yeti and edited in Audacity, while the footage was edited together with Sony Vegas Pro 13.

*Keywords: Mise-en-scene, Sound, Rushmore*
Analysis of Pollution in the Niger Delta
Chambers, Chad
Mentor(s): Jennifer Lipton, Geography

Oral Presentation, Session #8
10:00-10:20 a.m. in Room 140

Since 1957, the discovery of oil in the Niger Delta became an important source of revenue for the Nigerian government. Unfortunately, this resource is being exploited and resulting in pollution. So, does recent Landsat imagery illustrate the present continuation of this pollution? Clearly, there is evidence of air and water oil pollution; it can be identified using current January 1, 2015, data from Landsat 8 imagery paths 187, 188 and row 57. This can be done by manipulating band composites to illustrate gas flares in Short-Wave Infrared bands I & II as well as the red band; a normalized difference water index ratio (Green-NIR/ Green+NIR) can also be applied to show the difference between biomass (i.e., fish populations). Thus, evaluating brightness values and spectral reflectance graphs will illustrate irrefutable evidence that large corporations such as Royal Dutch Shell are polluting both water and air in the Niger Delta; they are destroying the environment and social stability of the residents in the region by practicing unsustainable methods of extracting oil.

Keywords: Pollution, Environment, People

Macro Analysis: In the Field Versus In the Lab Use Wear
Chenvert, Erin; Probasco, Desiree
Mentor(s): Patrick McCutcheon, Anthropology & Museum Studies

Poster Presentation Session #2, Poster #44
11:30-2:00 p.m. in Ballroom B/C/D

Recent efforts on the Yakima Training Center established research questions that stone tool data can address. For instance, are springs the location of diverse past human activities or do they represent a more limited activity location? The Bishop Hollow site (45KT1975) is located on the Yakima Training Center. Initial lithic analyses were performed on the material excavated at the site in the field and laboratory without the aid of magnification. An additional sample from this site was analyzed using magnification. The two samples are compared and the similarities and differences were used to assess the effects on the data that could be used to test hypotheses about past land use at springs. Results show that, in the initial analysis, two percent of objects were identified with wear while, in the subsequent analysis, five percent were identified with use wear. We have taken these results and explored the implications of such analytical biases imposed by doing lithic analysis with and without magnification. These results are relevant to those Cultural Resource Management and research settings where analysts are considering whether they should use magnification in stone tool analysis.

Keywords: Archaeology, Debitage, Use-Wear
Effects of Immune Serum on Macrophage Infection with *Leishmania*
Cheslock, Mercedes; Wenger, Analiess; Anderson, Heidi
Mentor(s): Gabrielle Stryker, Biological Sciences; Blaise Dondji, Biological Sciences

Poster Presentation Session #1, Poster #36
8:30-11:00 a.m. in Ballroom B/C/D

Leishmaniasis is a vector-borne disease caused by single-celled parasites in the genus *Leishmania*. More than 20 different species of *Leishmania* infect humans, with several occurring within the same geographical area. The disease is spread when an infected sand fly feeds on a susceptible mammalian host. *Leishmania* parasites are injected into the mammalian host during a blood meal; upon entry into the body, the parasites infect white blood cells, macrophages. Leishmaniasis symptoms vary and may elicit: no symptoms, skin sores, weight loss, fever, internal organ enlargement, or death depending on the species of parasite and susceptibility of the host. Previous experiments have shown that the susceptible BALB/c mouse, infected with a low dose of cutaneous *L. major* and challenged with *L. infantum* develop exacerbated disease with higher parasite burden relative to naive mice. The immune response generated to *L. infantum* had little notable difference between *L. major* exposed and naive mice. Cross-reactive antibodies were noted in both groups regardless of immune history. The present study focuses on the role of cross-reactive antibodies in uptake of *Leishmania* parasites by macrophages using immune serum containing antibodies. A mouse macrophage cell line was exposed to *Leishmania* parasites and either control serum or *L. major*-infected serum. Cells were exposed to parasites and serum for 24, 48, or 72 hours and then stained to visualize internal parasites. This study aims to reveal if preexisting antibodies to one species of *Leishmania* leads to the disease exacerbation seen upon exposure to a different species.

Keywords: *Leishmania*, Macrophage, Serum

**WakeBoard Winch**

Christensen, Eric

Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #3
2:30-5:00 p.m. in Ballroom B/C/D

Question: Can a device be fabricated that will allow wakeboard riders’ access to locations that may be inaccessible by boats or where motorized boats are prohibited? This device will be called a Wakeboard Winch and will need to meet specific design requirements to ensure adequate performance. For the winch design to be considered effective it must be able to support up to a 200 pound wakeboard rider, be able to achieve a maximum tow speed of 25 mph, and the final winch assembly should weigh less than 200 pounds. Rationale: The design and manufacturing of the winch must be optimized to meet the design requirements established, while also minimizing the cost of production. Methods: The Wakeboard Winch will be designed using mechanical engineering methods relating to power transmissions using shafts, torque converters, and roller chain drives. Along with this, the winch will be fabricated using manufacturing processes learned throughout the mechanical engineering technology (MET) coursework which may include, but is not limited to, milling, machining, and welding. Results: At this time, the Wakeboard Winch has been mocked-up and preliminary testing has been completed to ensure successful operation. Final assembly will be completed the second week of April and testing is scheduled to follow shortly after. Principal Conclusions: The preliminary evaluation of the winch displayed adequate operation giving promise to meeting the 200 pound weight limit and 25 mph speed limit established by the design requirements.

Keywords: Design, Manufacturing, Engineering
**Lucid Dream**  
*Clark, Malissa*  
*Mentor(s): Andrea Eklund, Family and Consumer Sciences*  
Poster Presentation Session #2, Creative Works, Poster #13  
11:30-2:00 p.m. in Ballroom B/C/D  

Purpose: The purpose of this design was to create a garment that is beautiful but also practical. The look is inspired by grunge but also by romanticism and the occult. I wanted to portray a completely simplistic garment in a way that makes it seem so much more profound and adaptable to any style the wearer chooses to portray.  

Process: I found my initial inspiration by looking at *Dark Beauty* magazine, a gothic fashion magazine. From there, I searched on various online databases and put inspirational images into a design Pinterest board. The images combined to create a tribal but celestial mood, with an otherworldly etherealness. After I had the mood concrete, I began looking to my favorite clothing websites like Dolls Kill and Nasty Gal to decide what kind of garment I might want to construct. These websites have out of the norm looks and an overall grunge, alternative feel, while still accommodating to many style tribes. All of this considered, I decided to create a romper with a tied back and small ruffle details on the shoulders and bottom hem.  

Techniques: To make this design a reality, I used flat patterning and draping to create a pattern. From the pattern, I made a sample, which I then fitted to my model. Once the fit was perfected, I created the final garment which you see today.  

Contribution to fashion or innovation used: My contribution to fashion is the creation of a piece of clothing that can seamlessly adapt to many different style tribes.  

Materials: Lightweight gray cotton fabric, all-purpose thread, invisible zipper. This is one in a line of three garments; the entire line can be seen at the Apparel, Textiles, and Merchandising spring fashion show, May 30, at 3:00 p.m. and 7:00 p.m. in Milo Smith Theater in McConnell Hall.  

**Keywords:** Fashion, Draping, Design  

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**The Effects of Light on ±-Catechin’s Inhibition of Idaho Fescue’s Root Growth**  
*Clark, Sarah; Seiler, Ian*  
*Mentor(s): Clay Arango, Biological Sciences*  
Poster Presentation Session #1, Poster #39  
8:30-11:00 a.m. in Ballroom B/C/D  

Spotted knapweed (*Centaurea stoebe*), a common invasive plant in the Pacific Northwest, produces the racemic chemical ±-Catechin. Current research suggests that ±-Catechin inhibits root growth in Idaho fescue (*Festuca idahoensis*), a common native bunch grass. These findings suggest that competition between these two species results in a negative fitness and diminished ecological success of Idaho fescue. This phenomenon of one species’ chemical exudate affecting another species’ fitness is known as allelopathy. Current allelopathic research is conducted in the dark to highlight any differential growth between control and experimental groups due to the over-expression of gibberellin hormones resulting in etiolation. It is difficult to simulate environmental conditions completely, and it is unknown if energy input through photosynthesis would affect ±-Catechin’s inhibition of Idaho fescue root elongation. Therefore, we will investigate if ±-Catechin’s allelopathic effects are mitigated by the input of energy by replicating previous ±-Catechin research under similar conditions and using light as the experimental variable. Using germination paper, three replicates of 120 Idaho fescue seeds that will be placed into rows and grown in solutions of (±)-Catechin at concentrations of 20 ppm. After two weeks, root length will be analyzed for significant differences between these experiments in the light and previous experiments conducted in the dark. Results of this research will be invaluable in understanding the ecological interactions of spotted knapweed on native plants and help current research more accurately replicate environmental conditions in a laboratory setting.  

**Keywords:** Allelopathy, Catechin, Invasive Plants
Analysis of Earthquake Hazards in Eastern Ellensburg
This research served to gather and analyze data relating to the seismic hazards in eastern Ellensburg, the area from North Chestnut Street to the city limits, and University Way to the Kittitas Highway, and develop strategies to mitigate those hazards. The Federal Emergency Management Agency’s Rapid Visual Screening process was used to gather data on buildings in the area such as the fairground structures, high school, and faith centers. Research of existing literature was conducted to determine the underlying risks, including liquefaction, and a survey of residents was conducted assessing risk perception and emergency preparedness. The Ellensburg Annex to the Kittitas County Hazard Mitigation Plan was analyzed and suggestions were made for additions at the next revision. Research showed eastern Ellensburg to have varying liquefaction risk, though most of the buildings in the area were wood frame houses. These homes are not easily affected by liquefaction and are at relatively low risk for damage in an earthquake. Specific mitigation strategies included determining community gathering areas, such as Ellensburg High School, and sending information about emergency preparedness, including making emergency kits and reinforcing weak parts of houses (e.g., chimneys), to residents through utility bills. High-priority targets for further mitigation strategy development were identified, including the trailer park between Alder and University and Bloom Pavilion in the Kittitas County Fairgrounds.

Keywords: Mitigation, Earthquakes, Geology

Compact Rio Wind Turbine
Clevenger, Taylor
Mentor(s): Lad Holden, Engineering Technologies, Safety, & Construction

I am going to take a wind turbine and monitor the turbine through a Compact Rio. The wind turbine will be mounted to the top of Houge Hall at Central Washington University with a Compact Rio to monitor the turbine. The Compact Rio has a chassis that modules can plug into. These modules are going to have sensors connected to them to monitor the turbine. The sensors will monitor wind speed, chassis, outside temperature, and voltage off of the main line and batteries.

Keywords: Self-Sustaining, Environmentally Friendly, Programming
Bridging is an affiliative interaction in which two individuals lift an infant between each other and lick the infant’s genitals. Male-male bridging has been studied in several macaque (Macaca) species, but female-female bridging has received less focus. Male-male bridging is believed to act as a way to reduce social tension between individuals, but it may function differently for females. We studied female-female bridging in provisioned Tibetan macaques (M. thibetana) from August to September 2014. We predicted that female-female bridging would show distinct patterns when compared to what has been reported for males. We recorded bridging behavior from an ethogram using all-occurrences and focal-animal sampling of eight adult and four subadult females. Similar to what has been observed for males, female-female bridges were never immediately followed by aggression, and females utilized infants more often than juveniles. Unlike what has been reported in males, within female-female bridging dyads, initiators were not more likely to be subordinate to recipients, $W=45$, $n=17$, $p>0.05$. Bridge initiation rates were strongly correlated with social rank, $r_s=0.73$, $n=12$, $p<0.05$, but there was no significant relationship between bridge reception rates and social rank, $r_s=0.30$, $n=12$, $p>0.05$. Receivers more frequently held infants in bridges, which is significantly different than what has been reported in males, $\chi^2= 42.23$, $df=1$, $p<0.05$.

Our results suggest that female-female bridging is more likely related to female interest in infants than to social tension between individuals.

Keywords: Primate, Behavior, Animal

A Panel Study of the Effects of World Labor Regime Integration on World Environmental Regime Integration in the 20th Century

Clifton, Grant

Mentor(s): Michael Mulcahy, Sociology; Dominic Klyve, Math

Oral Presentation, Session #14
12:00-12:20 p.m. in Room 137A

The concept of the regime is often used at the international level to describe sets of rules and norms that are expected to be followed by actors (e.g., nations, corporations, etc.). Two supported world regimes, the world labor regime and world environmental regime, center around policies concerning global labor conditions and global environmental degradation, respectively. Much research examines the formation of these regimes and the effects of regime integration at the national level; however, it is not yet known whether integration in the world labor regime at the national level influences integration in the world environmental regime. Understanding patterns of integration within these regimes can be significant in understanding how countries, particularly developing countries, prioritize both labor and environmental issues. Our main research question is: “Does integration in the world labor regime predict integration in the world environmental regime?” We measure countries’ world labor regime integration (WLRI) using ratifications of international labor conventions and environmental regime integration (WERI) using ratifications of international environmental treaties. Our dataset covers the period between 1919 and 2012. We use regression methods that correct for temporal and spatial dependence in the data. Our regression analyses measure the effects of WLRI on WERI, net of controls for country-level economic and social development, and global trade. Our pending results will demonstrate whether there are any linkages between the two regimes, and whether both regimes are simultaneously sustainable by integrated members.

Keywords: Global, Labor, Environment

Holocene Fire History of the Area Surrounding Lemanasky Lake, Eastern Cascades, Washington
Macroscopic charcoal analysis of lake sediments has been successfully used to reconstruct past fire patterns throughout the Pacific Northwest; however, there has been little research done on the forests of the eastern Cascades of Washington State. This research reconstructs the fire history of Lemanasky Lake, Washington (48.7°N, -119.6°W; elevation: 1088 m), located in the Cascade foothills near the Sinlahekin Wildlife Area, roughly five miles northwest of Tonasket, Washington. The analysis of macroscopic charcoal from a five-meter long sediment core provides a record of Holocene fire activity in the forest surrounding the lake. The primary research question addressed in this study is: “How has fire activity changed at the study site during the Holocene, and what has been the cause of those changes?” In order to reconstruct the local fire history of the site, we counted all macroscopic charcoal particles >125 microns from contiguous 2 cm³ samples taken at 1 cm intervals. Our results suggest intentional fire suppression during the last ~100 years, which was preceded by frequent, low severity ground fires, with less fire activity prior to that. This reconstruction not only facilitates our understanding of changes in fire frequency and severity at the site as a result a past climatic variability, but more importantly shows how 20th century fire suppression has affected the forest. Additionally, the results may assist landowners within the wildlife-urban interface of Washington in implementing safe fire management practices.

Keywords: Fire, Charcoal, Paleoecology

This presentation includes a short expository documentary that contributes to our understanding a behavior that occurs in Tibetan macaques (Macaca thibetana) known as bridging, and presents visual data on the behavior. Bridging is a complex interaction in which two individuals lift an infant between one another and lick the infant’s genitals. The behavior is affiliative, and among males, it is believed to function as a buffer to prevent aggression from dominant individuals. However, bridging is still understudied, and although all age and sex classes engage in bridging, past research has primarily focused on bridging between males. Furthermore, few visual depictions of the behavior exist outside of academic journals. During August and September, 2014, I conducted and visually documented a study on female bridging at The Valley of the Wild Monkeys near Huangshan, China, and identified differences between female and male bridging. The documentary around which my presentation is built introduces Tibetan macaques, explains bridging behavior, and summarizes hypotheses on its functionality. Additionally, I describe the gaps that my research fills, and conclude with ideas for future research, all with rich visual depiction.

Keywords: Primate Behavior, Visual Representation, Buffering Aggression
It Would Make Me Happy
Cole, Ryan
Mentor(s): Melissa Johnson, Film and Video Studies

Creative Expression Presentation, Session #13
12:40-1:00 p.m. in Room 135

This is a short form script written for my Film and Video Studies class, in which we studied not only the history of film, but the technical and cultural aspects that make filmmaking such a unique medium for storytelling. This story is about death and mortality and how we as humans cope with it. When faced with imminent death, does one cross off every item on a bucket list, or take control to remove any suspense and pain that comes with waiting? Though some would “live like they were dying,” some people treat death seriously and judiciously, as the next step of life for them. This short film is meant to explore the meaning of death and how it affects not only the person dying, but the people around them. This script will be performed in full by myself and three other readers.

Keywords: Death, Loneliness, Control

Racism and Sport: Occupational Segregation in International Men’s and Women’s Soccer
Colgan, Camille
Mentor(s): Nelson Pichardo, Sociology

Oral Presentation, Session #14
12:20-12:40 p.m. in Room 137A

The studies of racism in sport have largely focused on men’s sport (e.g., baseball, football, hockey, etc.). These studies reveal that the allocation of positions on the field of play has been governed by the underlying social construction of race. Known as the stacking hypothesis, it argues that those positions that are more believed to require intelligence and smarts (i.e., higher centrality) are awarded to Caucasians while those that require speed and quick reactions are awarded to non-Caucasians. I expand on this by applying the stacking hypothesis to a previously neglected sport, soccer, and to previously neglected population, women. The underlying research question is whether stacking is prevalent in national soccer teams and whether it is also a characteristic of women’s soccer. I will gather data at four-year intervals in each World Cup year from 1960 through 2012 for the rosters of national men’s and women’s soccer teams, the race of the players as well as their positions, and their win-loss records. After coding the positions in terms of centrality, I will test the proposition of whether occupational segregation by race has taken place in men’s and women’s international soccer teams.

Keywords: Sport, Sociology, Racism
Preserving the Race: Gendered Violence in the Early Conservation Movement

*Collier, Patience*

*Mentor(s): Brian Carroll, History*

Oral Presentation, Session #10
9:40-10:00 a.m. in Room 271

This paper examines the ways in which the conservation movement was a response to racial and gender tensions in the late nineteenth century. In the wake of urbanization, immigration, and increasing racial diversity, there were broad cultural concerns about the decline of white masculinity as a result of the changing environment, as well as concern about the decline of femininity as the suffrage movement grew. The responding political and cultural environmental movement was split, but both sides considered strong gender roles necessary in order to encourage the health of the white race. The hyper-masculine part of the conservation movement was best represented by the rugged manliness philosophy of Theodore Roosevelt. Roosevelt equated manliness with violence, and supported the conservation of wilderness as a proving ground for white masculinity. On the other side of the movement were preservationists, who supported preserving the wilderness for its own sake. They were associated with more passive hobbies such as bird-watching, and were frequently feminized by the media, despite being led mainly by men. This gendered division had a powerful effect on the sociopolitical culture of environmentalism.

*Keywords: Conservation, Frontier, Gender*

An Exploration of How Using Best Practices Curriculum with Tutoring Affects Kindergarten Literacy: A Literature Review

*Collins, Cay*

*Mentor(s): Heath Marrs, Psychology*

Poster Presentation Session #3, Poster #60
2:30-5:00 p.m. in Ballroom B/C/D

Early interventions are being used to improve reading skills in children. The purpose of this literature review is to examine the best practices used in kindergarten literacy. The review will look at some of the current tools used in schools that have produced positive results. It will also examine the Wildcat Buddies tutoring program at Central Washington University, which uses the Sound Partners curriculum. The review will focus on how using current programs with tutors may positively impact literacy outcomes for early learners.

*Keywords: Literacy, Kindergarten, Tutoring*

Library Research Guides: Adapting To User-Centered Design

*Cox, Courtney*

*Mentor(s): Geri Hopkins, Library*

Oral Presentation, Session #34
3:00-3:20 p.m. in Room 201

In 2014, Brooks Library decided to move from Subjects Plus research guide software to LibGuides by Springshare. The results are dramatic when both student and faculty input are leveraged, and the software is used to its fullest capabilities, as demonstrated by a before-and-after comparison to highlight this new student research tool. Goodbye to scrolling “walls of text” and hello to the tabbed, dynamic, user-centered design of the modern research guide!

*Keywords: Library, Research, Guide, Research Guide, User-Centered Design*
Revitalizing Central Washington University’s Largest Art Collection: *New Photographics*

**Crady, Skyler**  
*Mentor(s): Allyson Klutenkamper, Art*

Poster Presentation Session #2, Creative Works, Poster #5  
11:30-2:00 p.m. in Ballroom B/C/D

*New Photographics* was a nationally known photography exhibition held at Central Washington University. Organized by the late CWU emeritus, Jim Sahlstrand, the show ran from the early 1970s to the late 1980s. During its time, *New Photographics* was an anticipated event for photographers across the nation and for the CWU Art Department, where it was hosted in the Sarah Spurgeon Gallery. In the late 1980s, the exhibition fizzled out and has ceased to reemerge. Since then, an enormous amount of documents and artwork has been stored in a small room in Randall Hall and has rarely been touched. During this quarter, I am taking an Independent Study with current Central Washington University photography professor, Allyson Klutenkamper, to learn more about the *New Photographics* show and collection. With the help of Professor Klutenkamper, the Art Selection Committee, and Central Washington University alumni, I will be researching, documenting, and re-archiving the compilation so that Central Washington University’s largest art collection can be reintroduced into the art community and, hopefully, become an active part of it.

*Keywords: Archive, National, Photography*

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**Bonds of Blood: *Vampire the Masquerade* as Urban Heterotopia**

**Crosby, Nicolas**  
*Mentor(s): Hope Amason, Anthropology & Museum Studies; Mark Auslander, Anthropology*

Panel Presentation, Session #18  
11:40-1:00 p.m. in Room 271

This presentation explores the Live Action Role Playing game *Vampire the Masquerade* (*VtM*) through Foucault’s concept of the heterotopia, with special attention to the complex symbolic politics of blood and the family in modern American culture. Although, at times, dismissed as a frivolous game, *VtM* is taken seriously by its participants. Masqueraders have transitioned, within a microcosm, from hegemonic American notions of family into a completely different sort of family unit, which emerges from in-game dynamics. Due to a desire to be a part of something larger in scope, with stronger bonds, they have joined a system which allows them to have two families. While they may maintain their nuclear, real family ties, they have also joined themselves to another family, which I show to take shape in the form of a lineage with a long, documented, and noble history. These double lives tend to express themselves most frequently within urban environments, where societal bonds tend to weaken or disappear, as opposed to smaller towns, and villages where bonds tend to last longer and be more defined. In order to create new bonds and status hierarchies within the metropolis, the game is conducted in the real world and in a mythic cityscape. While the players may project their own society onto the cityscape, the city’s physical geography is always present underneath, in multilayered inversions. Thus, the heterotopia of the *Masquerade* is simultaneously produced and transmuted each night.

*Keywords: Heterotopia, Popular Culture, Urban*
Using Clay Models to Test for Avian Recognition of Aposematic Warning Coloration of Ring-Neck Snakes (*Diadophis punctatus*)
Crow, Hanna
*Mentor(s): Robert Weaver, Biological Sciences*

Poster Presentation Session #1, Poster #50  
8:30-11:00 a.m. in Ballroom B/C/D

Aposematic coloration is a common theme among many animals, both vertebrate and invertebrate. The bright and contrasting colors warn possible predators of distasteful and even poisonous compounds. The recognition of such warning signals has been shown within mammals, fishes, and avian and non-avian reptiles. For our study, we examined the efficacy of such possible warning coloration in a small, cryptic species of snake, the ring-neck snake (*Diadophis punctatus*). Ring-neck snakes are a trans-continental species that average less than 70 cm total length. Within the western United States, they are strongly associated with oak-pine woodland and along riparian zones in semi-arid habitats. When discovered by possible predators, ring-neck snakes are well known for revealing vibrant yellow or orange bellies, and for an upward curling of the bright red ventral surface of the tail. For our experiment, we used six types of clay models. The first three were green with alternating patterns of dots (i.e., no dots, single, or double row). The other type of model was bright orange with this same pattern of dots. Models, *n*=246, were placed in appropriate habitat where several species of birds might see them. After four to six days, models were gathered and scored for bite marks. Once scored, percentage of bit marks for each model type was determined. The percentages for the green models with varying patterns of dots are as follows: no dot, 34.6 percent; single row, 27.1 percent; and double row, 32.3 percent. The percentages for the orange models with varying patterns of dots are as follows: no dot, 2.3 percent; single row, 0.8 percent; and double row, 3 percent. These data show a greater percentage of bite marks in green models compared to orange models, pointing to the conclusion that there is avian recognition of aposematic warning coloration in *D. Punctatus*.

*Keywords: Snake, Behavior, Aposematism*

The Educational and Job Attainment Effects of Mentoring on Central Washington University Students
*Cummings, Reality*
*Mentor(s): Heather Bell, Family and Consumer Sciences*

Poster Presentation Session #3, Poster #43  
2:30-5:00 p.m. in Ballroom B/C/D

Do individuals who have been mentored tend to have a higher rate of success in education and other areas of their lives? Youth need positive, consistent relationships with caring adults to help them develop healthy behaviors in life. If the relationship does not happen naturally, mentoring programs can be employed to support youth by promoting positive youth outcomes. Having a better understanding of the differences in outcomes between mentored and non-mentored individuals is important in helping determine whether a mentoring program could be an option for Central Washington University. It was hypothesized that formal and non-formal mentoring affects most individuals positively and encourages youth to pursue success educationally and in their careers. A two-page, self-administered, anonymous questionnaire was distributed to 39 Central Washington University students regarding mentoring. Results showed that sixty percent of the participants in this study who had a mentor reported a higher grade point average, on average, than their non-mentored counterparts. Results also indicate a positive correlation between having had a mentor and currently being employed full-time or part-time. Seventy percent of respondents who reported having had a mentor maintained full-time or part-time employment. A greater understanding of preventative measures that influence children positively is vital in impacting their lives. These results support the addition of youth mentoring programs by administrators faced with decision-making regarding what type of programs to implement to improve outcomes for youth. These results may also assist with marketing efforts to recruit youth into existing mentorship programs. Further research should utilize a more diverse sample.

*Keywords: Youth Outcomes, Mentor Program, Youth Programs*
Adventure Girls: A Written Story
Cziske, Elsie; Grant, Abby
Mentor(s): Matthew Cziske

Creative Expression Presentation, Session #13
11:40-12:00 p.m. in Room 135

Have you ever wondered what would happen to two girls that got lost in the woods? Well you’re about to find out in a story written by two, fourth-grade girls, Abby Grant and Elsie Cziske called, Adventure Girls. Adventure Girls came about from a sleepover. We often get together for sleepovers as all fourth grade girls love to do! Our favorite activity to do together is write stories and, one night when looking for an activity, we took our mother’s suggestion of writing a book and got started. Because we love adventures, we decided we should make a story about the adventures of two friends just like ourselves. We brainstormed about what adventures they should do, what they should run into, and who their friends should be. The two main characters are Kelsey and Chelsey who are sisters and best friends. This story follows them on their adventure at school where they are confronted by bullies and become lost in the woods. The adventure really begins as they search for a way back home. Through the process of writing, we have learned how to work together and develop a topic. We hope our story will inspire others to challenge themselves to become writers.

Keywords: Initial Writings

Only in Memory
Daoust, Quinci
Mentor(s): Crystal Fullmer, Physical Education, School & Public Health

Creative Expression Presentation, Session #19
12:00-12:20 p.m. in Ballroom A

I choreographed Only in Memory for my final project in the choreography course. I wanted to create a humorous dance with movement inspired by animals, and it was at this time my dog lost her sight. There is no music because I was inspired by the sound scores of John Cage, an unorthodox, American composer. The final project in this course required that we choose a work of visual art and a poem as inspiration for our choreography. The poem I chose is called Running with Blind Dog by Brian Demay. I discovered this poem while researching blindness. Lastly, my visual inspiration is a picture of a dog named Iggy. He is a Boston terrier with a glazed look in his eyes and drool dripping down his flat face. I found this picture to be amusing and weird, just as dogs can be. The picture was created by Araki Hirohiko, a Japanese artist, for the manga series titled, Jojo’s Bizarre Adventure. I had a Boston terrier for a long time and am familiar with how they move and act. I had no difficulty finding a dancer willing to be as energetic as a puppy, but the challenging part was in making the dancer appear to be blind. I want my dance to bring laughter and pity from those who watch it, while conveying the excitement that dogs hold for life even when misfortune has blinded them.

Keywords: Dance, Blind Dog, Comedy
Phthalate Esters Exacerbate Neurodegeneration in a *Caenorhabditis elegans* Parkinson's Disease Model

**Darley, Jacob**

*Mentor(s): Lucinda Carnell, Biological Sciences*

Oral Presentation, Session #32
2:40-3:00 p.m. in Room 137B

Parkinson’s disease (PD) extracts a significant medical and financial toll on the developed world and is second only to Alzheimer’s disease in terms of prevalence as a neurodegenerative disease. Up to 90 percent of PD cases are idiopathic or environmental in origin. Benzyl Butyl Phthalate (BBzP) and Bis (2-ethylhexyl) Phthalate are plasticizers, compounds used in industry to improve the malleability and durability of plastic products, which were evaluated for their potential contribution to neurodegeneration of dopamine neurons in a *Caenorhabditis elegans* (roundworm) PD model. These phthalates were assessed for effect in two genetic worm strains of PD. The first genetic strain is a transgenic animal expressing the human alpha-synuclein gene that is known to contribute to PD in humans. The second strain was a transgenic animal that overexpressed tyrosine hydroxylase, leading to excess production of reactive oxygen species, another suspected cause of PD neurodegeneration in humans. It was discovered that different PD models were affected by different phthalate esters. DEHP induced neurodegeneration in non-genetically predisposed animals at ten days post-exposure and in the tyrosine hydroxylase model at seven and ten days post-exposure while BBzP only exacerbated neurodegeneration at ten days post-exposure. Further BBzP exacerbated neurodegeneration in the alpha-synuclein model at day seven and ten. Our results suggest that phthalate esters could be important in the development of PD.

*Keywords: Parkinson’s, C. elegans, Plasticizers*

Comparative Morphological Analysis of Calcined Bone

**Davis, David; Brown, James**

*Mentor(s): Patrick Lubinski, Anthropology & Museum Studies*

Poster Presentation Session #2, Poster #46
11:30-2:00 p.m. in Ballroom B/C/D

Along the Pacific Northwest Coast of North America, faunal remains are rarely preserved within archaeological contexts, outside of coastal sites with shell middens. This is primarily due to the degradation of bone by humic acids in the soils (pH 4.5-5.5) and carbonic acids caused by heavy precipitation. Preserved bones in archaeological contexts in this region are typically highly burned, or calcined. Calcined bone is known to entail a size reduction compared to unburned bone, but the nature of the reduction is unknown. The question this project seeks to answer is: Does calcining cause significant change in bone size and weight? Consequently, this experiment documents the amount of change observed in artiodactyl phalanges (i.e., elk and black-tailed deer) by calcining, either via heating in a semi-temperature-controlled outdoor wood fire, and/or by heating in a completely temperature-controlled indoor muffle furnace. Twelve separate variables were measured before and after burning on the first phalanx and second phalanx specimens. Eight distinct variables were recorded on the third phalanx specimens. In addition to 38.13 percent mean weight loss expected due to the loss of the organic component of the bone, several variables exhibit noteworthy change. The height in region of extensor process variable displays a mean reduction of 7.52 percent, and the breadth proximal variable showed 4.39 percent mean reduction. Bones burned in the muffle furnace had uniform color and burning stage and no fracture, while those burned in the outside fire had variable results for all of these attributes, including extensive fracturing.

*Keywords: Zooarchaeology, Calcined Bone, Artiodactyl*
Pliocene – Quaternary Extension Across the Volcanic Tableland and Black Mountain Area, Eastern California Shear Zone

DeLano, Kevin

Mentor(s): Jeffrey Lee, Geological Sciences

Poster Presentation Session #1, Poster #9
8:30-11:00 a.m. in Ballroom B/C/D

The San Andreas fault and the Walker Lane Belt (WLB) together form the boundary between the Pacific and North American tectonic plates. A fundamental question in geology is how do faults in the WLB accommodate strike-slip motion between the Pacific and North American tectonic plates over space and time? To document the evolution of faults at a tectonic plate boundary, geologists compare present-day fault slip rates (geodetic studies) with geologic measurements of long-term slip rates (past ~0.1-5.0 million years). At latitude 37.5°N across the WLB, long-term slip rates sum to ~33 percent of the present-day slip rate. Nagorsen-Rinke et al. (2013) proposed that undocumented long-term fault slip explains part of this discrepancy. To test this model, I conducted new field geologic and LiDAR mapping, fault studies, and geochronology (determine the age of a rock) to calculate long-term fault slip rates across two areas: the Black Mountain and the Volcanic Tableland regions, eastern California. To calculate fault slip rates, I divided offset, a measure of the magnitude of displacement across faults, by the age of the displaced rock. In the Black Mountain area, fault slip rates are ≥0.2 mm/yr since 3.5 million years (m. y.). In that time, faulting has horizontally extended the Earth’s crust by ~15 percent. In the Volcanic Tableland area, the fault slip rate is 0.1-0.2 mm/yr since 0.7 m.y. Since 0.7 m.y., faulting has horizontally extended the Earth’s crust ~0.8-1.6 percent. The style of faulting matches our prediction, but our preliminary fault slip rate estimates are slightly lower than hypothesized.

Keywords: Tectonics, Normal Faulting, Mapping

Evaluating the Efficacy of an Eight-Week Therapeutic Horsemanship Program with PTSD- and TBI-Experiencing Military Servicepersons

DeNoble, Gina

Mentor(s): Susan Lonborg, Psychology

Oral Presentation, Session #22
1:50-2:10 p.m. in Room 137A

The purpose of this research is to evaluate the efficacy of the eight-week therapeutic horsemanship program currently being carried out by the Professional Association of Therapeutic Horsemanship International (PATH)-certified 501(c)(3) nonprofit organization Rainier Therapeutic Riding. Participants in this program were men and women in the military stationed at Joint Base Lewis McChord. Many of these participants were recruited by their occupational and other military therapists; other participants were recruited directly by Rainier Therapeutic Riding via word-of-mouth and promotional materials. All direct identifiers will be removed from this archival data; participants’ responses and general rider category will remain completely anonymous. Several hundred individuals have participated in this program to date. The therapeutic horsemanship program, itself, entails eight weekly sessions in which men and women in the military interact with, and eventually ride, one horse with which they develop a relationship focused on mutual trust. A PATH-certified instructor, in compliance with PATH procedures and guidelines for safe and effective therapeutic horsemanship facilitation, guides each participant through his or her weekly protocol. For analytical purposes, the participants will be divided based upon their general rider category: Posttraumatic Stress Disorder (PTSD) or Traumatic Brain Injury (TBI). Any specific medical information, including specific clinical diagnoses (e.g., DSM 5 or ICD10) given by medical personnel will not be included in the archival data set provided to this researcher. Variables such as self-reported general anxiety, mood, and physical pain as measured by three simple Likert scales will be compared both before and after each therapeutic horsemanship session, and between participants in the two rider categories.

Keywords: PTSD, Therapeutic Horsemanship, Anxiety
Effects of Fluorescent and Natural Lighting on Auditory Working Memory Tasks

*Dion, Madison*

*Mentor(s): Ralf Greenwald, Psychology*

Poster Presentation Session #3, Poster #46  
2:30-5:00 p.m. in Ballroom B/C/D

The purpose of this research is to assess if there are differences in working memory in fluorescent lighting settings compared to naturally lit settings as well as to evaluate if there are any differences in male and female working memory in these lighting environments. Previous research has suggested that there are some gender differences in neurological activity during working memory tasks, and that students in naturally lit school settings tend to have better long-term cognitive performance than their counterparts in fluorescently lit classroom settings. Data on working memory will be collected using four standardized auditory subtests from the TOMAL-2. Based on previously conducted research, the current study hypothesizes that female participants will outperform male participants in all four working memory subtests and that both males and females will perform better in naturally lit environmental conditions than in the florescent lighting conditions.

*Keywords: Working Memory, Lighting, Environmental Psychology*

Film and Video Studies: Promotional Video

*Durkopp, Eric; Titus, Nicholas*

*Mentor(s): Jon Ward, Film and Video Studies*

Video and Creative Expression Presentation, Session #20  
12:20-12:40 p.m. in the Theatre

The film and video studies program at Central Washington University has grown immensely since its creation in 2008. Since then, the program has gone on to graduate numerous majors studying in critical studies or production specializations. The program has upgraded its equipment to allow near Hollywood-level productions and signed on new faculty members to feed the growing need of the students studying the major. Through all these fantastic improvements and upgrades there was one element lacking, a new promotional video. The old promotional video for the Film and Video Studies program which was created in 2008 was very dated and lacked many of the higher production values the program could now achieve. It could not effectively promote the program as it stands today. So in Jon Ward’s Corporate Media Production class, Nick Titus and I (Eric Durkopp) were chosen to create a new promotional video. We knew this promotional video had to demonstrate the program’s maturity in teaching the practical and theoretical, but also exhibit its capacity of high production filming at the same time. Achieving such a level was not an easy task and would require a balancing act to keep it all together. In the end, we believe we found that balance from our countless interviews of faculty and students alike. The film and video studies promotional video represents the program as a whole. It demonstrates what prospective students will receive if they choose to study at Central Washington University Film and Video Studies.

*Keywords: Promotion, Visual, Information*
**Pit of Greed Audio Demonstration**  
*Durkopp, Eric; Ranniger, Johnny; Harmon, Jeff; Amort, Aaron; Morey, Alex*  
*Mentor(s): Michael Ogden, Film and Video Studies*

Video and Creative Expression Presentation, Session #20  
11:40-12:00 p.m. in the Theatre

Love, ambition, and deceit are three words describing the *Pit of Greed*. *Pit of Greed* is a film noir about the lovely Margo Blanche, a chauffeur of the long sought crime lord, Bud. Dale Drummond thinks he finally caught the missing piece connecting Bud to the crimes. Only, he discovers Mrs. Blanche has been the crime lord the whole time and Bud has played the pawn. *Pit of Greed* was created by the very stellar Central Washington University Motion Picture Club consisting of extremely motivated and passionate filmmakers. We put this film together for the film and video studies 48hr Film Slam competition. We were given only 48 hours to put a film together consisting of writing, casting, filming, and editing. With such a short time span, there were many issues ranging from equipment failure to cranky individuals. But the most devastating issue of the whole project was the audio. The audio in *Pit of Greed* had been neglected and needed to be fixed. It took many hours dedicated to post-production to fully clean up the audio. Even under such a tight deadline, the film was finished and went on to win best directing. You can see the film here: https://www.youtube.com/watch?v=QlEb5k3XKzA. Eric Durkopp directed this film short.

**Keywords:** Audio, Clean-up, Post-production

**Web-Tool Design for the Sciences**  
*Edwards, Brannond; Jones, James; Michel, Alec; Brooks, Elizabeth*  
*Mentor(s): Filip Jagodzinski, Computer Science; Alison Scoville, Biology*

Oral Presentation, Session #15  
12:00-12:20 p.m. in Room 137B

When performing research in any given field, the use of custom-built software may be employed in order to facilitate a more expedient research process. Users of these programs are most often not computer specialists themselves and experience difficulty utilizing the software. We are developing a front-end platform that is capable of interfacing with back-end programs hosted on a server. The infrastructure integrates web development technologies (HTML, CSS, PHP), shell scripts utilizing gnuplot, and a locally hosted server. The HTML web-page invokes the scientific software, which has been reviewed and debugged for efficiency and run-time errors, before utilizing a shell script to generate statistical plots of functions. This script parses the hosted scientific software’s output and formats the data for gnuplot to extrapolate. The statistical and graphical plots are posted to the website’s front-end graphical user interface for the end user to analyze. This platform is currently being tested by implementing software that is in development by Elizabeth Brooks for biology (co)variance research at Central Washington University.

**Keywords:** Data Analysis, Online, Visualization
Vivido Déesse
Eklund, Andrea
Family and Consumer Sciences

Poster Presentation Session #2, Creative Works, Poster #9
11:30-2:00 p.m. in Ballroom B/C/D

Purpose: The purpose of this design was to integrate various apparel construction techniques used throughout history in one creative garment. Process: Inspiration for the design came from recent trips to Paris, London, and Milan. My imagination was sparked while I was engrossed in the stories and images of these historical cities were people have lived their lives and fashion evolved over hundreds of years. Drawing inspiration from a boat ride down the Seine River in Paris and the miles-long network of canals, the monuments and carvings at Westminster Abbey, the Wedding Dress 1775-2014 exhibit at the Victoria and Albert Museum, and many other historical locations, the cut, proportion, and details of the garment came into fruition. Graffiti seen throughout Paris and Milan along with the stained glass windows and vivid colors at Westminster Abbey was the inspiration for the unique textile design on the garment which is meant to stimulate thought and emotion. A simple leotard was created to go underneath the garment as to cover the body but not take away from the over garment. Techniques: Creating the front bodice of small even pleats was a long and precise process. The size, placement, and angle of the pleats was detailed work to assure that they fit over the chest correctly and would open up beyond the chest so the viewer could clearly see the textile design. Once the pleated fabric was sewn together, it was carefully drawn on to create the unique textile design. The dramatic ruff was created using traditional methods and was practiced a few times to assure the final product was accurate, clean, and balanced. Contribution: Combining the draping, pleating, neck ruff, bold textile art, and specific details the garment has a unique and unseen design combination and aesthetic to contribute to the design community. Materials: 100 percent plain weave fabric, polyester thread, leather, fabric paint.

Keywords: Draping, Textile Art, Pleating, Historical Inspiration

Rapid Detection of E. coli Using Flow Cytometry Immunofluorescence
Elg, Clinton
Mentor(s): Clay Arango, Biological Sciences; Blaise Dondji, Biology

Poster Presentation Session #1, Poster #38
8:30-11:00 a.m. in Ballroom B/C/D

The bacteria Escherichia coli O157:H7 poses a public health threat as demonstrated in a Washington State lake-associated swimming outbreak that hospitalized eight children in 1999 and the recent outbreak on Mercer Island that closed schools and restaurants for nearly one week as residents boiled drinking water due to contamination. Current methodology of testing for pathogenic bacteria in surface water relies on counting all fecal coliform bacteria with no specificity for pathogenic strains, which are rarely enumerated as the typical laboratory requires three days to positively identify pathogenic E. coli O157:H7. I am developing a flow cytometer assay for rapid (<30 min) detection of E. coli O157:H7 from natural waterways (i.e., streams, lakes, ponds) at detection levels suitable for application to public safety. To date, I have used fluorescent tagged E. coli O157:H7 antibodies (immunofluorescence) to detect the pathogen via flow cytometry in heterogeneous natural stream samples in less than 20 minutes and am incorporating use of a second fluorescent dye to differentiate organic matter from nonorganic debris in mixed water samples to lower the E. coli O157:H7 detection threshold. The ability of this novel flow cytometry assay to speed detection of E. coli O157:H7 from days to minutes holds the potential to protect public health in recreational waters. It also has potential application for use in rapid diagnoses of E. coli O157:H7 in human feces, protection of drinking water quality, and the prevention of food borne illness.

Keywords: Escherichia coli, Water Quality, Public Health
ELLENSBURG HIGH SCHOOL STUDENTS: ABSTRACTS

Expanding Environmental Awareness in our Hispanic Community

*Ellensburg High School Students: Baldovinos, Diana; Magana, Viridiana; Sanchez, Daisy; Valera, Carmen*

*Mentor(s): Jeff Hashimoto, Ellensburg High School*

Poster Presentation Session #1, Poster #23
8:30-11:00 a.m. in Ballroom B/C/D

In 2014, we educated Hispanic families about the 3 Rs (i.e., Reduce, Reuse, Recycle) and documented their improvements. In 2015, we want to educate more families about the 3 Rs and also about other ways they can reduce their resource use. To broaden our reach, we plan to create a event in which we focus on children so they can spread the word with their parents and other adults. We plan to teach about the 3 Rs and other topics like energy use and how it will benefit our community environmentally and economically.

*Keywords: Recycling, Community Outreach, Environment*

Willows and Soil Invertebrates at Reecer Creek, Ellensburg, Washington

*Ellensburg High School Students: Barker, Maggie; Whitney, Samantha; Dineen, Andrew*

*Mentor(s): Jeff Hashimoto, Ellensburg High School*

Poster Presentation Session #1, Poster #14
8:30-11:00 a.m. in Ballroom B/C/D

We studied the changes over time in the riparian zone of the Reecer Creek Flood Plain Restoration Project in Ellensburg, Washington, which is a stream restoration project constructed in 2011. We studied the populations of native versus nonnative willows and the diversity of soil invertebrate species. We have documented the return of soil invertebrates to Reecer Creek and an establishment of volunteer native willows since 2011.

*Keywords: Reecer Creek, Willows, Ecology*

Optimal Wetland for Ellensburg

*Ellensburg High School Students: Davis, Logan; Summer, Star; Canterbury, Owen*

*Mentor(s): Jeff Hashimoto, Ellensburg High School*

Poster Presentation Session #1, Poster #21
8:30-11:00 a.m. in Ballroom B/C/D

We researched the carbon dioxide emissions and water pollution for our county, along with the methods and practices involved in constructing a wetland. We then looked at our local climate and geography to determine the ideal location to implement a resulting wetland that would sequester our produced greenhouse gas and purify our water. Our plan incorporated the calculated cost of installation and maintenance, and the long term benefits of the system.

*Keywords: Wetland, Carbon Dioxide, Sequestration*
Black Carbon Levels within the Ellensburg Community
Ellensburg High School Students: Dell, Max; Garoutte, Kellen; Deffner, David
Mentor(s): Jeff Hashimoto, Ellensburg High School

Poster Presentation Session #1, Poster #17
8:30-11:00 a.m. in Ballroom B/C/D

The Ellensburg High School Advanced Placement (AP) Environmental class measured the concentration of black carbon throughout the community in winter 2015. Using an aethalometer, we determined black carbon levels both indoors and outdoors, at schools, and at public spaces. Understanding black carbon is important because it is composed of ultrafine particles which can contribute to respiratory and cardiovascular diseases, as well as directly contributing to global warming.

Keywords: Black Carbon, Ellensburg, Air Pollution

Imagine Tomorrow Transportation
Ellensburg High School Students: Ernest-Beck, Abby; Shissler, Tamzen; Hashimoto, Uhuru; Larson, Elle; Snedeker, Garrett
Mentor(s): Jeff Hashimoto, Ellensburg High School

Poster Presentation Session #1, Poster #22
8:30-11:00 a.m. in Ballroom B/C/D

We will map the routes of each high school going to the Imagine Tomorrow Competition in Pullman, Washington, and use this to identify the best carpooling system. We will attempt to implement this solution for this year’s event. We will also document this process and explore reasons for resistance to carpooling to this event and in general.

Keywords: Transportation, Carpooling, Carbon Footprint

Macro-Invertebrate and Water Quality of Reecer Creek
Ellensburg High School Students: Gylling, Travis; Charlton, Claire; Alcaraz, Daniel; Moore, Emma
Mentor(s): Jeff Hashimoto, Ellensburg High School

Poster Presentation Session #1, Poster #19
8:30-11:00 a.m. in Ballroom B/C/D

We studied the Reecer Creek Restoration Project’s Ellensburg, Washington, health through water quality testing and macro-invertebrate monitoring. Macro-invertebrate life can be correlated to the characteristics of the water in the creek by identifying indicator species. Additionally, the water quality of the stream would reveal the overall health. Many factors contribute to the quality of the water and macro invertebrate life

Keywords: Macro-invertebrates, Water Quality, Reecer Creek

Geographical Variations in Black Carbon around Ellensburg, Washington
Ellensburg High School Students: Jensvold, Nate; Hagen, Jaron
Mentor(s): Jeff Hashimoto, Ellensburg High School

Poster Presentation Session #1, Poster #18
8:30-11:00 a.m. in Ballroom B/C/D

Ellensburg High School Advanced Placement (AP) Environmental class used a black carbon Aethalometer to record the concentration of black carbon in multiple locations around Ellensburg during the winter
of 2015. We compared black carbon concentrations over both elevation and location. Black carbon is ultrafine particulate pollution that can be absorbed into the lungs and cause respiratory problems.

**Keywords:** Black Carbon, Air Pollution, Ellensburg

**Reecer Creek Cross Sections and Stream Sedimentation**  
Ellensburg High School Students: Mathis, Jamie; Butterfield, Lia  
Mentor(s): Jeff Hashimoto, Ellensburg High School

Poster Presentation Session #1, Poster #15  
8:30-11:00 a.m. in Ballroom B/C/D

To visualize the change in the bed of Reecer Creek since the reconstruction of the riparian zone in 2011, we collected cross-sectional depth data from multiple sites in the restored zone. Combining past data from the same locations with the types and amount of sedimentation in the area, we were able to interpret how the creek has adapted to its new meandering course in the floodplain.

**Keywords:** Reecer Creek, Cross Section, Sediment

**Reecer Creek Sediment Size and Embeddedness**  
Ellensburg High School Students: Michel, Marcus; Gasper, Quinton; Reynolds, Thys  
Mentor(s): Jeff Hashimoto, Ellensburg High School

Poster Presentation Session #1, Poster #16  
8:30-11:00 a.m. in Ballroom B/C/D

The sediment particles in any given stream are a vital factor in determining the suitability of a given location for salmon habitats. The size of the sediment particles and how deeply they are buried in the streambed (i.e., embeddedness), in particular, are major determining factors for redd survival. We took a random sample of sediment particle sizes and embeddedness and, ultimately, found that there are some midstream and upstream sites suitable for the construction of salmon redds, while the downstream location is uninhabitable.

**Keywords:** Reecer Creek, Sediment, Embeddedness

**Building Better Burning Bubbles**  
Ellensburg High School Students: Wilson, Eric; Sumner, Sasha; Nover, Miranda; Ernest-Beck, Langdon  
Mentor(s): Jeff Hashimoto, Ellensburg High School

Poster Presentation Session #1, Poster #20  
8:30-11:00 a.m. in Ballroom B/C/D

The aim of our project is to design and evaluate a feasible offshore hydrogen generation plant off the coast of Washington State. Our plant will utilize existing offshore wind and wave generator technology to produce electricity that will power electrolysis. The purpose of the plant is to create a feasible hydrogen generation solution to allow for the phasing out of conventional gasoline.

**Keywords:** Hydrogen, Wave Energy, Wind Energy
The Effect of Applesauce and Nonfat Yogurt as Fat Replacers in Brownies

*Epstein-Solfield, Alexandra; Knopp, Shelby; Wetli, Jennifer*

*Mentor(s): David Gee, Nutrition, Exercise & Health Science*

Poster Presentation Session #2, Poster #24
11:30-2:00 p.m. in Ballroom B/C/D

The American diet is high in saturated fat and cholesterol, partially contributing to the current obesity epidemic and increase in diet-related diseases. One solution to this problem is the substitution of high fat ingredients such as butter and oil with lower fat options in baked goods. This study examined the acceptability of non-fat yogurt and applesauce as butter replacements in brownies. Statistical analyses indicated that the applesauce and yogurt recipes were significantly different from the control in several sensory and objective tests and were generally less acceptable, $p<0.05$. Two sensory testing sessions gathered data from 51 total judges. The judges rated moistness, sourness, and chewiness, for each variation. The results showed a significant difference in chewiness and sourness between the three variations but no significant difference in moistness. Objective tests, using a TA.XT2 Texture Analyzer, indicated that the yogurt and applesauce variations took significantly more force to penetrate and withdraw than the control. Our results, therefore, determined that applesauce and yogurt were not equivalent full-fat substitutes for butter in brownies.

*Keywords: Applesauce, Nonfat Yogurt, Fat Replacement*

A Composite Brake Rotor Assembly by Utilizing Replaceable Friction Surfaces

*Evert, John*

*Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction*

Poster Presentation Session #3, Constructed Objects, Poster #7
2:30-5:00 p.m. in Ballroom B/C/D

This project investigated a proof of concept design involving a rotor fabricated from aluminum with replaceable friction surfaces with greater or equal performance characteristics in order to reduce cost and maintenance. The replaceable friction surfaces provide a means to mitigate cost to the end user. The structure is constrained by the dimensions, 11.75” diameter and 1.25” width, and serves as a direct replacement rotor for a circle track racecar. Analyses provide a direct comparison in static mass, moments of inertia, and forced convection thermal calculations in order to determine if the concept was viable. Requirements for a successful design were a 22 percent reduction in total rotating mass, resist a linear deceleration rate of eight meters per second, and the centripetal forces of an angular velocity of 315 radians per second. Off-car testing revealed a four pound reduction in static rotor mass and achieved a 34 percent reduction in the moment of inertia. On-car testing involved data logging multiple laps at a local racetrack and displayed a higher theoretical peak temperature than the conventional design. For the composite structure, the heat was rejected earlier in the cool-down phase of the lap resulting in a higher steady state of absorption/radiation characteristics. Means of monitoring the performance are by way of a global positioning system (GPS) accelerometer and remote mounted infrared guns mounted to each hub. This design offers all the function of a conventional rotor with a 42 percent reduction in replacement cost and a 18 percent reduction in replacement time.

*Keywords: Temperature, Replaceable, Braking*
Post-Glacial Fire and Vegetation History of Horsetail Lake in the Teanaway Area of the Central Eastern Cascades, Washington
Ferri, Serafina; Walsh, Megan
Mentor(s): Megan Walsh, Resource Management

Poster Presentation Session #2, Poster #34
11:30-2:00 p.m. in Ballroom B/C/D

Landscapes of the Pacific Northwest have been shaped by dramatic shifts in climate since the last glacial maximum, and more recently, by human activity. However, it is unclear how past relationships between people, fire, and climate played out on the landscape. The purpose of this research is to reconstruct the post-glacial paleoenvironmental history of a wetland known as Horsetail Lake, located in the Teanaway area of the eastern Cascades. The goal is to evaluate how fire activity and vegetation patterns have varied under different climatic scenarios during the last ~13,000 years and in relation to human land-use actions. This lake was selected because it is one of only a few natural wetlands that exist in the Teanaway area below an elevation of 4,000 feet, and because the archaeological record supports the idea that people utilized mountain environments in the eastern Cascades similar to that around the site. In 2011, a nine-meter long sediment core was extracted from Horsetail Lake using a modified Livingstone corer. High-resolution macroscopic charcoal and pollen analysis is being used to reconstruct the fire and vegetation history of the Horsetail Lake watershed. The chronology of the sediment will be determined using radiocarbon (14C) dating and tephra layer identification. Preliminary results of this study show that fire frequency and severity has varied widely at Horsetail Lake during the post-glacial period. The early Holocene shows high fire activity with a drop in fire activity during the middle Holocene. Fire activity then becomes more frequent during the late Holocene. Completion of the pollen analysis will show how the forest around Horsetail Lake has changed both in terms of composition and structure in relation to the fire history. My results will hopefully be incorporated in future management plans of forest environments in the eastern Cascades as climate continues to change.

Keywords: Biogeography, Environment, Reconstruction

The Collapsible Wheelchair Wheel
Fischer, Joseph
Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #28
2:30-5:00 p.m. in Ballroom B/C/D

Portability, convenience, and efficiency are becoming more and more prevalent as technology increases. This is also true with wheelchairs. Wheelchairs are being designed to fold and collapse smaller and smaller with every iteration but there is one parameter that remains constant, the wheel. No matter how small the wheelchair frame folds, it is always limited by its wheel’s diameter. This project aims to create a collapsible wheel design to accompany a foldable wheelchair in order to make it more portable and storable. Since the diameter of the wheel is the limiting factor in a foldable wheelchair, the relatively small width dimension of the wheel was increased in order to compensate for the reduction of the diameter dimension. This was achieved by creating a wheel composed of six equal parts that interlock to form a solid, functional wheel capable of supporting a human to the weight capacity of other wheelchairs (i.e., 250 pounds). It is also important that the wheel is easy and quick to assemble and disassemble for users of all ages and capability. It will be tested for strength but also for how quickly it can be assembled and disassembled. To achieve a one minute assembly time, quick release hinges were used, an instruction manual was created, and magnet and Velcro attach points were implemented. This collapsible wheel design collapses a standard 24-inch wheelchair wheel to an 11.25 by 10.75 by 6.00 inch assembly. This is a reduction of 83 percent of its original frontal area when collapsed.

Keywords: Collapsible, Wheel, Portable
**Constraining the Uplift History of the Transantarctic Mountains with Apatite Fission Tracks**

*Fisher, Teo; Bauer, Nick*

*Mentor(s): Audrey Huerta, Geological Sciences*

Oral Presentation, Session #16  
12:20-12:40 p.m. in Room 140

The Transantarctic Mountains (TAM) span approximately 3,000 km and stand 3 to 4 km high but their origin is not well understood. There are several competing theories regarding the origin of the TAM. One theory, rift flank uplift, involves one side of a fault rising and being eroded. Another theory, plateau collapse, involves the rifting (pulling apart) and collapse of a plateau with a remnant margin forming the TAM. The exhumation (uplift and erosion) history of the TAM is recorded in the mineral apatite. Apatite fission track (AFT) data allows us to see the duration and rate of exhumation starting at a depth of about 4 km below the surface. Decades of work in the TAM by researchers has produced an abundance of AFT data. In this study, AFT data in the TAM were compiled and plotted in ArcGIS along with geological maps and digital elevation models for analysis. The AFT data were analyzed in fault blocks segmented by major faults perpendicular to the coast. AFT data of the TAM were plotted with elevation and distance from the coastline of the Ross Sea and Ross Ice Shelf to evaluate the overall trend of each fault block in relation to the coastline. Preliminary results show more exhumation near the coastline which decreases inland and with elevation, and appears to accommodate the plateau collapse model.

*Keywords*: Antarctica, Transantarctic Mountains, Exhumation, Apatite Fission Track

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**Leadership in the Collective Movements of Tibetan Macaques (*Macaca thibetana*) at Mt. Huangshan, China**

*Fratellone, Gregory; Sun, Lixing; Sheeran, Lori K.; Wagner, R. Steven; Li, Jinhua*  
*Mentor(s): Lixing Sun, Biological Sciences*

Poster Presentation Session #1, Poster #34  
8:30-11:00 a.m. in Ballroom B/C/D

As a socially well-connected and cohesive species, humans tend to make many collective decisions. How do nonhuman species collectively relay information? We present data on the leadership of collective movements in Tibetan macaques (*Macaca thibetana*) in Mt. Huangshan, China, by analyzing their movements in relation to their social networks. All-occurrence sampling was used to investigate collective movement patterns, and focal and scan sampling were used to retrieve information on their affiliative and agonistic behaviors for a complete social network analysis. There were a total of 128 successful collective movements recorded over a two month period. All 20 adult individuals participated in collective movement leadership. There was no significant effect of sex, age, or rank on the leadership frequency of adult troop members. However, the highest-ranking female (YH) and a young female (TXX) significantly led more collective movements than expected by chance. The strength and eigenvector centrality of affiliative and agonistic social networks were significantly correlated with collective movement. Both females belong to different clusters in the social network analysis of collective movement, meaning that certain individuals tend to move with one female or the other. Individuals belonging to these two clusters may be a consequence of the mating season. An alpha level of .05 was used for all statistical tests. Supported by NSFC (30970414 & 31172106) and NSF-OISE (1065589).

*Keywords*: Movement, Leadership, Social
Measured Laser Frequencies from the Optically Pumped Methanol Isotopologue $^{13}$CD$_3$OD

Freeman, Benjamin

Mentor(s): Michael Jackson, Physics

Poster Presentation Session #1, Poster #56
8:30-11:00 a.m. in Ballroom B/C/D

The far-infrared region of the electromagnetic spectrum, informally defined as the wavelength region between 0.025 mm and 2.00 mm, is an area that has been investigated using laser radiation for more than 50 years. Research with far infrared lasers has a range of applications including terahertz imaging, a form of noninvasive imaging. Creating a catalog of far-infrared laser emissions is also beneficial for their use in high-resolution spectroscopic investigations of stable molecules and short-lived free radicals. The purpose of this research was to measure the frequencies of known far-infrared laser emissions generated by $^{13}$CD$_3$OD, an isotopic form of methanol. This was achieved using an optically pumped molecular laser and two carbon dioxide reference lasers. In this work, the frequencies for 16 far-infrared laser emissions have been measured with a one-sigma uncertainty of approximately 0.7 MHz. This poster will cover the experimental procedure used for this research along with the data that were recorded.

Keywords: Far-Infrared Laser, Frequency Measurement, $^{13}$CD$_3$OD

Why Are Visitor Information Centers Important for Rural Tourism?

Freeman, Madalyn

Mentor(s): Elizabeth Kerns, Communication

Oral Presentation, Session #2
8:50-9:10 a.m. in Room 201

This research study was undertaken by the Central Communication Agency, a student-run strategic communication firm at Central Washington University. The group was comprised of four undergraduate seniors working in conjunction with the Kittitas County Chamber of Commerce Tourism Bureau. Our goal was to find out why visitor information centers are important for rural tourism. The group decided to move forward with a regional study on this topic and surveyed other rural Visitor Information Centers and Tourism Bureaus in Colorado, Idaho, Northern California, Oregon, and Washington State. The students in the Central Communication Agency aggregated results and compared findings about trends and developments in the rural tourism industry.

Keywords: Research, Tourism, Branding

Your Home Matters

Freeman, Madalyn; Peone, Masey; Stewart, Robyn; Downing, Aubree; Caoili, Silver

Mentor(s): Elizabeth Kerns, Communication

Oral Presentation, Session #2
9:10-9:30 a.m. in Room 201

The Public Relations Student Society of America hosts a yearly national public relations campaign called the Bateman Competition. This year, over 120 teams across the nation organized and implemented a public relations campaign for Home Matters, a national movement focusing on quality, affordable housing. The goal of the Your Home Matters campaign was to recognize the need and provision of quality, affordable housing in Kittitas County and unify local businesses to increase awareness of this local, regional, and national movement. To fulfill this goal, our team of five students conducted research and held the Your Home Matters Affordable Housing Fair 2015 in our community to raise awareness on the topic of local, quality, affordable housing.

Keywords: Home Matters, Public Relations, Campaign Competition
Identifying Sediment and Woody Debris Deposition Following Peak Flows on the Elwha River, Washington

Frenzel, Ethan; McCausland, Nick; Free, Bryon
Mentor(s): Lisa Ely, Geological Sciences

The purpose of this study is to identify relationships between peak flow, sediment redeposition, and woody debris transport on the Elwha River in western Washington during and following the removal of the Glines Canyon dam. Dam removal started on June 1, 2011, and was completed on August 26, 2014. We hypothesized that, as portions of the Glines Canyon dam were removed, the woody debris and sediment from behind the dam would create logjams, fill in existing bars, and decrease the average sediment size in the channel downstream. Our research was conducted two to six kilometers downstream from the dam site. Sediment sizes were surveyed bimonthly and/or following large flood events at four sites during the study period. Surface sediment size was recorded every meter along a cross section for a minimum of 100m. ArcGIS was used to map large woody debris and log jams on Mosaicked aerial photos of the entire study area, which allowed us to track the transportation of woody debris after peak flows and dam removal stages. Woody debris below the Glines Canyon Dam generally increased during the study period. Sediment size initially rapidly decreased as cobble bars were buried by sand released from the reservoir, then increased slightly as the new sediment was reworked. This research will provide valuable information on sediment transport and river dynamics during and after dam removal, which is relevant for planning for the effects of future dam removal projects.

Keywords: ArcGIS, Sediment, Woody Debris

Elucidating the Hormonal Regulation of the Claudin Genes in Ovarian Cells

Gadson, Sean
Mentor(s): April Binder, Biological Sciences

Protein structures called tight junctions adjoin neighboring cells, together forming a selective barrier. This barrier separates cellular sheets in a way that allows them to be distinct from other areas of the body. Claudin proteins within these complexes help form and maintain these tight junctions. Prior research suggests that altered regulation of the claudin genes may contribute to the development of diseases in the tissues where they are expressed. An increase in the transcription of a select few claudin genes in ovarian tissues has been observed in estrogen receptor alpha knockout mice. These mice have ovarian phenotypes similar to mouse models of polycystic ovarian syndrome (PCOS). PCOS patients have also been shown to have a greater propensity for the development of ovarian cancer. The ovaries of ovarian cancer patients overexpress a subset of the claudin genes. Normally, these genes are not expressed in a healthy ovary, however in disease states they become expressed. Despite these findings, the regulation of the claudin genes in the ovaries has remained largely unexplored. Using a human ovarian cell line, SKOV-3, this study seeks to characterize the hormonal regulation of the claudin genes in the ovary. Ovarian cells will be treated with testosterone, to mimic the excess testosterone reported in PCOS patients. The expression of claudins 3, 4, 7, and 11 will be measured by quantitative reverse-transcriptase PCR in the ovarian cells. This research may shed light on the expression of these genes in PCOS disease states.

Keywords: PCOS, Claudin, Regulation
The Advances in Prosthetics

Garcia, Jose

Mentor(s): Roger Beardsley, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #12
2:30-5:00 p.m. in Ballroom B/C/D

Throughout time, many people have been able to build, create, and do amazing things with their arms and legs. However, those who have lost limbs at birth or through an event in their life sometimes have a harder time being as accomplished as others. While some people without limbs have had a harder life, some have been able to accomplish what others with a normal physiology can by the use of prosthetics. This presentation will focus on the advances of prosthetics, the benefits for the user, and their future development. The main focus will be on prosthetic arms and their capabilities and movement processes for the user. Two types of prosthetic arms will be explored in this presentation. The first type of prosthetic arm explored will be made of ABS plastic, PLA, polyamide (nylon), and several other different types of materials, depending on the needs of the patient. Another further sophisticated prosthetic arm examined is made of carbon fiber or pylon with circuits for the more advanced material to give the user better movement capabilities.

Keywords: Advances, Prosthetics, Arm

Measuring Far-Infrared Laser Frequencies from Optically Pumped CH$_3^{18}$OH

Gerke, Clarissa; Barajas, Jose

Mentor(s): Michael Jackson, Physics

Oral Presentation, Session #16
12:00-12:20 p.m. in Room 140

Far-infrared radiation, defined as having wavelengths from approximately 0.025 mm to 2 mm, has applications in many disciplines including astronomy and spectroscopy. These advances and subsequent applications have become possible through the research performed with far-infrared lasers that includes the discovery and classification of viable far-infrared emissions from various lasing media. Over the last few years, undergraduate students at Central Washington University have used a recently constructed optically pumped molecular laser system to generate more than 600 far-infrared laser emissions, about half of which have been measured solely by wavelength. Last year, this optically pumped molecular laser system was incorporated into a heterodyne, or frequency mixing, system consisting of two additional carbon dioxide (CO$_2$) reference lasers and their respective stabilization systems. With this heterodyne system, the laser emissions generated by a number of different laser media have been further characterized by measuring their frequency. This presentation will focus on the process of using the heterodyne system to search for and measure far-infrared laser frequencies, as well as how these frequencies are used in the spectroscopic assignment of far-infrared laser emissions as applied to the CH$_3^{18}$OH methanol isotopologue.

Keywords: Far-infrared Emission Frequencies, Lasers, Spectroscopy
Nutrient Intake of Elite Canadian and American Athletes with Spinal Cord Injury

Gerrish, Heather

Mentor(s): Kelly Pritchett, Nutrition, Exercise & Health Science; Dana Ogan, Nutrition, Exercise and Health Science; Robert Pritchett, Nutrition, Exercise and Health Science

Poster Presentation Session #2, Poster #29
11:30-2:00 p.m. in Ballroom B/C/D

The nutrient needs of spinal cord injury (SCI) athletes are dependent on their physiological alterations, training load, and intensity of practice. Limited research is available regarding the current nutrient intake of SCI elite athletes, possible nutrient deficiencies, and geographical consumption patterns. The purpose of this study was to examine the diets of Canadian (CAN), n=12, and American (USA), n=27, elite athletes with SCI from the United States Paralympic Canadian Sport Institute utilizing a self-reported 24-hour diet recall. Nutrient inadequacy was estimated by the proportion of athletes with mean intakes below the estimated average requirement (EAR) using the Research Solutions Food Processor Diet Analysis Software (ESHA). Mean energy intakes were 1,603 +/- 855 kcal for women and 1906 +/- 756 kcal for men. Reported micronutrient intakes were below EAR in >60 percent of USA athletes for vitamin D, folate, calcium, magnesium, potassium, and zinc, while 60 percent of CAN athletes reported intakes below the EAR in Niacin, B6, B12, vitamin C, vitamin D, folate, calcium, iron, magnesium, potassium, and zinc. In conclusion, nutrient intakes below the EAR were consistently found for both groups of elite athletes with SCI and suggested similar nutrient insufficiencies. Further research is needed to examine nutrient intake using other methods of dietary assessment and to determine the factors that may lead to nutrient insufficiency among elite athletes with SCI.

Keywords: Nutrient Insufficiency, Spinal Cord Injury, Elite Athletes

Whole Body Fuel Use: A Preliminary Study of Carbohydrate and Fat Oxidation During Water Exercise

Gerrish, Heather; Miller, Laura; Fisher, Mitchell; D’Acquisto, Debra

Mentor(s): Leo D’Acquisto, Nutrition, Exercise & Health Science

Poster Presentation Session #2, Poster #30
11:30-2:00 p.m. in Ballroom B/C/D

The purpose of this investigation was to measure energy expenditure and whole body carbohydrate and fat oxidation during shallow water exercise (SWE; submerged to axillary level). The level of energy expenditure and the relative contribution of fuels (e.g., carbohydrate [CHO], fat) depends on the intensity of exercise effort. This descriptive study addressed two questions: (1) what is the energy expenditure of performing SWE over a range of intensities; and (2) how does the rate of CHO and fat usage change with increasingly more demanding SWE efforts. Five healthy females (ages 18 to 26 years) performed five submaximal and one maximal SWE bout based on perceived effort (Borg Scale). Indirect calorimetry (Parvo-Medic metabolic analyzer) was employed to assess metabolic response while heart rate (HR) was monitored via telemetry (Polar technology). For perception of efforts ranging from very light (~50 percent HR peak) to very hard (~88 percent HR peak), the rate of energy expenditure ranged from 3.5+0.7 to 10.5+1.3 kilocalories per minute (Kcal.min-1), while the maximal SWE effort elicited a metabolic response of 13.2+1.7 Kcal.min-1 (~10 X resting metabolic rate). From very light to very hard, the rate of CHO oxidation increased from 2.0+1.0 to 9.4+1.8 Kcal.min-1 (~370 percent increase), while fat oxidation remained variable among the SWE efforts. In conclusion, carbohydrate oxidation plays an increasingly more important role as a fuel source during SWE efforts that require a high rate of energy expenditure. Furthermore, this study provides insight into the energy requirements of SWE, a mode of exercise that is becoming more popular.

Keywords: Metabolism, Water Exercise
Patenting Genes: Genetically Modified Organisms (GMOs)
Gibbs, Kelsey
Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #2, Poster #68
11:30-2:00 p.m. in Ballroom B/C/D

Protecting intellectual integrity of inventions is not a new concept. Protection in the form of patents dates as early as Ancient Greece. In the United States, patent laws have a very broad scope that have been very loosely interpreted. These laws were designed to protect man-made innovations. Until the 1980s this principle has been upheld. In 1980, a Supreme Court case ruled that a bacteria had been genetically modified by the insertion of genes. The inserted genes transformed the bacteria from a product of nature to a commodity. This case opened a floodgate of patents sought for genetically modified organisms. A patent is a mutually beneficial agreement between inventors and society. In exchange for full disclosure about a product, the inventor is granted a limited monopoly on a product. The shift that occurred in 1980, allowing a patent on genes, started a monopoly over plants and crops. Allowing patents on living organisms is causing a monopoly over certain crops. This monopoly is causing too many farmers to lose their livelihood due to patent infringement. The ethical debate regarding GMOs is constant; however, the real concern should be the ability to patent these genes. Allowing the patenting of genes is a slippery slope that has potential to devastate the food supply and subject farmers to a lifetime of debt and lawsuits. The purpose of this presentation is to analyze current patent laws with regards to genetically modified organisms and propose alternatives to protect farmers from unintentional patent infringement.

Keywords: Patent, Policy, Analysis

Toyota Disk Brake Conversion
Gibson, Geoffrey
Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #30
2:30-5:00 p.m. in Ballroom B/C/D

A common issue with Toyota pickups from the 1980s is that the factory braking system is not responsive enough for the driver to properly brake during an emergency situation. The cause of the poor response in braking comes from the drum brakes that are on the rear of the vehicle. Aftermarket vendors offered disk brake conversions that change the brakes on the rear axle from drum to disk. The aftermarket brackets that are in the conversion are thick and bulky, adding excess weight to the already heavy pickup. These thick brackets in the conversion do not retain the factory emergency brake which is required to maintain proper functionality. To remedy the issue, a set of brackets were designed around the use of Ford Mustang calipers and Mitsubishi Montero rotors in order to retain the factory emergency brake and to maintain the correct wheel lug pattern. In order to reduce the bulk of the brackets, stress analysis was performed on the bracket design to find the minimum allowable thickness. This was performed over multiple materials to use different thicknesses. Once a thickness was calculated for each material, it was reevaluated to ensure that the brackets would not deflect more than what the tolerance allowed. With brackets designed and built, they will be tested on the test vehicle where the deflection of the bracket will be recorded and compared to the .005” tolerance. The calculations that were performed prove the vehicle will safely stop in the specified distance of 75 ft at 40 mph.

Keywords: Deflection, Stress Analysis, Thickness
The Relationship Between Gender and Perceived Stress Levels in College Students
Gilbert, Meghan
Mentor(s): Jesse James, Psychology

Poster Presentation Session #3, Poster #62
2:30-5:00 p.m. in Ballroom B/C/D

Previous research on stress in adults demonstrates that stress, even perceived stress, can take a toll on an individual's health. Research also indicates that the severity of stress in college students has been rapidly increasing, which indicates a need for more investigation in this area. The purpose of this study was to determine if there was a difference between the stress levels of male and female college students and, if so, whether there is another factor involved that can account for this difference. The participants consisted of students attending Brigham Young University who were also active members of The Church of Jesus Christ Latter-Day Saints (152 women, 91 men) between the ages of 18 and 38 years (M=20.3, SD= 3.27). The participants were recruited through the Department of Psychology's online research participation system and took an online survey. When participants were asked if the amount of stress they experienced was greater than they perceived other college students’ stress to be, females were more likely to agree than males. Neither relationship status, nor having a ruminative explanatory style, could account for the difference. Implications of this research are discussed.

Keywords: Gender, Perceived Stress, College Students

Leadership Before and After Hurricane Katrina
Gohl, Philip; Barclay, Hannah; Vidaurri, Elizabeth; Newby, Ryan; Arquette, Joshua
Mentor(s): Joanne Perez, Other; Manuel Rodriguez, Center for Leadership and Community Engagement

Oral Presentation, Session #2
8:30-8:50 a.m. in Room 201

The Cross Cultural Leadership Program is a great opportunity for selected individuals to see how leadership can differentiate by cultures. Going to New Orleans, we had the privilege of talking with guest speakers who gave us an opportunity to understand the leadership of the city before and after Hurricane Katrina. Being able to compare the leadership styles of the guest speakers helped us, as a cohort, understand the wide range of leadership qualities, as each speaker gave us a different perspective on their style of leading.

Keywords: Leadership, Culture, Community

Self-Sustaining Greenhouse
Golding, Ethan
Mentor(s): Lad Holden, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #23
2:30-5:00 p.m. in Ballroom B/C/D

This project is a self-sustaining greenhouse that monitors temperature, humidity, soil moisture, and water level. The temperature is constantly monitored and controlled through a temperature/humidity sensor that will turn fans on/off when the temperature rises too high. Temperature, humidity, soil moisture, and water level are all displayed on a monitor for convenience. Since the greenhouse is an indoor greenhouse, the monitored values should remain consistent; however, alarms will sound if control limits are triggered. Control levels can be easily changed for different plant needs. Water-level must be restored manually when the level drops below a user-defined set point.

Keywords: Convenience, Self-Sustaining, Reliable
Fire Regime Dynamics of Fish Lake, Blue Mountains, Oregon
Goodner, Chris
Mentor(s): Megan Walsh, Resource Management

Poster Presentation Session #2, Poster #35
11:30-2:00 p.m. in Ballroom B/C/D

Fire has been a key process in shaping the forests of the Pacific Northwest (PNW) throughout the Holocene (the past ~12,000 years). However, in recent centuries, anthropogenic climate change and land-use actions (e.g., fire suppression) have severely disrupted pre-Euro-American settlement fire regimes, leading to the risk of catastrophic wildfires in many forests. Federal agencies are interested in using prescribed fire to restore historic forest mosaics and to reduce the risk of these conflagrations; however, there is a lack of fire history data from many areas in the PNW that spans more than a couple hundred years, including the Blue Mountains of Oregon. This study is reconstructing the fire history of the Fish Lake watershed in the Wallowa-Whitman National Forest of the Blue Mountains using macroscopic charcoal analysis of a lake sediment core. The purpose of this research is to determine how fire regimes have changed at the site during the past ~12,000 years with respect to past climate variability. Fish Lake is located at an elevation of 2,030 m and exists among trees with low fire return intervals, primarily lodgepole pine (Pinus contorta) and subalpine fir (Abies lasiocarpa). Preliminary results indicate that infrequent high-severity fires have historically dominated the region. Our findings also suggest these fires have become more common in the last few hundred years. It is our hope that the information from this study can be used by forest managers to determine how fire activity may change in the future due to climate change.

Keywords: Fire Regime, Macroscopic Charcoal Analysis, Climate Change

A Statistical Analysis of Sunflower Growth
Gowdey, Ashley
Mentor(s): Dominic Klyve, Mathematics

Oral Presentation, Session #17
12:40-1:00 p.m. in Room 201

This study considers whether the date at which a maternal sunflower begins to flower has a significant impact on the sunflowers grown from its seeds. The data were collected by Professor Jenny Dechaine of the Department of Biology. She ran an experiment which began with one population of sunflowers. From there, seeds were taken from those flowers in the order in which they flowered. Seeds taken from the sunflowers that flowered first became seed group A. Seeds from the next flowering group became seed group B, and so on until seed group H. The purpose of the experiment was to test if there was any relationship between when a seed's maternal plant flowered and a variety of measurements. Data on over 100 sunflowers were collected, recording such information as the number of leaves a plant had, the lengths of the leaves, and whether or not there was a presence of downy mildew. I performed the analysis of the dataset to find any significant differences in the groups of sunflowers. I provide descriptive statistics of each variable, as well as some combinations of seed groups, to better test if there was a significant difference between seeds with maternal plants that flowered early and those with maternal plants that flowered later.

Keywords: Analysis, Sunflowers, Growth
River Channel Migration in the Teanaway Community Forest, Washington, from 1954 to 2013  
Gray, Alison  
Mentor(s): Jennifer Lipton, Geography

Oral Presentation, Session #8  
10:20-10:40 a.m. in Room 140

The purpose of this project was to analyze river channel migration in the North, Middle, and West Forks of the Teanaway River located in the Teanaway Community Forest, in north central Washington to determine the amount of change that has occurred from 1954 to 2013. Tracking this change in the Teanaway Community Forest is important to decipher what kinds of restoration can be done in the floodplain to help riparian growth. Using geographic information systems (GIS), aerial photographs from five different years were georeferenced to a National Agriculture Imagery Program (NAIP) image of Kittitas County to account for a sixty year time period with approximately 10 years between each set of photographs. Only images where the river is present and located within the boundary of the Teanaway Community Forest were used in the georeferencing process. The river channels were then digitized from each year and compared to each time period to get an idea of migration and width changes. Areas of large change over the time period were selected and individual maps were made of each of these areas. Preliminary analysis shows that areas with small changes in river channel migration between 1954 and 1978 encountered large changes in channel migration by 2013. Knowing these areas of small and large change will help to focus restoration projects in the Community Forest.

Keywords: Rivers, Channel Migration, Teanaway, GIS

Emulsion Pressure Relief  
Greear, Aaron  
Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #15  
2:30-5:00 p.m. in Ballroom B/C/D

Over time the harsh outdoor environment wears away at asphalt surfaces. Asphalt emulsion is sprayed onto the surface to act as a sacrificial barrier. To pump this asphalt emulsion for spray application, an effective pressure relief device must be incorporated. High pressure is needed to achieve the desired spray pattern, but this same pressure can cause components to fail in the presence of a pressure spike. Hydraulically driven positive displacement pumps are used to pump the emulsion, so pinched hoses or a clog in the system can result in a severe pressure spike. Due to the emulsions viscosity and abrasive additives, a direct relief device is not suitable for long term service. A remote activated pressure relief device is needed to allow adequate spray pressure and prevent system failure. The device is manufactured with off-the-shelf hydraulic and pneumatic parts bolted to a steel base plate. A pilot pressure is taken from the emulsion circuit and feeds a pneumatic cylinder that pulls a linearly actuated hydraulic valve, in turn, diverting the hydraulic flow to the reservoir instead of driving the pump. The pull of the cylinder is balanced by an adjustable spring to allow for different pressure settings. After installing the pressure relief device, pressure was measured at different locations throughout the system. The emulsion pressure relief device performed as engineered and the pressure remained between 50 and 90 pounds per square inch.

Keywords: Pressure, Emulsion, Asphalt
Tracking Molecular Motors Along Microtubules

Griffin, Daniel

Mentor(s): Erin Craig, Physics

An axon is a long narrow fiber that extends away from a nerve cell body and makes contact with other cells. In addition to serving as the wire for transmission of electrical signals from the nerve, the axon also provides a pathway for transport of molecular-scale cargo, such as mitochondria, lipids, proteins, and other organelles, to and from the nerve cell. Molecules called molecular motors carry cargo along a dense bundle of long parallel filaments inside the axon. We are interested in understanding the physical mechanism molecular motors use to transport cargo over long distances in the axon, and the role this plays in nervous system development. Our collaborators, Professors Peter Baas and Anand Rao at Drexel University, used fluorescence recovery after photobleaching (FRAP) microscopy to produce time-lapse movies of the movement of short microtubules along an axon. My research is to analyze the movement of the microtubules in an attempt to understand how the molecular motors transport them. Using the program ImageJ with the plug-in TrackMate, I can take the experimental images and analyze the microtubule’s movements over a time period. The plug-in TrackMate works by using detectors, filters and other parameters to identify bright spots in the image corresponding to an object, and tracking these bright spots from one frame to the next. This research may someday lead to innovations in Alzheimer’s disease and cancer because, with knowing how the motors are supposed to move, one can locate those that move irregularly.

Keywords: Molecular Motors, Microtubules, Tracking

Factors that Influence College Students’ Choice of a Mathematics Based Career

Guadarrama, Veronica

Mentor(s): Mark Oursland, Mathematics

A student’s choice of college major builds a foundation for their future career. One of the first decisions a student must make is a college math course, which is dependent on their choice of major. This researcher sought to provide insight into the choices students make about their first college math courses and college majors. The study population included students who had completed at least 45 credits at Central Washington University (CWU), in Ellensburg, Washington. Data were collected using the online survey software Qualtrics (Qualtrics, Provo, UT). The survey collected responses about their high school and college courses as well as a four-factor Attitudes Toward Mathematics Inventory (ATMI) developed by Dr. Martha Tapia, an associate professor of mathematics at Berry College in Mount Berry, Georgia. The ATMI measures students’ enjoyment of math, self-confidence in math, motivation to do math, and perceived value of math. The results from this study showed a statistically significant relationship between the rigor of a student’s last high school math course and their choice of a math dependent college major. The relationship between the grade students received in their last high school math courses and choosing a math-dependent college major was also statistically significant. The results of the ATMI showed that students who report a higher level of enjoyment of math, motivation to do math, and value for math were statistically more likely to choose majors that require math. Motivation to do math was the factor with the highest positive correlation with choosing a math dependent college major.

Keywords: Choice, College Major, Math
___ Lives Matter: Current Movements Against Police Brutality

Guerra, Felicity; Osborn, Joshua; Ryser, Nate; Vander Stoep, Beth; Wu, Sheena
Mentor(s): Nelson Pichardo, Sociology; Pamela McMullin-Messier, Sociology

Poster Presentation Session #3, Poster #57
2:30-5:00 p.m. in Ballroom B/C/D

___ Lives Matter is a study on the social construction of public response to police brutality. Our research strives to provide an overview of the relationship between outrage over police brutality and activism. Specifically, our objective is to uncover the goals and ideologies of activist groups and organizations that emerged in response to recent events regarding police brutality in the age of social media. Our central question is why now? Why did these activist movements begin so strongly now in comparison to the 1990s, when police brutality was just as prevalent and highly publicized? In addition, we want to determine the role of and type of resources available to these groups and the diversity (e.g., race/ethnicity, age, etc.) of the members and leaders involved. Our theory is that these movements spread from their points of origin via the increased level of communication through the use of advanced technology and social media, especially focusing on the role of personal video recording. In conducting this study, we will use internet searches via social media, websites, and news media stories in order to collect and uncover information about these activist groups and organizations. Specifically, we will examine these groups’ goals, ideologies, and activism using a qualitative content analysis in order to construct a narrative around the social meanings behind why ____ lives matter.

Keywords: Social Movements; ___ Lives Matter; Police Brutality

College Students’ Perception of Rape

Gutierrez, Laura; Moore, Dorothy
Mentor(s): Marte Fallshore, Psychology

Oral Presentation, Session #22
1:10-1:30 p.m. in Room 137A

College students are the biggest population that experience rape situations and has the biggest population that accepts and endorses rape myths overall. The purpose of this study was to ask college students their perceptions of rape depending on the gender of the perpetrator and whether or not the victim, who was presented as being under the influence of alcohol, repeatedly says “no” to the perpetrator. Participants rated the severity of the assault and had the option of saying the assault was not a crime in order to investigate whether college students realize that having sex with an intoxicated person is rape even if they don’t say no. The results demonstrated that the rape involving a female victim was rated more severely than when the rape victim was a male. The results also demonstrated that when the intoxicated victim said “no”, the rape scenario was rated more severely than when the intoxicated victim said nothing. Implications of these results are discussed.

Keywords: Students’ Perceptions, Crime Severity, Alcohol Intoxication
Bare Hands Learning Resource  
*Hager, Kimberly; Phillips, Christopher*  
Mentor(s): Jer Loudenback, World Languages  

Business Plan Competition, Oral Presentations, Session #4  
11:20-11:50 a.m. in Room 301  

BHLR will provide services to people who possess the skill of sign language, such as a parent of deaf children, deaf adults, teachers, or interpreters for the deaf. BHLR focuses on developing a learning resource website accessible through the internet, with the goal to provide free service for people to use. This website will include a variety of educational videos that use American Sign Language and visual effects programs to better enhance the experience. The deaf community is known to rely heavily on visual communication and visual stimulus. Many deaf children and adults do not have reliable access to a learning resource, and most cannot afford to get a tutor or to enroll in a college where there is a lack of “know how” to communicate and teach in the child’s native language, which is usually American Sign Language.  

*Keywords: Business Plan Competition, American Sign Language, Website*  

Investigation of Wilson Creek Coliform Bacteria Sources Within Ellensburg City Limits  
*Hallsson, Kristel; Elg, Clint; Macke, Josh; Smith, Tyler*  
Mentor(s): Holly Pinkart, Biological Sciences  

Poster Presentation Session #1, Poster #47  
8:30-11:00 a.m. in Ballroom B/C/D  

The city of Ellensburg, Washington, is heavily invested in agriculture and livestock production. The concern for contamination of local streams and rivers represents an important local issue that sits at the crossroads of science, community health, politics, and the rural lifestyle. Previous research projects have found that fecal coliform levels of Wilson Creek are three times higher in Ellensburg than they are in the water surrounding town, with in-town levels dangerously exceeding surface water quality standards as set forth in Washington State law. The focus of this research was to find the location and source of coliform bacteria making its way into Wilson Creek in Ellensburg. Sample sites were established along Wilson Creek from September to November 2014 where biweekly standardized water sample tests were performed. Total coliform counts from the various sample sites have narrowed the suspected input source to a two-block stretch of Wilson Creek. A drop in the coliform level following the cessation of irrigation water flow suggest the source of contamination is the nearby canal. Continuing research has isolated several strains of coliform bacteria from the creek, tested them for antibacterial resistance, and attempted to identify the species of bacteria. This research is taking place in conjunction with city water management specialists and represents a joint effort between the City of Ellensburg and the Biological Sciences Department at Central Washington University to protect public health by identifying and eliminating sources of dangerous bacteria in local surface waterways.  

*Keywords: Water Quality, Coliform, Antibiotic Resistance*  

Higher Vocational Education and the Demands of Rapid Development in China  
*Han, Xiao*  
Mentor(s): Rex Wirth, Political Science  

Poster Presentation Session #2, Poster #58  
11:30-2:00 p.m. in Ballroom B/C/D  

With the dramatic development of its economy and society, China became one of the world’s largest economies. However, China takes longer to develop and train skilled technicians than it does to build factories. As the industrial base expanded, the need for vocational education to keep up with the
escalating demand for technical expertise and skills became increasingly important in China. Liuzhou City, as one of western China’s most important industrial cities, is an example of this kind of rapid growth and of the way in which continued development now depends on vocational education. To meet the demands of the growing industrial base, Liuzhou City government has established new colleges and upgraded existing city facilities. The analysis on which the poster is based examines the case of the Liuzhou Vocational and Technical College (LVTC). Recognized as one of the best vocational colleges in China, LVTC successfully meets the critical demands of both modernization and growth. The poster deals with the following important components of success: (1) goals consistent with the local economic and social development goals and needs; (2) majors that match up with the local labor market demand; (3) university-enterprise cooperation education projects; (4) support of social services; (5) preparation of students for the global economy; and (6) leadership in regional vocational education reform and development.

*Keywords: Higher Vocational Education, Demands of Development, China*

**The Perils of Command in the British Navy**  
*Hanberg, Claire*  
*Mentor(s): Liahna Armstrong, English; Anne Cubilié, Douglas Honors College*

Oral Presentation, Session #27  
1:30-1:50 p.m. in Room 301

This is a creative thesis project focusing on leadership in the British Royal Navy during the Napoleonic Era, during which the Royal Navy played an important military role while fostering its own unique society. The mystique and romance that surrounds the Royal Navy often clashes with equally held notions of a brutal and unforgiving institution of war, two extremes that must be navigated to seek an accurate picture of the Royal Navy and British society of this period. My research will explore naval structures including promotion, command, discipline, society, and shipboard life. I have studied primary source documents, secondary research, and other works of naval fiction set during this era. The research involved in this project will culminate in a piece of short historical fiction focusing on a First Lieutenant in the British Royal Navy. The lieutenant faces a dilemma of ethics and of duty in that his ship is on the eve of battle and his captain is unfit to command. The lieutenant is compelled to act against his captain to spare the crew, but must consider that doing so will invite a court martial and, likely, his death. The climax of the story will be the lieutenant’s decision about what action to take against the captain and how he justifies it. The story will raise questions about duty, honor, and personal sacrifice. My presentation will also highlight my creative process and experience as an author of historical fiction attempting to produce an accurate and engaging story.

*Keywords: British, Navy, Fiction*

**MIDI Instrument Control in LabVIEW**  
*Hand, Justin*  
*Mentor(s): Lad Holden, Engineering Technologies, Safety, & Construction*

Poster Presentation Session #3, Constructed Objects, Poster #16  
2:30-5:00 p.m. in Ballroom B/C/D

The goal of this project was to explore the capabilities of National Instruments’ LabVIEW software for controlling electronic musical instruments. The project primarily involves LabVIEW software through which the MIDI code can be transmitted to an audio synthesizer to generate sounds, while using proximity sensors as novel controls to translate hand movements into musical note data. The project demonstrates that LabVIEW can be used to interpret a signal from any kind of sensor and can use digital controls within the software to generate note data for generating music on MIDI instruments.

*Keywords: LabVIEW, Programming, Midi*
Bioarchaeology, Barbados, Eastern Caribbean: Isotopic Analyses of Teeth and Bone from Human Remains
Hansen, Tiffany
Mentor(s): Steven Hackenberger, Anthropology & Museum Studies

Poster Presentation Session #2, Poster #52
11:30-2:00 p.m. in Ballroom B/C/D

Bioarchaeological studies have grown in sophistication and are now helping test assumptions about island garden agriculture (e.g., palm, cassava, and/or maize) and the relative contributions of marine proteins. Bone and teeth samples from five sites on Barbados and one on Barbuda were processed by the Center for Applied Isotopic Studies, University of Georgia, and data are reported for $\delta^{13}C_{co}$, $\delta^{13}C_{ca}$, $\delta^{15}N_{co}$, and $\delta^{18}O_{ap}$. Stable isotope ratios, adjusted ratios, and apatite-collagen spacing correspond with results from elsewhere in the Lesser Antilles. After adjustment, all of the $\delta^{15}N$ bone and teeth samples are within the food web range for marine protein resources. Adjusted values for samples from Heywoods, Chancery Lane, Goddard, and Light & Power sites are indicative of a marine diet. Protein models of marine/C4 plants and C3 plants indicate a mixture of plant and marine protein.

Keywords: Bioarchaeology, Isotope Studies, Anthropology

Consumers’ Psychological Understanding of Nutrition Labels in Regards to Nutrition Value
Hardwick, Danica
Mentor(s): Marte Fallshore, Psychology

Poster Presentation Session #3, Poster #48
2:30-5:00 p.m. in Ballroom B/C/D

Individuals make food decisions multiple times a day, leading to food behaviors and patterns. However, many are unaware of what they are consuming due to the complexity of nutrition labels. With such complexity apparent, the Food and Drug Administration is proposing a new food label to update the current label and based on the latest science-based nutrition recommendations. This experiment was constructed in order to measure participants’ comprehension of the old versus the new food labels. Participants were asked to select which food they preferred (i.e., healthy versus not-so healthy) depending upon whether the label was old or new. The new label probably won’t have any impact on participants’ choices. The food choice process incorporates many psychological factors including the ability to understand nutritional labels.

Keywords: Nutritional Label, Food Choice, Comprehension of Nutritional Labels

The Social Business Card
Haro, Kevin; Dovhalets, Dmytro
Mentor(s): Holly Johnson, Computer Science

Oral Presentation, Session #7
9:40-10:00 a.m. in Room 137B

We present a cross platform mobile application that facilitates the distribution of personal and professional contact (i.e., business card) information. This application allows users to enter any contact handle (e.g., phone, e-mail, or Facebook). In addition to all of an individual’s contact information being in one convenient place, users can also distribute their information to other users easily via a high performance user interface. Furthermore, users will have the ability to make multiple versions of their business card. For example, a user’s social media accounts can be put into a personal card that can be distributed to friends and family. Similarly, more business oriented forms of communication can also be
placed into a professional or business card and sent to potential clients. This application helps to mitigate information exchange issues such as: complex contact data transfer between individuals, outdated contact information, and non-standardized ways to present contact information. In addition to expediting the process of exchanging contact information with personal or professional individuals, this application also allows the aforementioned cards to updated dynamically as well as distributed readily to the various accounts (e.g., e-mail, social media) of different people. This project is currently in development and facilitates the transfer of contact information via Bluetooth connectivity. This instance of the project is only being developed for the android mobile operating system at this time as development for iOS requires the use of fee-based licenses and related tools. Looking forward, our development plans include the implementation of more efficient methods to transfer data as well as development for the Apple iOS.

*Keywords: Android, Social-Media, Mobile-Development*

**Wanderlust**  
**Harris, Kaylee**  
**Mentor(s): Andrea Eklund, Family and Consumer Sciences**

Poster Presentation Session #2, Creative Works, Poster #14  
11:30-2:00 p.m. in Ballroom B/C/D

Purpose: The purpose of my design is to create a look that is simple and easy to wear while still being superbly unique and daring. My ultimate goal was to create a garment to be worn in a festival setting where there are no rules or boundaries according to dress and personal style. I wanted to create something that would stand out in a crowd and still be wearable and flattering. Process: The process of designing this piece was really quite simple. I knew I wanted to have a basic and flattering silhouette, which I achieved with a slightly flared skirt. But I wanted there to be drama to the piece, which I incorporated with a plunging neckline and low cut back. The drama of my garment is the tie-dyed pattern, which I created by hand. I knew at the beginning of my designing process that I wanted to have something that really stood out and was unique in comparison to anything else that will be seen on the runway. I hope to achieve that with my one-of-a-kind dyed fabric. Techniques: Draping was used to create this garment. Once I completed the drape, I adjusted the pattern to give the skirt a larger flare to achieve more fullness and volume. A challenge I ran into was the absence of a dress form with similar measurements to my model, so I had to rely on the fittings with my model to create a truly custom-fitted garment. This process is more time consuming but it gave the dress a more accurate fit and, thus, an overall more flattering look. Contribution: Tie-dying is not only pretty to look at, but it is a bonding experience between friends and even with oneself, because creating something, especially art, is a soul gratifying experience. I hope to bring personal creativity back into the picture of fashion and show people that you don’t have to have the same exact thing as the next person in order to be fashionable, but rather be completely and truly yourself. Materials: 100 percent cotton knit, polyester plain weave lining, polyester thread, braided fabric. *This is one in a line of three garments; the entire line can be seen at the Apparel, Textiles, and Merchandising spring fashion show, May 30, at 3:00 p.m. and 7:00 p.m. in Milo Smith Theater in McConnell Hall.*

*Keywords: Draping, Tie Dye, Apparel*
Environmental Protection: Recovery and Development in Liuzhou City

He, Hong

Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #2, Poster #61
11:30-2:00 p.m. in Ballroom B/C/D

The steel industry came to Liuzhou in the 1960s and sparked an economic boom that turned it into an industrial center. By the end of the 1980s, however, Liuzhou was among the top four areas in China for acid rain, earning it the name “Acid Rain City.” A city that had historically been known for the natural beauty of its landscape was a mess. This is an analysis of Liuzhou’s clean-up. Today children swim, raft and play in the river, and the sky is remarkably clear given that industrial production is higher today than it was in the 1980s. The project explains and the poster depicts how the city was restored and is now, once again, recognized for the most beautiful landscape in an industrial city and the strongest industrial city with a beautiful landscape in China. The transition from polluted industrial center to ecologically balanced, livable industrial city was accomplished through the implementation of comprehensive plans for economic upgrading and urban transformation. Focusing on the physical environment, the poster shows both the dynamics of degradation in the last decades of the twentieth century and the policies that have brought about recovery and restoration since 2000. Although recovery and restoration are far from complete, Liuzhou has arrived at a point where maintaining its livability through a sustained effort is the main concern.

Keywords: Ecological Disaster, Transformation, Recovery

Analysis of Fatty Acids in Precontact Ceramics from Barbados, West Indies

Hendrix, Jillian; Troth, Kaylee; Barker, Sara; Kaminski, Amanda; Peters, Joanne; Ward, Timothy

Mentor(s): Steve Hackenberger, Anthropology & Museum Studies; Joanne Peters, Chemistry; Timothy Ward, Chemistry; Diane Ward, Chemistry

Poster Presentation Session #2, Poster #53
11:30-2:00 p.m. in Ballroom B/C/D

Analyses of organic residues on ceramics complement other types of archaeological evidence used to characterize diets of populations colonizing and adapting to Caribbean Islands. Gas chromatography-mass spectrometry (GC-MS) is used to identify compounds sampled from 20 sherds excavated from two households (the Goddard Site 200 B.C.-A.D. 300 and Chancery Lane Site A.D. 800-1500). Measurable peaks of fatty acid residues are present on six samples from the Goddard Site. Smaller traces of fatty acids are present on Chancery Lane sherds. A comparison is made of fatty acids by type of sherd (i.e., rim/body, size, decoration), and visible types of residue (i.e., black and/or white substances). The specific composition of fatty acids present may help identify garden produce such as maize, cassava, and/or palm lipids as well as animal resources such as fish and turtle. Results contribute to the growing field of molecular archaeology and environmental archaeology in the Caribbean.

Keywords: Archaeology, Ceramics, Caribbean
Public Knowledge of Earthquake Hazard and Perceptions of Risk and Preparedness in Ellensburg

Hersfeldt, David; Browitt, Elisabeth; Kempf, Daniel; Martinick, Bailey; Schuler, Cece

Mentor(s): Pamela McMullin-Messier, Sociology; Anne Egger, Geological Sciences; Tim Melbourne, Geological Sciences

Poster Presentation Session #1, Poster #6
8:30-11:00 a.m. in Ballroom B/C/D

The possibility of earthquakes in the Kittitas Valley is a reality; however, it is unclear how members of this community perceive this hazard, how much they know about earthquakes in general, and how prepared they feel in the event of a disaster. The Douglas Honors College course, “Hazards, Risks, and Resilience in the Pacific Northwest”, set out to find answers. The class conducted a community survey to address these concerns. The purpose was to gather information regarding the public’s knowledge, perception of risks and vulnerabilities, and the level of preparedness in the event of an earthquake in Ellensburg and Kittitas County. The online survey, available from January 30 to February 15, 2015, was conducted by asking citizens to participate and was shared via word of mouth, Daily Record newspaper, KLXE radio station, and a variety of social media sources. One hundred and twenty-four responses were recorded in total. Earthquakes were not seen to be as likely as wildfires and floods and yet the feedback from the survey suggests that people would still experience some amount of vulnerability if an earthquake were to occur. Although many people have experienced an earthquake and believe them to be possible, only one third of the respondents knew the best way to respond to an earthquake, less than one half had emergency kits in their homes, and less than one third had an evacuation plan. The class created some suggested mitigation strategies that include creating opportunities for citizens of all ages to participate in earthquake drills, and encourage preparation of evacuation plans and emergency kits.

Keywords: Earthquakes, Kittitas, Public Survey

Language and Legislation: Bilingual Education in the United States, Eighteenth Century to the Present

Hirschey, Olivia

Mentor(s): Susana Flores, Educational Foundations & Curriculum; Loretta Gray, English; Anne Cubilié, Douglas Honors College

Oral Presentation, Session #36
3:40-4:00 p.m. in Room 301

This project is a comprehensive analysis of the relationship between politics and bilingual education in the United States, from the eighteenth through twenty-first centuries. It first examines the historical foundations of public schools in the United States. Then, it analyzes nineteenth century educational policies, focusing on German- and Spanish-speaking students as well as Native American missionary schools. Next, it assesses key court cases and legislation in the twentieth century, including the Bilingual Education Act. Finally, it looks at the current state of bilingual education, examining the issues from both linguistic and political perspectives. This project will assess both English language learning students and native-English speaking students who are learning a second language in order to fully encapsulate the scope of bilingual education. From this historical analysis, the project then begins to assess not just the what, but the why of American bilingual education, analyzing institutionalized racism and issues in research in order to examine the current capacity and controversy of bilingual education in key states. As a whole, the goal of this research is to see not only how politics have affected bilingual education policy, and how those policies have changed throughout time, but ultimately to see how these policies and practices affect students.

Keywords: Bilingual Education, Politics, Language
The Missing Meditatio: Leonhard Euler’s (1707–1783) Contribution to Articulatory Phonetics
Hirschey, Olivia
Mentor(s): Dominic Klyve, Mathematics

Oral Presentation, Session #27
1:50-2:10 p.m. in Room 301

This is an interdisciplinary research project combining the history of mathematics and linguistics. The work describes the contributions of Leonhard Euler (1707–1783), the eighteenth century physicist and mathematician, to the fields of articulatory and experimental phonetics. First, the authors provide evidence for Euler’s role in establishing the St. Petersburg Academy prize of 1780. Next, they consider a short and posthumously published work of Euler, the Meditatio de formatione vocum. It is shown that the Meditatio represents an early attempt to compare vowels in several languages, and includes a two-dimensional classification of vowels which anticipates in many ways the International Phonetic Alphabet vowel chart.

Keywords: Mathematics, Linguistics, History

Kinetic Characterization of an Indicating Indigotetrasulfonate Ink
Hoene, Becca
Mentor(s): Dion Rivera, Chemistry

Oral Presentation, Session #24
1:50-2:10 p.m. in Room 140

Indicator inks, or inks that change color, are important for insuring that the packaging of food products and sterile medical equipment has not been compromised. Through their use, people are able to visually determine by a color scale whether products have reached their expiration date, or in the case of medical equipment, if the seal to keep the components sterile has been broken and it is therefore no longer safe to use. The goal of this study is to determine the kinetic rate of decay for an indigotetrasulfonate ink through the use of fluorescence spectroscopy. After the kinetics of the system are known, the amount of ink needed for a specific period of time will be able to be determined. As the ink used in this study is oxidized, it changes color from yellow to blue, creating a decrease in fluorescence as it is excited at a wavelength of 520 nm. The rate of ink decay was measured at five different temperatures (i.e., room temperature, 30°C, 40°C, 50°C and 60°C) for dilutions of 1:500 and 1:1000 ink to water over a period of three hours. A decrease in emissions was seen as time progressed for each separate sample, and the rates increased along with the temperature.

Keywords: Fluorescence, Kinetic Decay, Indicator Inks

Observing the Effects of Novel Flavonoid Malheuran-2 on MCF-7 Cells Using Flow Cytometric Analysis
Hoffer, Dean
Mentor(s): Eric Foss, Biological Sciences

Poster Presentation Session #1, Poster #45
8:30-11:00 a.m. in Ballroom B/C/D

Apoptosis is the mechanism used to regulate the balance between cell proliferation and cell death. Reduced levels of apoptosis or increased levels of proliferation can lead to regions of uncontrollable growth, or cancer. Flavonoids are being studied because of their anti-tumor qualities and low toxicity on surrounding healthy tissue. Of six flavonoids extracted from the Dalea searlsiae plant, flavonoids 1 to 4 showed inhibitory effects on the proliferation of MCF-7 cells. After further studying the effects of flavonoid 2, apoptosis was confirmed using fluorescent microscopy and staining with Annexin V Alexa fluor 488 and propidium iodide. Analysis using flow cytometry was impossible due to false binding of Annexin which was attributed to harsh cell harvesting techniques compromising the cell membrane and surface proteins.

Keywords: Flow Cytometry, Cancer, Cell Biology
The Design and Construction of Tensile Test Gripping Assemblies
Hortman, Melvin
Mentor(s): Craig Johnson, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #31
2:30-5:00 p.m. in Ballroom B/C/D

The goal of this project was to design, manufacture, and test a pair of cheap gripping assemblies with mount adapters to the Instron TT-C tensile testing machine, which is currently out of service in the Materials Laboratory of Central Washington University’s Hogue Technology Building. The gripping assemblies would enable tensile, or pulling force, tests on tensile specimens up to 20,000 lbs, being able to test high carbon steel. The gripping assemblies and mounting adapters were designed and manufactured completely by a Central Washington University Mechanical Engineering Technology student who used the cumulative knowledge gained from engineering analysis and manufacturing courses over the span of his four years at Central. All design and manufacturing were done using the Central Washington University facilities and laboratories with the exception of heat treatments which were outsourced. It is estimated that the initial device construction will cost $771.00 and 440 man hours. Most gripping assemblies in industry cost anywhere between $6,000 and $15,000 for assemblies with a 20,000 lb load capacity. The design of the gripping assemblies is simple with no luxury of hydraulic, pneumatic, or mechanical clamping capabilities. The manufacture of the initial pair of gripping assemblies was unreasonable and robust due to limitations governed by the capabilities of Central Washington University’s lab facilities which also added unreasonable hours to the amount of man hours required. In common industrial factories/warehouses owned by testing machine manufacturers, the amount of man hours would be significantly less.

Keywords: Tensile Grips, Testing Machines, Materials Science

Employing Feedback Training to Bolster the Quantity and Quality of Peer-Feedback Flowing to Student Teachers
Hougan, Eric
Educational Foundations & Curriculum

Des Moines Center - Poster Presentation, Poster #5
Tuesday, May 19; 2:00-5:30 p.m. in Higher Education Center Bldg 29 - Des Moines Center

Current education reforms aim to improve teacher effectiveness by calling for high-quality teacher preparation programs that provides preservice teachers with impactful learning opportunities. At the heart of this teacher training is delivering high-quality feedback to the preservice teachers during their practicum experience. Yet, there is limited research on the student teachers’ feedback infrastructure, including the quality, quantity, and medium for offering student teachers regular, meaningful, and useful feedback on their emerging classroom practice. Employing design-based research and social network analysis methodologies, this study: (a) sheds light on the student teachers’ feedback (social) network from within a traditional teacher preparation program; and (b) highlights professional development training efforts to bolster student teachers’ capacity for exchanging more impactful feedback with peers. Analysis suggests the study’s interventions influenced the quantity and quality of the peer-exchanged feedback.

Keywords: Feedback, Student Teaching, Feedback Training
Sustainable Local Agriculture to Support Liuzhou’s Metropolitan Complex  
**Huang, Xiaojie**  
*Mentor(s): Rex Wirth, Political Science*

Poster Presentation Session #2, Poster #63  
11:30-2:00 p.m. in Ballroom B/C/D

In China, a majority of the population is involved in the large agricultural economy. Since rural incomes lag well behind those of urban areas, improving farm income is a major concern. The rising demand for meat caused by the development of the urban economy and society makes development of a breeding industry a mutually beneficial way to do this. Liuzhou City has a rural population of 1,596,800, accounting for 41.75 percent of the total resident population. The municipal government is focused on the efforts to develop the whole city’s breeding industry, but it could not be done using traditional methods. Small backyard breeding operators posed a serious constraint to the development of breeding industry because of the large fluctuations they created in meat prices. These economic conditions were not conducive to expansion of the scale of breeding, but only such an expansion could solve the problem. Through a series of policies that provide financial support and loans through banks to the breeding enterprises at a discounted rate, the Liuzhou City government is mitigating the market problem and eliminating it over time as livestock production transitions from the traditional backyard model to standardized and large-scale breeding. After six years, the large scale-breeding rate has reached over 50 percent and the value of livestock production accounts for 30.88 percent of total value of agricultural output. The per capita net income of farmers has shown an annual growth rate of 14.53 percent, reaching $191.93 dollars at present.

*Keywords: Breeding, Industry, Liuzhou*

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Branch Cutting Attachment  
**Hubbard, Cullen**  
*Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction*

Poster Presentation Session #3, Constructed Objects, Poster #8  
2:30-5:00 p.m. in Ballroom B/C/D

There are many homeowners that would like to maintain the trees around their homes but cannot do so. The drive of this project was to develop a branch cutting mechanism which would provide a senior citizen or an individual with limited upper body strength, with the ability to cut through branches that would otherwise pose challenging. The design would allow the end user to cut a branch by simply pulling a trigger. A branch cutting attachment was designed to attach to the front of a DeWALT cordless impact gun. This attachment will convert the rotational torque and motion from the impact gun into a shearing motion which can be utilized by a set of cutting blades to cut through the branches. This conversion came through a worm gear set that simultaneously changes the rotational direction of motion and increases the output torque of the impact gun through the gear set. The cutter was constructed from lightweight aluminum to keep the weight down as it is a hand held tool and was also designed to be easily attached and detached from the impact gun for ease of use. The design incorporated off the shelf blades so that in the event a blade was damaged during use a new blade was easy to obtain. Through testing it was found that the cutting attachment performed well on a variety of tree branch types and sizes up to 1-1/8”. It was also found that the attachment was easy to use by all user types.

*Keywords: Tool, Manufacturing, Analysis*
Mitigation Strategies for Central Washington University and Surrounding Residential Areas
**Huffstetler, Amanda; Hershfeldt, David; Martoncik, Bailey; Malella, Kimberly**
Mentor(s): Tim Melbourne, Geological Sciences; Anne Egger, Geological Sciences; Pamela McMullin-Messier, Sociology

Poster Presentation Session #1, Poster #4
8:30-11:00 a.m. in Ballroom B/C/D

This project stemmed from the Douglas Honors Class, “Hazards, Risks, and Resilience in the Pacific Northwest”, that specifically looked at earthquakes and their impact on communities in that area. Ellensburg’s susceptibility and preparedness in the event of an earthquake was analyzed through visual data and survey analysis. To accomplish this, this group assessed the Central Washington University campus, and the areas north of University Way using Rapid Visual Screening (RVS) guidelines set out by the Federal Emergency Management Agency (FEMA). Since the buildings surrounding campus are mostly stable, wood frame structures, Central Washington University is the main concern of this poster. There is concern with older parts of campus because the brick structures have higher earthquake susceptibility. A web-based survey to learn about the community’s knowledge, experience, and preparedness for an earthquake was also created. One hundred and twenty-four responses over a two-week period were recorded. This poster compared the total number of survey responses that fell within the area and whether or not they had an emergency kit prepared. The survey received a large proportion of responses from the 18-to-24-year-old age range that implies oversampling of the student population. Mitigation strategies were proposed to develop community preparedness after the results were collected. We propose that there is an increase in student, faculty, and staff awareness of the current Central Washington University Disaster Plan, and instructions on how to prepare an emergency kit for on campus housing. We also suggest annual flyers for off-campus housing in this area about earthquake hazards.

**Keywords: Mitigation, Risk Assessment, Ellensburg**

The Road Less Traveled
**Ingebretson, Josh**
Mentor(s): Jenna Hyatt, University Housing and New Student Programs (UHNSP)

Oral Presentation, Session #34
2:40-3:00 p.m. in Room 201

Every year, there are millions of students worldwide who attend a higher education institution. Each individual carefully takes the time to choose between a wide set of pre-planned major and minors. These degrees may range from topics such as biology to sociology. However, what happens to those students who are faced with a list of degrees that don’t fit their career path. That same challenge is the obstacle that I have had to overcome when it came to my future career aspirations of working within higher education. As a second-year student, I was faced with the reality of having to choose an undergraduate degree that wasn’t specific to my future career path, until I discovered the Inter-Disciplinary Studies (IDS) program at Central Washington University. Through this revolutionary program, I have had the ability to forge my own pathway during my undergraduate career. This flexibility of designing and implementing my own degree has allowed the opportunity to have priceless experiences in both the classroom and real world situations. Those experiences have already given me an incredible advantage as I embark further into my career. It is my testimony that offering unique programs such as the IDS degree allows the precious opportunity for those students who don’t align perfectly with a pre-planned major, to forge their own pathway. This unique pathway, furthermore, allows those same students to create an intentional undergraduate degree, which allows them to graduate as competitive applicants in a specialized career field of their choosing, such as higher education.

**Keywords: Revolutionary, Flexibility, Intentionality**
Metatarsal Variation in Morphology of the Hallux in Non-Human Primates

Jager, Daniel

Mentor(s): Patrick Lubinski, Anthropology & Museum Studies

Poster Presentation Session #2, Poster #50
11:30-2:00 p.m. in Ballroom B/C/D

Terrestrial and arboreal environments present different locomotive challenges for non-human primates. This study focuses on interpreting how those challenges impact the degree of proximal facet concavity of the hallux in New World and Old World monkeys. The study used measurements of halluces from 34 monkeys (Alouatta, Cebus, Lagothrix, Cercopithecus, Macaca, Miopithecus, and Papio) stored at the University of Oregon, and two (Macaca and Saimiri) at Central Washington University, using both traditional caliper methods and a MicroScribe three-dimensional digitizer. MicroScribe data included nine landmarks, five on the proximal articular surface and four on the distal. Caliper measurements followed Marchi (2010). Monkey species comprised four locomotor groups from least to most arboreal. Regressions of MicroScribe data came from principal component scores via EVAN’s Toolbox (Phillips et al., 2010). Locomotion alone was significant, however, size was a confounding variable. There was a significant correlation for locomotion and monkey size class combined, $F(9, 28)=27.64$, $p<0.001$, $R^2=92.90$, $R^2$ Adjusted=89.54. Size was the primary explanation for this variation, when looked at separately, $F(7, 29)=26.40$, $p<0.001$, $R^2=89.36$, $R^2$ Adjusted=85.98. While the results showed a difference between monkeys with extremely curved proximal articular surfaces and those with a flatter surface, it was difficult to correlate it to locomotion alone. The relationship between the relative flatness of the surface and allometry needs to be further explored.

Keywords: Functional Morphology, Anthropology, Primate

United States of Surveillance

James, Kyle

Mentor(s): Todd Schaefer, Political Science; Jackson Muhirwe, ITAM

Oral Presentation, Session #31
3:40-4:00 p.m. in Room 137A

In June 2013, Americans learned that Orwell’s Big Brother was much more than speculation when ex-National Security Administration (NSA) contractor Edward Snowden leaked information on the NSA’s collection of telephony metadata and other national surveillance programs. Since the attacks of September 11, 2001, American citizens have paid the price and been victimized in the process of national security. Unfortunately, the current classified nature of the bills regulating these programs are not transparent enough to disclose information to the public. With the information world growing around us faster than we can develop laws and security to match, there is a greater need to reform the laws currently governing us to protect the autonomy of our personal data both big or small. This paper examines Internet privacy laws and regulations, the leaked surveillance programs that coattail these acts, evaluates the proposed legal reforms, and describes how to fight back as a citizen.

Keywords: Surveillance, Cyber Security, Policy

Supreme Court and the Modern Death Penalty Doctrine: Hall v. Florida and the Application of the Death Penalty

Jammeh, Njambou

Mentor(s): Cody Stoddard, Law & Justice

Oral Presentation, Session #6
10:40-11:00 a.m. in Room 137A

This research will examine the Supreme Court’s decision involving the application of the death penalty in the State of Florida involving an individual with an intellectual disability. I will examine the Hall v.
Florida decision handed down by the Supreme Court in May, 2014, in which the judges constructed their decisions on an established Supreme Court case Atkins v. Virginia. In Atkins v. Virginia, the Supreme Court concluded that criminal defendants with mental retardation could not be sentenced to death or be executed due to the fact that such an execution would constitute cruel and unusual punishment and, therefore, it violates an individual's constitutional right. Cruel and unusual punishment was prohibited by the Eighth Amendment. Using Atkins as precedent, the Supreme Court of the United States addressed the constitutionality of Florida's application of the death penalty when dealing with individuals with an intellectual disability. This presentation will outline Hall v. Florida, Atkins v. Virginia, and the role of the Supreme Court when protecting individuals with intellectual disability from the death penalty. The research will include previous case law, legal questions decided, holding and rational of the court, facts of the case, and policy implications for the area of law and as well as the criminal justice aspect.

Keywords: Intellectual Disability, Death Penalty

Concert Performance of Clusters by Douglas Hill
Jarvis, Mary; Brisk, Clarissa; Green, Rosie; Hansen, Jarrett; Henkle, Jessica; Mortensen, Sophie; Moss, Logan; Osborne, Madeline; Smith, Naomi; Stephenson, Hayley
Mentor(s): Jeffrey Snedeker, Music

Creative Expression Presentation, Session #37
3:00-3:20 p.m. in Ballroom A

On April 11, 2015, the Central Washington Horn Ensemble performed at the 2015 Northwest Horn Symposium in Eugene, Oregon. The centerpiece of our performance was the world premiere of Clusters by the noted horn teacher and composer, Douglas Hill. Our horn ensemble has worked with Professor Hill in the past and had the chance to develop a working rapport with him. When he finished composing this piece, he offered us the opportunity to premiere it. This piece of music was a scholarship challenge for every member of the ensemble because of the need for part independence, the use of playing techniques unique to Hill’s music, and the pressure of learning a piece of which there are no recordings. Our SOURCE performance of this piece will have the benefit of multiple performances and further input from the composer.

Keywords: Horn, Ensemble, Music

Concert Performance of Variations on a Five-Note Theme by Russell Garcia
Jarvis, Mary; Brisk, Clarissa; Green, Rosie; Hansen, Jarrett; Hawthorne, Sierra; Henkle, Jessica; Mortensen, Sophie; Moss, Logan; Nash, Katherine; Osborne, Madeline; Phipps, Madison; Smith, Naomi; Stephenson, Hayley
Mentor(s): Jeffrey Snedeker, Music

Creative Expression Presentation, Session #37
3:20-3:40 p.m. in Ballroom A

In August, 2015, the Central Washington University Horn Ensemble will perform at the 2015 International Horn Symposium in Los Angeles, California. The program we will present explores the history of music written for horn ensembles by playing music that was commissioned for famous ensembles through the years. The centerpiece for this particular performance is Variations on a Five-Note Theme by Russell Garcia. Garcia’s seminal work for horn ensemble was commissioned by the Los Angeles Horn Club and, in the process of preparing the piece for performance, we have studied the group’s performing practices, collected discography, and history. Our performance at SOURCE will serve as a good opportunity for an initial performance reflecting our collected research in anticipation of the symposium performance.

Keywords: Horn, Ensemble, Music
Wet-Sites Artifacts: Preservation and Exhibition
Johnson, Andrew
Mentor(s): Hope Amason, Anthropology & Museum Studies; Lynnn Bethke, Museum of Culture and Environment
Poster Presentation Session #2, Poster #43
11:30-2:00 p.m. in Ballroom B/C/D

Over the last sixty years, archaeology has seen a rise in the discovery, excavation, and preservation of artifacts from wet sites, which differ greatly in composition to that of artifacts recovered from more common dry sites. Wet sites are unique as they are anaerobic. Oxygen is removed from the site through natural occurrences, this prevents bacteria and other agents of decay from taking hold on artifacts which would otherwise decay and vanish from the historical record. The result is a site rich in organic artifacts consisting of materials which are not found in other sites. Artifacts taken from wet sites pose difficulties and challenges that require a different tool set and conservation procedures in order to address the vulnerabilities of organic matter, which is as susceptible to decay. Artifacts taken from sites such as Hoko River and the Ozette Indian Village site, both in Washington State, as well as sites across the globe have shown the need for new techniques in how to deal with the various aspects with these artifacts. Because these artifacts have not been exposed to oxygen for such long periods of time, it is vital that, while excavating, handling, and preserving them, the artifacts continue to be in an environment deprived of oxygen, otherwise decay of these items will begin in earnest. In this poster, I will explore the techniques and practices in achieving the needs of artifacts in a wet site.

Keywords: Archaeology, Preservation, Exhibition

After Death
Johnson, D’ondre
Mentor(s): Andrea Eklund, Family and Consumer Sciences
Poster Presentation Session #2, Creative Works, Poster #15
11:30-2:00 p.m. in Ballroom B/C/D

Purpose: The purpose of this design was to compose a minimalist ready-to-wear garment. Process: The process of this design began with extensive design development. Design development began with inspiration of several Christian Dior and Saint Laurent designs along with other inspirational images. Techniques: Draping was used to design the garment. Fabric was draped on a dress form and manipulated into the design. Darts were placed on the front and back bodices for proper fitting. Once the final look via draping was achieved the muslin was removed and the design was translated to paper patterns. A sample was made from the patterns and fit on the model. Final changes to the pattern from the fitting were made and, then, the final fabric was sewn together to complete construction of the design. Innovation: Simplification of design provides an alternative outlook to traditional outlooks. Materials: Silk, wool, and cotton fabrics, polyester yarn, and invisible zipper. This is one in a line of three garments; the entire line can be seen at the Apparel, Textiles, and Merchandising spring fashion show, May 30, at 3:00 p.m. and 7:00 p.m. in Milo Smith Theater in McConnell Hall.

Keywords: Drape, True, Pattern
Heat Transfer Capabilities of a Plate and Frame Heat Exchanger

Johnson, Eric

Mentor(s): Roger Beardsley, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #11
2:30-5:00 p.m. in Ballroom B/C/D

Heat exchangers are a commonly used device in many different industries, with many different applications. The heat exchanger used in the brewing program here at Central Washington University is a brazed plate and frame heat exchanger, so it cannot be taken apart for cleaning. Due to this, the overall efficiency of the heat exchanger will be reduced, causing fouling, because of the buildup of brewing material. In order to effectively combat this fouling, a heat exchanger must be constructed that can be disassembled for cleaning, and then reassembled with ease, while still being able to perform the same amount of heat transfer as the brazed system. Specifically, a gasketed plate and frame heat exchanger was constructed for this purpose, which utilizes rubber gaskets to seal the system, instead of brazing. This heat exchanger was constructed using twenty stainless steel plates, with four flow holes punched for the fluid paths, and arranged with the attached gaskets in a cross flow pattern. To test the effectiveness of this system, the heat exchanger will operate using cold tap water to cool down water heated to approximately 200°F. The output temperature of the water will be measured in order to see how well the heat exchanger is able to transfer heat between the two fluids. The results of this test will indicate the viability of this system, state the specific rate of heat transfer within this system, and compare this value to the previously utilized brazed heat exchanger.

Keywords: Heat Exchanger, Heat Transfer, Manufacturing

Statistical Testing for Patterns in the Distribution of Middle Columbia Housepit Archaeological Sites

Johnson, Matt

Mentor(s): John Bowen, Geography

Poster Presentation Session #2, Poster #48
11:30-2:00 p.m. in Ballroom B/C/D

Cultural resource management salvage archaeology of the past 50 years has resulted in high resolution geographic data concerning the location of housepit archaeological sites. For this study, statistical tests (Quadrat and Spearman Rank Correlation) were completed for the location of 116 housepit archaeological sites in relation to three rapids and three dams along a section of the Middle Columbia River, stretching approximately 60 miles from the Rock Island Dam at the north end to the beginning of the Hanford Reach at the south end. Housepit locations were tested against the location of rapids to test for correlation between favorable fishing locations and housepit locations. Housepit locations were also tested against the location of dams to test for correlation between a potential bias in the location of discovered archaeological sites and housepit location. These tests found that housepit sites are significantly clustered, that their locations are correlated to the locations of rapids along this section of the Columbia River, and that their locations are not correlated to the locations of dam construction. These results are consistent with both previous data and the ethnographic record, supporting the location of housepit village sites near favorable fishing locations.

Keywords: Statistics, Archaeology, Geography
**Effects of Fine-Fraction Pre-Treatment for Laser Diffraction Particle Size Analysis**  
*Johnson, Matt; Walton, Lauren*  
*Mentor(s): Patrick Lubinski, Anthropology & Museum Studies; Ian Buvit, McNair Scholars*

Poster Presentation Session #2, Poster #49  
11:30-2:00 p.m. in Ballroom B/C/D

Pretreatment of sediment samples for particle-size analysis can be costly and time consuming. Here we present results of how various levels of pretreatment affect laser diffraction results. For this study, we subjected 35 sub-samples from seven different stratigraphic layers of the Sanders archaeological site (45KT315) in central Washington State to different combinations of pretreatment (removal of organic and inorganic carbon using 30 percent H$_2$O$_2$ and 1N HCl, respectively, and ultrasonic dispersion). Fully treated samples were presumed to be most accurate and were used as the test control. As expected, completely untreated samples exhibited excess coarse-sized particles (i.e., most negatively skewed). Other results demonstrate inter- and intra-sample variations that are likely due to differences in physical and chemical properties of each sample. No clear patterns emerge that lead us to conclude anything other than full pretreatment is required for best results.

*Keywords: Geology, Sediment Analysis, Laser Diffraction*

**Space Saver Bike Rack**  
*Johnson, Taylor*  
*Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction*

Poster Presentation Session #3, Constructed Objects, Poster #19  
2:30-5:00 p.m. in Ballroom B/C/D

Apartment living can be crowded especially for a cyclist. Bicycles are bulky and difficult to store. A device is needed to store two road bikes weighing up to 40 pounds each while saving as much space as possible. To solve this problem, many iterations of various free standing and wall-leaning bike rack designs were drawn. Evolution of the design can be traced through the drawings included in the report. The first design analyzed was a free standing rack. After calculations and adjustments, this design was going to be very bulky in order to achieve stability requirements. The next design that was analyzed was a wall-leaning rack. This design was very compact and satisfied the stability requirements gracefully. In winter, materials were ordered and prepared for construction. Construction included cutting ABS pipe, gluing or drilling, and pinning fittings. Construction was completed without major issues. The final device is working properly despite a couple of minor clearance related oversights. The bike rack supports two bikes weighing 35 pounds each. The compactness requirement of 72 inches squared was met. This spring, the deflection of the rack will be tested and compared to the predicted data. The racks capacity to support loads up to 40 pounds will be tested. A test will be run where the rack is loaded with two bikes and the floor area and volume occupied will be determined. These values will be compared to the original configuration of road bike leaning against the wall in the apartment.

*Keywords: Compact, Static, Load-bearing*
You Want Me to Do WHAT? Transforming Faculty Practice to Improve Student Critical Thinking

Kappenman-Schiller, Kristy; Kurtz, Martha; Johnson, James; Thomas, Carin
Mentor(s): Ian Quitadamo, Biological Sciences

Poster Presentation Session #3, Poster #35
2:30-5:00 p.m. in Ballroom B/C/D

This three year quasi-experimental study compared the effects of college teaching strategies on the critical thinking scores of students enrolled in undergraduate courses throughout Central Washington University’s College of the Sciences. Faculty were recruited to first teach a baseline course using their usual lecture/laboratory approach, followed by a subsequent course implementing all or some of the Community-Based Inquiry (CBI) method, which includes student-led research and active learning strategies. A network of faculty collaboration and peer mentoring supported the participating instructors. Critical thinking levels were measured in all student participants pre- and post-treatment using the online California Critical Thinking Skills Test. Results showed significant critical-thinking gains in the classes that implemented all or some of the CBI active learning strategies, but no change or decreases in the traditionally taught classes.

Keywords: Critical Thinking, Science Education, Biology

Three-Phase Motor Controller

Kastner, Cameron
Mentor(s): Lad Holden, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #33
2:30-5:00 p.m. in Ballroom B/C/D

The purpose of the project is to create an in-class demonstration of a three-phase motor control. The demonstration will use pulse width modulation (PWM) to control the speed of the motor and to protect its components. Slow start-up and variable load will also be major components of the project.

Keywords: Pulse Width Modulation, Over-current Protection, Micro-processing

An Ancient Calendar Teaches Celebrating Conscious Living

Kaviani, Khodadad (Khodi)
Teaching Elementary Adolescent and Young Children

Des Moines Center - Poster Presentation, Poster #4
Tuesday, May 19; 2:00-5:30 p.m. in Higher Education Center Bldg 29 - Des Moines Center

Calendars not only keep track of the passing days, but also reflect the values of cultures. Special holidays and events can be found on a typical American calendar that include Thanksgiving, Christmas, the birthdays of Washington and Dr. King, Valentine’s Day, Memorial Day, and others. The Latin saying, carpe diem, is credited to the Roman poet Quintus Horastius Faalccus who died about 8 B.C. and signifies the temporary nature of the moments that make up our lives. Carpe diem implies making the most of the present without much regard for tomorrow. The ancient Iranian calendar that continues to be used by the Zoroastrians reflects the values of a sophisticated culture that promotes paying attention to values that are needed for good governance (i.e., tranquility, strong leadership for and with justice, etc.) and the elements that sustain life (i.e., water, fire, earth, and air). In this solar-based calendar, each month has 30 days and each day has a name. These 30 names are repeated 12 times during the year. The last five days are given names that correspond to the Zoroaster’s songs. Every four years, an extra day is added to make the start of the spring season constant and in tune with nature. When the names of the day and the month match, a special celebration is held to honor conscious living. This research focuses on the twelve major monthly festivals that offer a practical model for improving people’s lives.

Keywords: Zoroastrian Calendar, Iranian Festivals, Celebrations
Banish All The World: The Contrarianism of John Osborne

Kelly, Joshua
Mentor(s): Jay Ball, Theatre

Oral Presentation, Session #30
3:20-3:40 p.m. in Room 135

In this paper, I will explore the theme of intersections of performance and philosophy by explaining the use of contrarianism in the work and life of John Osborne and show how it was essential in the success of his drama. In order to best exemplify this, I will be theoretically engaging British philosopher John Stuart Mill and his work “On Liberty,” to talk about necessity of attacking what he called the deep slumber of a decided opinion on principle—or contrarianism for its own sake. Through the use of this methodology, we will see how (whether or not Osborne was aware of it) his continuous position of being anti-some ideas but rarely pro-others was a key component of his ability to write characters such as Jimmy Porter. By engaging “On Liberty”, we can deduce that contrarianism helped Osborne produce art that brought much needed life to a conventional 1956 English theatre. It is by this assumption that the questioning of the status quo is just as artistically beneficial as the presentation of original thought that Osborne makes his mark in dramatic history, and what becomes a fulcrum in the messages of Look Back in Anger, The Entertainer, and many of his published essays including "A Letter To My Fellow Countrymen."

Keywords: John Stuart Mill, John Osborne, Contrarianism

Queer Photography and the Betrayal of the Image

Kim, Philippe (Hyojung); Walton, Lauren
Mentor(s): Ellen Avitts, Art

Oral Presentation, Session #30
3:00-3:20 p.m. in Room 135

Queer is a descriptor of what is non-normative, generally associated with the rejection of traditional identities. What is queer is counter to what is accepted as normal. Photography, as a visual medium, is often used to reveal a subject and inform an audience. Queer photography has historically been utilized to expose the normal masses to what is not normal, and also to inform a select audience of what is acceptably queer. Our study proposes that queer photography establishes a self-negating concept; as a visual medium that aims to inform, photography has come to define a set norm for queer and has led to certain expectations for queer viewers and the non-queer public. Through an exploration of the visual history of queer photography, this study analyzes its effect on contemporary visual and popular culture and how the current structure of queer portrayal has betrayed the reality of the queer.

Keywords: Gender Studies, Photography, Queer Theory

Biking in the Burg

King, James
Mentor(s): Lene Pedersen, Anthropology & Museum Studies

Panel Presentation, Session #26
1:50-2:10 p.m. in Room 271

This short film focuses on the sport and recreation of mountain biking in and around the Ellensburg area. Through interviews and visual imagery of mountain biking, the film explores the motives behind mountain biking, provides a glimpse into a unique and growing subculture, and offers insight into the positive impacts that biking can have on a personal, community, and worldwide scale. Hands-on footage was collected using a mounted camera, and the images and interviews were collected using a handheld camera. The intention of the film is to expose the audience to the subculture, as well as widen their perspectives on the sport, the environment, and human interactions with nature and each other.

Keywords: Biking, Nature, Recreation
Will Improved Assembly Approaches Lead to Improved Biological Inferences?

Kleyn, Olivia; Mei, Wenbin
Mentor(s): Linda Raubeson, Biological Sciences

Oral Presentation, Session #23
1:10-1:30 p.m. in Room 137B

The ability to determine the DNA sequences of genomes has provided an excellent source of data for biological studies. Next generation sequencing (NGS) techniques have expanded our ability to determine genome sequences as they are relatively inexpensive; however, they are potentially less accurate due to the read length being shorter than in first generation techniques, giving a higher probability of incorrect assemblies. The short NGS reads must be assembled into genome sequences, and computer programs to do this work are improving all the time. The goal of my work is to analyze the impact of those changes on chloroplast genome assembly and see if they can lead to improved biological inferences. To do this, we compared chloroplast assemblies of genomes from NGS data for six species within *Araucariaceae*. Wenbin Mei analyzed these data using the assembly methods available in 2010; we have reanalyzed these reads using newer assembly techniques in combination with a new tool to remove nucleotides of low quality. The assemblies we made were compared both to each other and to Wenbin’s assemblies. We found that all of our new methods returned a greater percentage of the genome than the earlier methods. In addition, our methods showed improvement in numerous other statistics used to characterize assemblies. Once the best of the new methods has been determined, that method will be applied to the additional 20 species of *Araucariaceae* for which NGS data are available, and biological analyses will be conducted and compared to Wenbin’s results.

Keywords: NGS Assembly, Chloroplast Genomics

Custom Glasses Cases

Klukas, Nikolas
Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #9
2:30-5:00 p.m. in Ballroom B/C/D

The modern market is centralized around technological advances that improve and better everyday life. With approximately 150 million Americans that use corrective eyeware on a daily basis, the need for improved technology in glasses cases is inevitable. Current glasses cases work to either protect the glasses and are big and bulky, or are made smaller to be more easily transported. The concept is to take any pair of glasses and make a custom case for them. The programs being utilized to complete the project are Solidworks and Excel. The process is started by making a base layout of the glasses case in Solidworks. Then, a Excel spreadsheet was made. Linking an Excel spreadsheet to solidworks enables rapid input of new dimensions to adjust Solidworks drawing to the correct or new size. This provides a quick way to make my case fit any pair of glasses, no matter the dimensions. The solidworks model is then saved as a Stereolithography file and sent to the 3-D printer. The cases come out fully functional and open and close perfectly. The time required from sit down to completed glasses case depends on the size of the glasses the case is modeled around. The more cubic inches the case is, the longer it takes to print. The first case took 10 hours to print.

Keywords: Custom, 3-D Printer, Strong
History, Identity, and the Origins of the Israeli-Palestine Conflict

Krienen, Maggie
Mentor(s): Geraldine O’Mahony, Philosophy & Religious Studies

Oral Presentation, Session #36
2:40-3:00 p.m. in Room 301

Modern media today portrays the conflict between the Israeli and Palestinian people as a religious battle, but it did not start that way. Historical analysis has shown that the conflict started over a battle for land. The history of the Arab-Israeli conflict is extremely valuable to understanding both sides because there are two narratives of history, one from each side, each claiming to be victims of the other. Describing the historical narrative of the Arab-Israeli conflict allows the spotlight to be taken off of religion to show how religion is not the cause of this war, but a tool used by both sides. In this project, I will examine the history and culture of both the Jews and the Arabs in Palestine and give a brief analysis of the mindset of both groups, comparing and contrasting their cultural ideologies. Identity also plays an integral part in this conflict. Religion plays a part in this conflict, but it is not the centerpiece. I have also traced the history of the Zionist movement as well as the role Britain has played in the origins of the Arab-Israeli conflict. I will describe both sides of the conflict and show the progression of how a land dispute became a bloody battle in the name of religion.

Keywords: Religion, History, Identity

Theoretical Study of the Flame Synthesis of Titanium Dioxide Nanoparticles

Lam, Kui Ting; DePrekel, Douglas; Ngo, Kevin; Vo, Phu; Ge, Yingbin
Mentor(s): Yingbin Ge, Chemistry

Poster Presentation Session #1, Poster #28
8:30-11:00 a.m. in Ballroom B/C/D

Titanium dioxide (TiO$_2$) nanoparticles have been used for various applications in our daily lives. For example, TiO$_2$ nanoparticles are used in contaminant remediation, food coloring, coating for polymers, and photocatalysis. Dye-coated TiO$_2$ nanoparticles help convert solar energy into electricity and are, thus, used in solar cells. While TiO$_2$ nanoparticles have so many useful applications, the mechanism of the flame synthesis of TiO$_2$ nanoparticles is not well understood. In this research, we will study the chemical mechanism of the flame synthesis of TiO$_2$ nanoparticles. This mechanism involves various gas-phase and surface reactions between titanium species. Density functional theory methods will be used to model these reactions. In the end, we will be able to propose the mechanism of the flame synthesis of TiO$_2$ nanoparticles through the density functional theory calculations. The ultimate goal is to provide theoretical guidance on the size and surface control of the manufactured TiO$_2$ nanoparticles. The benchmark coupled cluster calculations and 42 different density functional theory (DFT) methods calculations using the 6-311+G(d) basis set have been done in order to obtain reliable data for Ti-O-Cl species. Among the 42 DFT methods, B98 gives the best overall results to predict Ti-O-Cl species energies, geometries and vibrational frequencies.

Keywords: Flame Synthesis, Density Functional Theory, Titanium Dioxide (TiO$_2$) Nanoparticles
Student Usage and Perceptions of Digital Devices in the Classroom and While Driving

Larrabee, Elena; Williams, Hannah
Mentor(s): Ralf Greenwald, Psychology

Poster Presentation Session #3, Poster #47
2:30-5:00 p.m. in Ballroom B/C/D

The purpose of this study is to examine Central Washington University students’ use of electronic devices for non-class related purposes and while driving. For the purposes of the study, electronic devices are defined as cellphones, tablets, laptops, and any other devices that are non-essential to the classroom environment, and non-classroom purposes are defined as any non-course specific activities performed on an electronic device during lecture. The survey has two parts, the first focusing on electronic device usage in the classroom, and the second focusing on electronic device usage while operating a vehicle. The survey is administered online, and focuses on students over the age of eighteen. Psychology students represent the largest demographic, but the survey also draws from numerous other departments. Preliminary results are similar to those of studies regarding electronic device usage conducted at other universities, and indicate that the use of electronic devices is prominent in Central Washington University classrooms. These findings highlight how important it is for professors to understand students’ perceptions toward the use of electronic devices in the classroom for non-class related purposes.

Keywords: Electronic Devices, Classroom, Driving

Geological Mapping and Analysis of Red Mountain Fault, Owens Valley, California

Larsen, Erik
Mentor(s): Anne Egger, Geological Sciences

Poster Presentation Session #1, Poster #11
8:30-11:00 a.m. in Ballroom B/C/D

Fault scarps and offset landforms identified using GIS tools and techniques map and describe the Red Mountain Fault in Owens Valley, California. The Red Mountain Fault (RMF) is a N-S-oriented, west-dipping normal fault that runs parallel to the right-lateral Owens Valley Fault (OVF). The fault scarps span 9.5 km, and are roughly continuous in the north, while the southernmost 3 km are segmented. The fault cuts ~100 ka alluvial fan deposits and 63-84 ka Crater Mountain Basalt, suggesting that all measured offset is younger than ~60 ka. Topographic profiles pulled from a lidar-derived DEM were exported into an Excel program that conducted Monte Carlo analysis to calculate offset by predicting the most likely result and computing the uncertainty. The amount of vertical offset ranges from 0.79 ± 0.2 m to 7.31 ± 0.3 m. There has been erosion of the fault scarp and sedimentary deposition on the hanging wall of the fault, so calculated offset values are considered minimal. The largest offsets are in the central portion, decreasing towards the ends, a typical offset distribution along a normal fault. Determining the amount of offset and extension along the RMF can help us understand the Quaternary tectonics of Owens Valley, where strain appears to be partitioned between major right lateral faults like the OVF and smaller normal faults like the RMF.

Keywords: Fault Scarp, Owens Valley, GIS
Assessing Earthquake Preparedness in Southern Ellensburg

Lawrence, Brian; Ray, Marcus; Schuler, Cecelia; Vance, Taylor Dale

Mentor(s): Anne Egger, Geological Sciences; Tim Melbourne, Geological Sciences; Pamela McMullin-Messier, Sociology

Poster Presentation Session #1, Poster #1
8:30-11:00 a.m. in Ballroom B/C/D

Because Ellensburg is situated in an area of moderate seismic risk, it is critical that the community is made aware of risks they face and utilize existing mitigation plans and strategies to best prepare themselves for a seismic event. As a class, we studied the earthquake hazard in Ellensburg, and assessed the degree to which the community and economy are vulnerable to a seismic hazard. We conducted a city-wide survey to ask the community about their earthquake knowledge and preparedness. Our sub-group was assigned to research the southern region of Ellensburg, covering between Water Street and Chestnut Street, and Capitol Avenue and East Umtanum Road. Using existing resources from the Kittitas County Planning Office, we extrapolated the county’s susceptibility data to our southern region of Ellensburg. We studied the liquefaction susceptibility of the soil in our region. Using these data, residential and commercial facilities were examined using Federal Emergency Management Agency rapid visual screening protocol. We found that residential buildings tended to score higher than commercial buildings. In addition, critical facilities in our region such as Lincoln Elementary and Kittitas Valley Community Hospital were asked about their existing earthquake plans. Based on any existing mitigation strategies these facilities had in place, as well as our own findings, we made recommendations on how to better prepare these facilities for a seismic event. These included expanding education efforts, as well as providing emergency kits to stakeholders.

Keywords: Earthquake, Mitigation, Risk Assessment

She’s Awakened: Release

Leach, Alissa

Mentor(s): Andrea Eklund, Family and Consumer Sciences

Poster Presentation Session #2, Creative Works, Poster #8
11:30-2:00 p.m. in Ballroom B/C/D

Purpose: The purpose of the design is to show the desire of a woman through her sexuality while also following her belief of modesty. This is a woman with a lot of creativity and elegance. She wants to show every unique side to her. I wanted to challenge my design abilities by doing a garment I have not done before. Using a slippery fabric and a fitted top, it gave the garment the class, elegance, and sex appeal I desired. The colors show the creative side of her while the flow gives her elegance. Process: Before beginning the sketches for my designs, images were collected for inspiration and design elements. The inspiration was primarily photos of Muslim women, who are often viewed as oppressed, but these photos show the creativity in which they have control over their fashion. To me, this represented strong women who are fun and creative while still being able to practice modesty for their beliefs. In order to show a modest look while giving a little sex appeal, I chose to gather the skirt at the waist using a lot of fabric while keeping a slit up to show the leg while she’s walking. Not only fashions and prints were inspiration but also architecture and colors of the Middle East including mosques as well as Jewish synagogues across Israel and Lebanon. Techniques: Draping and flat patterning methods were used to create this garment. The top of the dress is flat-patterned and then altered to fit the model’s bust. The skirt was solely draped at the waist and cut for each panel, then the front seam was left partially opened up the leg. The materials include 1-¼ yards of the top skirt sheer organza fabric as well as for the black sheer lining fabric underneath. There is a half a yard of the top woven fabric used as well as for the neck and armhole facings. Contribution to fashion: A lot of playful colors and lines gives a feminine look to the garments. Architectural and geometric design elements that show strength in the look as well. The flow of the skirt with the high slit shows boldness while the movement gives elegance. Materials: Woven fabric, zipper, interfacing, polyester thread. This is one in a line of three garments; the entire line can be seen at the Apparel, Textiles, and Merchandising spring fashion show, May 30, at 3:00 p.m. and 7:00 p.m. in Milo Smith Theater in McConnell Hall.

Keywords: Draping, Strength, Creativity
Pivoting Foot Pegs
LeBlanc, Michael
Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #5
2:30-5:00 p.m. in Ballroom B/C/D

It is difficult for dirt bike riders to keep their feet in full contact with the foot pegs on their bikes at all times when riding. The foot pegs that come factory and aftermarket today are universally static and non-rotational which prevent the ability for maximum contact to be maintained. During various riding positions, a rider’s foot can partially become disconnected from the peg allowing for a potential loss of control and balance/stability. The solution devised was a set of pegs that have the ability to rotate with the rider’s foot. The rotational ability of the pegs allow for the rider’s feet to stay in full contact throughout various riding positions or conditions. The pivoting peg that allows for full contact with the pegs provides more stability and control over the bike, which improves capabilities of balance and speed/momentum. To accomplish the pivoting, a round shaft with limiting stops was created to rotate fifteen degrees forward and backwards on the bike. Based on the design concept that was created and calculations that were done on the design, such as deflection and load bearing calculations, these pegs will easily support the weight of a 185 pound rider, while still having the capability to rotate without binding. More testing of these pegs is scheduled for spring quarter 2015. From the calculations that were prepared, the pegs will pivot 15 degrees and support the minimum weight requirement of 185 pounds.

Keywords: Dirt Bike, Foot Pegs, Engineering, Pivoting, Rotational

Searching for Maximal Holes in Databases
Lemley, Joseph
Mentor(s): Razvan Andonie, Computer Science

Oral Presentation, Session #1
9:10-9:30 a.m. in Room 137B

The problem of finding maximal empty rectangles in a set of points in 2D and 3D space has been well studied, and efficient algorithms exist to identify maximal rectangles in 2D space. Unfortunately, such efficiency is lacking in higher dimensions where the problem has been shown to be NP complete when the dimensions are included in the input. We compare existing methods and suggest a novel technique to discover interesting maximal empty hyper-rectangles in cases where dimensionality and input size would otherwise make analysis impractical. Applications include big data analysis, recommender systems, automatic knowledge discovery, and query optimization.

Keywords: Maximal Empty Rectangle, Maximal Cuboid, Big Data

Film Music and Audience Expectations
Leshley, Lauren
Mentor(s): Melissa Johnson, Film and Video Studies

Oral Presentation, Session #29
1:30-1:50 p.m. in the Theatre

This paper covers the functions and uses of music in mainstream films. While its original purpose was to distract the audience from elements that might lessen the illusion of reality, today’s film music seeks to enhance emotion, set the tone for audience expectation, and communicate about characters’ mental states and their relationships with one another. Films with notable scores that accomplish these goals are Up, Pirates of the Caribbean: Curse of the Black Pearl, and The Treasure of the Sierra Madre. Up’s score consists of one main theme that is played throughout the film. Originally, it represents Carl’s wife
Ellie and their life together; after she dies, it comes to represent more generally the spirit of adventure his wife possessed. *Pirates of the Caribbean’s* characters have various leitmotifs that are combined at the end into a triumphant musical piece called “He’s a Pirate,” that symbolizes the main character’s victory and growth. *Treasure of the Sierra Madre* has several themes that communicate much about the genre and events of the film, but also give clues as to the mental state of Fred C. Dobbs, whose mental health starts to deteriorate the more gold he finds. Each of these films shows how music can be used for multiple purposes to enhance audience experience.

*Keywords: Film Music, Leitmotifs, Themes*

**New Thinking about Urban Growth: Liujiang County**  
*Li, Lihua*  
*Mentor(s): Rex Wirth, Political Science*

Poster Presentation Session #2, Poster #62  
11:30-2:00 p.m. in Ballroom B/C/D

*The New Road to Urbanization with Chinese Characteristics* that was put forward by the eighteenth Congress of the Chinese Communist Party is being implemented in Liujiang County of Luizhou city through a series of plans and policies. This is an analysis of the process of urbanization under those plans: *The Twelfth Five-year Economic Plan for Liujiang County and The Research Report on Liujiang Urbanization*.  
The poster depicts three of the major components: (1) background material on the urbanization of Liujiang County and the opportunities that both external and internal factors present; (2) the new thinking about urban growth and the policies that can enhance the urbanization in terms of developing competitive industries, accelerating facilities construction, promoting the equalization of public services, and eliminating the institutional barriers, and; (3) a model of interaction between urbanization and industrialization to guide Liujiang’s development.

*Keywords: Urbanization, New Thinking, Industrialization, Liujiang County*

**Improved Drop-Weight Tennis Racquet Stringer**  
*Ligon-Bruno, William*  
*Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction*

Poster Presentation Session #3, Constructed Objects, Poster #29  
2:30-5:00 p.m. in Ballroom B/C/D

What design change to a conventional ATS Sports model drop-weight stringer can be made to decrease the stringing time for a tennis racquet? To answer this, a detailed analysis on design, manufacturability, and structural integrity was prepared to design a product that is manufacturable within the timeframe and produces a device which decreases the stringing time. First, an analysis on each vital component was completed, including the ratcheting components, pressure arm/drop mass, etc. Second, a virtual model was created with auxiliary components to test different designs. Through this analysis, and the virtual model, it was indicated that a duel stringing device opposed to a conventional single stringing device would meet the design requirements set forth in the project report. A more detailed design was done to the device to finalize the product for manufacturing. This included reducing the weight of the product through shelling out components and using lightweight material, reducing the cost through utilizing cheaper pre-designed material other than requesting custom designed material, modifying dimensions for the correct weight distribution, and planning for the ergonomics of use. The manufacturing process consisted of machining and 3D printing more than 40 parts. After final assembly, modifications are again assessed to increase functionality. Testing results should demonstrate a reduction in the time needed to string a racquet by half and produce a tension from 30 to 90 lbs as stated in the design requirements.

*Keywords: Tennis, Stringer, Drop-weight*
Comparative Analysis of Tool Cut Marks on Cattle Bone
Limberg, Caitlin; Holstine, Robert
Mentor(s): Patrick Lubinski, Anthropology & Museum Studies

Poster Presentation Session #2, Poster #47
11:30-2:00 p.m. in Ballroom B/C/D

The tools used in both consumption and butchering of animal foods leave signatures that can be used to distinguish material type. Experiments were conducted to establish the characteristics of cut marks on cattle bone left by a serrated steel knife, a straight-edged steel knife, an obsidian bifacial tool, a chert bifacial tool, an unmodified obsidian flake, and an unmodified chert flake. Comparative analysis of the slicing-marks showed the shape of slice marks created with the steel knives and obsidian flake were generally similar in width, depth and shape. Tool morphology played the largest role in dictating the shape of scrape marks, and tool edges defined by a pattern of bifacial flake scars or serration left clear signatures. Straight-edged tools left subtler characteristic scrape marks in the form of patches and striations, suggesting the direction of the tool stroke. Tool marks left by steel knives, straight-edged and serrated, were the most prominent, uniform, and consistent. The shape of marks left by the bifacial tools were incredibly similar, meaning differentiation between material types is difficult, and thus identification would likely only be able to be made to the level of bifacial stone tool.

Keywords: Zooarchaeology, Cutmarks, Butchery

For Mark Loud, Austin
Mentor(s): Lene Pedersen, Anthropology & Museum Studies

Panel Presentation, Session #35
2:40-3:00 p.m. in Room 271

“Anyone who knew me before I joined, knows that I am quite aware and at times sympathetic to the arguments against the war in Iraq. If you think the only way a person could bring themselves to volunteer for this war is through sheer desperation, or blind obedience, then consider me the exception.”-2nd Lt. Mark J Daily.

My short entitled, For Mark, will take the viewer on an emotional rollercoaster while looking at a soldier, Mark J Daily, who fought in the war in Iraq. My hope is that this experience will spark the reality of war to those that deter from this touchy subject. Through Mark’s eyes, viewers will be given insight that not every young man who joins the service does so blindly for the cause, but can have a righteous inclination of why they join. Mark was someone who could look through the political jargon to find an ultimate cause he valued and sought to fight for. Although this commemoration is emotional, I hope it brings positive insight and reflection to those dealing with, or have dealt with, loss of family and friends during times of war. Mark could see a light even in the darkest times, and through his writings he was able to impact many.

Keywords: Memorialization, Commemoration, War in Iraq

Central Washington University Campus Community Garden: A Mural Project
Love, Angie; Soto, Blanca; Leger, Catherine; Johnson, Alex
Mentor(s): Tishra Beeson, Physical Education, School & Public Health

Poster Presentation Session #2, Poster #17
11:30-2:00 p.m. in Ballroom B/C/D

This service-learning project represents the first phase of constructing a mural for the campus community garden at Central Washington University. The purpose of the mural is to bring awareness to the garden by creating a welcoming space that empowers the community to learn from, work with, and teach others.
As a group, we became involved with the Campus Community Garden through a Health Education (HED) course, Community Organization and Coalition Development (HED 450). The purpose of this course is to provide public health students the knowledge, practices, and skills necessary to be successful while working with community organizations. We started out developing a concept to attract more Central Washington University students to be a part of the garden through participating in a design competition for the garden’s mural. Submitted designs from Central Washington University students are currently being considered for final selection during the month of April. The chosen artist will be asked to recreate the drawing on a plywood panel for a Community Mural Painting event which will be held on the first Friday in May, and it will be open for participation by all community members. Our role in this project was to collaborate in the launching of the mural design competition, engaging local businesses to contribute resources to the mural project, and participate in the Community Painting Event in May. Our service learning project also involved several opportunities for academic reflection on this experience, and we plan to highlight some of our reflection pieces, as well as photos from the design process, and the actual garden space in our SOURCE presentation.

Keywords: Academic Service Learning, Community Engagement, Community Health

The Vicissitudes of My Life Through Still Life Art
Lupton, Alexandra
Mentor(s): Rachel Kirk, Art

Poster Presentation Session #2, Creative Works, Poster #6
11:30-2:00 p.m. in Ballroom B/C/D

This presentation exhibits a collection of still life scenes, in graphite and charcoal, that represent my life. The goal of the project was to capture the everyday scenes or objects that both symbolize and reflect my personal journey growing up as a young adult. Through these still lifes, I present to the viewer my reality of tone, form, composition, proportions, and shapes. Graphite and charcoal are used to allow for the depiction of striking shades and intricate details. The vicissitudes of life are dynamic, yet relative, to my space and time. I am utilizing skills that I recently learned in Central Washington University’s Drawing 1 art class.

Keywords: Art, Still Life, Collection

Comics Without Panels: Alternative Approaches to Graphic Storytelling
Macinko, Jess
Mentor(s): Anne Cubilié, Douglas Honors College

Oral Presentation, Session #27
1:10-1:30 p.m. in Room 301

This presentation will explore historic and contemporary forms of narrative graphic art, with an emphasis on non-panel or loose-panel methods. By analyzing diverse approaches to graphic narrative, this presentation will explore the potential for a broader, freer comics universe. “Comics are just words and pictures. You can do anything with words and pictures,” said the late graphic novelist Harvey Pekar, extolling the versatility of his chosen medium. Yet today, most comics and graphic novels are dominated by the panel and gutter form, a grid-like division of the page that isolates illustrations within borders of white space. And while this tried-and-true organizing structure has many strengths, its hegemonic status within the genre precludes the exploration of alternative, equally fertile forms of graphic narrative. Drawing from diverse sources, including Persian miniature painting, naive art, 1950s pulp/comic hybrids, and contemporary alternative comics, this presentation will identify and analyze alternative methods, and will consider the challenges and rewards of breaching the traditional panel structure.

Keywords: Comics, Graphic, Narrative
Capabilities for Central American Minors
Madrid, Sergio
Mentor(s): Michael Goerger, Philosophy & Religious Studies

Oral Presentation, Session #3
8:50-9:10 a.m. in Room 271

Based on Martha Nussbaum's Capabilities Approach, I argue that unaccompanied minors from El Salvador, Guatemala, and Honduras should be granted asylum in the United States. Nussbaum's approach answers a basic question: what is this person able to do and to be? A just society should create freedom and opportunities by securing capabilities for each and every individual to function at a threshold level in every way required for decent human existence. Her approach is focused on protecting areas of freedom, so vital, that their removal would make life unworthy of human dignity. An individual should be provided these fundamental freedoms and opportunities created by a combination of personal abilities, political, social, and economic environments. Thus, because of political corruption, increased violence, and an ongoing failure to meet basic needs in El Salvador, Guatemala, and Honduras, Central American children fleeing to the United States should be granted political asylum.

Keywords: Ethics, Dignity, Immigration

The Common Star
Mahr, Emma
Mentor(s): Andrea Eklund, Family and Consumer Sciences

Poster Presentation Session #2, Creative Works, Poster #7
11:30-2:00 p.m. in Ballroom B/C/D

The purpose of my design was to create the perfect garment that a woman on-the-go could wear, from running errands to a spring walk in the park. The touches of gold in the sleeves and pant cuffs represent stars peeking out of the night sky, which is also mirrored in the depths of the blue bodice and black pants. During the creation process, I started with a pair of capris pants. For the top, I wanted something that would have some flow as the model walked. I decided to have flowing sleeves. After I made the sleeves gold, I thought it would also be a nice coordinating touch to add the same gold fabric on the cuff of the pants. The bodice was created by draping muslin on a dress form, then making patterns from the completed draping. The pants were made by flat-patterning, a process involving taking the model's specific leg measurements, completing specific mathematical calculations, and precisely drawing out the pant pattern directly on paper. After all the patterns were made, samples were created and fit on my model. Adjustments were made from the fitting and the final garments were constructed. The bodice is fully lined with an invisible zipper, and the pants include a facing along the top and an invisible zipper. The conservative neckline and pant length makes it perfect for a wide variety of body types. The coordinating gold fabric for the sleeves and pant cuffs makes the garments perfect to be worn together, but also separates that could be worn with other garments, making them very versatile. The materials are polyester fabric, invisible zippers, polyester thread. This is one in a line of three garments; the entire line can be seen at the Apparel, Textiles, and Merchandising spring fashion show, May 30, at 3:00 p.m. and 7:00 p.m. in Milo Smith Theater in McConnell Hall.

Keywords: Draping, Design, Outfit
Total Synthesis of Clavatadine A Analogs to Produce a Viable Reversible Inhibitor for Factor Xla

Malmberg, Christopher
Mentor(s): Stephen Chamberland, Chemistry

Oral Presentation, Session #24
2:10-2:30 p.m. in Room 140

Cardiovascular disease has quickly become a major health concern in the United States, with numerous citizens dying from cardiovascular disease each year. Older medications, while effective against cardiovascular disease, are problematic to prescribe. A recently isolated natural product, clavatadine A, selectively inhibits human blood coagulation factor Xla. As a result, the synthesis and biological testing of clavatadine A, and synthetic clavatadine A analogues that selectively inhibit factor Xla, would represent a new direction in cardiovascular disease research. A potent and selective factor, Xla inhibitor, has the potential to be a safer replacement for current anticoagulants, such as Warfarin. We recently completed the first total synthesis of clavatadine A and will use our general approach to prepare several synthetic clavatadine A analogues. Clavatadine A binds irreversibly to the active site of factor Xla; therefore, we hope to design a selective, reversible factor Xla inhibitor. We hope to improve the effectiveness of clavatadine A as a potential treatment of blood clotting disorders by modifying its structure to make it a reversible inhibitor. First, we will create four analogues of clavatadine A that we believe will be less likely to form a covalent bond with Ser-195 in the active site of factor Xla, then test the binding activity and selectivity of each analogue toward factor Xla. Phase two will involve creating additional analogues based off of the strongest and most selective reversibly binding analogue from phase one to further improve the effectiveness of the molecule as a potential factor Xla inhibitor.

Keywords: Synthesis, Cardiovascular, Anticoagulants

Manastash Showcase
Manastash players: Castro, Steven; DuChene, Chelsea; Fisher, Daniel; Glenn, Kimberly; Hanberg, Claire; Haskin, DJ; Hinger, Kendra; Kulm, J. William; Lindsley, Haley; May, Karie; Morrow, Ebonesiah; Nichols, Michael; Tranchell, T.J.; Tye, Kala
Opening remarks from Manastash managing editors: Hirschey, Olivia; Hoag, Alisa; Morrow, Ebonesiah
Mentor(s): Xavier Cavazos, English

Oral Presentation, Session #5
9:40-11:00 a.m. in Room 135

The English Department Professional and Creative Writing Program is proud to showcase Central Washington University’s student-edited, student-produced journal of writing and art, Manastash. We present a series of short readings of student work featured in the new 2015 issue of Manastash. Faculty advisor, Xavier Cavazos, will introduce the presentation with a few words about the journal and the readers.

Keywords: Manastash, Literary, Journal
Investigating the Correlation Between Inclination of Coronal Loops and Solar Flare Activity

Mann, John-Paul

Mentor(s): Darci Snowden, Physics

Poster Presentation Session #1, Poster #57
8:30-11:00 a.m. in Ballroom B/C/D

The purpose of this research is to investigate changes in the coronal loop structures during the life cycle of a solar flare. Coronal loops are intricate and complicated magnetic features on the solar surface that are the source of large solar flares. Understanding the dynamics of these coronal loops provides better models for predicting solar flare activity. By obtaining the magnetogram, or magnetic field strength, along with the inclination of these coronal loops, the full structure of the coronal loop can be obtained. Therefore, we studied how the coronal loops inclination angle, as it emerges from the photosphere, changes in response to variations of the magnetic field strength. Research data were used from the Helioseismic and Magnetic Imager (HMI) instrument aboard the Solar Dynamic Observatory (SDO). Helioviewer, an online application, was used as a visual database for active region selection. Numerical data were then collected for each active region through the Joint Science Operations Center (JSOC) online by Stanford. Python coding language was implemented in order to manipulate these large data sets and images for multiple different solar active regions. A baseline for the relationship between magnetogram strength and inclination angle of a coronal loop was obtained by investigation of multiple active regions where no solar flares were present. Then, two active regions with multiple large X-class solar flares were investigated for magnetogram strength and inclination angle over time. These differences in inclination for the solar flare active regions versus the baseline active region are still being investigated.

Keywords: Astrophysics, Solar Physics, Solar Flares

Piefect

Marino, Daniel

Mentor(s): KeKe (CoCo) Wu, Management

Business Plan Competition, Oral Presentations, Session #4
9:35-10:05 a.m. in Room 301

Piefect will be a bakery that creates special in-house and custom pies with the best local ingredients, all at reasonable prices. The vision for Piefect is to make it the best-known bakery for custom pies in Whatcom County. Piefect’s mission is to two-fold: 1) to provide customers a memorable experience with custom pies made with fresh local ingredients, and 2) to support the local community by offering proceeds or raffling pies to raise money. Piefect will welcome its customers with a warm aroma of sweet buttery pies baking in the oven, and introduce them to the menu featuring the distinctive names and ingredients in each pie accompanied with a picture of the finished product. For example, a crème brulee pie might have the name “Torched Custard” with ingredients like local organic eggs, flour, sugar, unsalted butter, vanilla bean, and heavy cream.

Keywords: Business Plan Competition, Pie, Local Ingredients
Active Learning and Industry Collaboration: Bringing the Real World into the Classroom
Martin, David; Plugge, Warren
Engineering Technologies, Safety, & Construction

Oral Presentation, Session #25
2:10-2:30 p.m. in Room 201

Building Information Modeling (BIM) is gaining mainstream acceptance in the construction industry. Construction Management educators at Central Washington University have struggled to successfully implement BIM into the curriculum. However, the construction of the Sciences Building Phase II on Central Washington University’s campus, and the aid of an industry partner, provided an outstanding opportunity for the students in the Construction Management program to develop their BIM knowledge. The industry partner aiding this effort was contracted to construct the building and developed a BIM for their own project management efforts. The faculty and the industry partner created an active learning BIM workshop, and provided the students with the knowledge and skills to manipulate an existing BIM and create a 4D schedule using NAVISWORKS. Students were teamed together and tasked with creating a 4D schedule for the concrete forming, re-steel, placing, and finishing of the building. The teams presented their plans to the industry partner and their fellow students, and were evaluated accordingly. Upon completion of the presentations, the industry partner presented his schedule giving students time to reflect on their respective approaches. The active learning opportunities and outcomes of creating and implementing a BIM workshop are presented.

Keywords: BIM, Active Learning, Student Workshops, Construction Management

Acceptability of Adding Pea Powder Protein to Pumpkin Spice Muffins to Make a Good Source and Excellent Source of Protein
Marzano, Jami; Johnson, Samantha; Weldon, Cassandra
Mentor(s): David Gee, Nutrition, Exercise & Health Science

Poster Presentation Session #2, Poster #26
11:30-2:00 p.m. in Ballroom B/C/D

Consuming recommended amounts of protein is vital to ensure adequate health and proper function of the body. Specific populations, such as vegans and vegetarians, may find consuming recommended amounts of protein from the diet challenging. Therefore, the addition of alternative sources of protein in baked goods was the primary focus in this study. Pea powder protein isolate, from the dry yellow pea, was utilized. Pumpkin spice muffins were manipulated to contain various amounts of pea powder protein to create a good source of protein and an excellent source of protein compared to a control containing no added protein. Data were collected to determine if an identifiable change in physical properties existed as a result of the added protein. Data for the sensory and objective tests were evaluated using ANOVA, Tukey’s LSD and Chi-Squared Analysis. Fifty-nine judges provided sensory data. Results of the sensory tests for pumpkin flavor intensity, tenderness, moistness, and preference indicated the pumpkin spice muffin prepared as a good source of protein was an acceptable product compared to the control containing no added protein. Objective data for cone penetration force, moisture content, muffin height, and density index indicated that, although the moisture content was greater in the muffins prepared as a good source and excellent source of protein, the control was the most tender. It can be concluded a pumpkin spice muffin prepared as a good source of protein using the pea powder protein is an acceptable product, while the pumpkin spice muffin prepared as an excellent source of protein is not.

Keywords: Pea Powder Protein, Pumpkin Spice Muffins, Acceptability
Managing Risk on the Street: Forging Alliances and Building Trust
Matson, Hillary
Mentor(s): Mark Auslander, Anthropology & Museum Studies

Panel Presentation, Session #18
11:40-1:00 p.m. in Room 271

At night in San Diego’s historic Gaslamp district, street performers, or buskers, can be found trying to capture the attention of passersby, as they make their way to the nearest restaurant or nightclub. These buskers work for tips on crowded sidewalks adjacent to corporate entertainment venues. This ethnographic study explores how buskers in the Gaslamp forge alliances with those they share the streets with, including night club promoters, bouncers, passersby, and cab drivers. These alliances are both actively sought out and inactively acquired. Through participant observation, direct observation, and interviews, I explored how gifting and creating networks of trust can help buskers manage risk and earn respect. How do buskers benefit from alliances formed within this corporate controlled environment, yet still maintain their independence from it?

Keywords: Alliances, Trust, Respect

Assessment of Anthelmintic Activity of Plant Extracts on Ancylostoma Ceylanicum and the Development of a Toxicity Bioassay
McCornack, Jocelyn
Mentor(s): Blaise Dondji, Biological Sciences

Oral Presentation, Session #33
2:40-3:00 p.m. in Room 140

Soil-transmitted helminthes are intestinal parasites that contribute to major disease burden in people within tropical and impoverished areas. It has been estimated this blood sucking parasite has been responsible for the loss of over one million liters of blood per day. Recently, resistance to current control programs has rendered it necessary to develop new treatments. Earlier projects within the lab have assessed the anthelmintic effects of plant extracts and their enriched fractions on Ancylostoma ceylanicum ex vivo. The plants Dalea ornata and Oemlaria cerasiformis have shown efficacy with adult worms showing either significant decreases in motility or mortality. The additional fractions tested, however, did not display anthelminthic activity. Another important step was to develop an assay testing the toxicity of the extracts to mammalian cells. Three were attempted: a Trypan Blue assay, a Flow Cytometer assay, and a Cell Counting Kit assay. All of them used hamster splenocytes with the extracts at various concentrations. Death and mitosis were monitored over a three to five day period and compared with the control.

Keywords: Hookworm, Natural Products, Toxicity Testing
Trends in Youth Drug Behavior in Guam
McCutchen, Jennifer
Mentor(s): Tishra Beeson, Physical Education, School & Public Health

Poster Presentation Session #2, Poster #18
11:30-2:00 p.m. in Ballroom B/C/D

As a United States territory, the island of Guam is home to 159,358 individuals, including adolescents and young adults. Drug activity among Guamanian youth has increased considerably over the last 20 years. The purpose of this study is to examine trends in drug-related activities and behaviors among adolescents on the island of Guam, using the Youth Risk Behavior Surveillance System (YRBSS) public data set. Participating in drug use, sale, or other distribution during adolescence has been associated with declining grades, dropping out of high school, patterns of criminal activity, and both physical and mental health conditions, making it a concerning public health issue. The 2013 Centers for Disease Control (CDC) High School Youth Risk Behavior Survey shows that 41 percent of youth in Guam reported being offered, sold, or given an illegal drug at school; this is double the national average (CDC, 2015). While we have seen the national average going down since 2001, the rates in Guam have increased by 14 percent since 2001 and, despite these concerning statistics, very little evidence exists to suggest why the burden of illegal drug sale or distribution on school property is higher in Guam than in other parts of the United States and territories. We will explore both school-based and other related drug behaviors reported by the YRBSS dataset from 1995 to 2013. This study is a preliminary effort to a larger study of drug perceptions among youth that will take place in Guam as a part of a faculty-mentored research experience in Summer 2015, partially funded by the Office of Undergraduate Research.

Keywords: Adolescents, Drug Use, Guam

Fostering a Culture of Safety: Aviation Reporting System
McFarlane, Trenton; Turner, Patrick
Mentor(s): John Anvik, Computer Science

Oral Presentation, Session #1
8:30-8:50 a.m. in Room 137B

In the aviation field, whether in study or in practice, creating an environment for efficient incident reporting is a very important task. The Aviation Department at Central Washington University used a paper system for reporting incidents where students would need to fill out a piece of paper to report an incident and place it in a metal box in the Aviation Department office. This proved to be less than useful as many incidents were not being reported. Research showed there were many reasons this system was not used by students. Lack of privacy was the most common reason for incidents not being reported because students did not want to be seen filing a report; some students were worried about their flight instructors getting mad about incidents being reported. For these reasons, the Aviation Department reached out to the Computer Science Department for a new system. My team and I designed, developed, and delivered a quality and efficient system for reporting incidents with privacy. Using modern web technologies, we were able to accurately solve the Aviation Department’s problem, and hopefully increase the number of reports being submitted.

Keywords: Aviation, Safety, Reporting, Incidents, Accidents
RetroPie Gaming System  
McKittrick, Micah  
Mentor(s): Lad Holden, Engineering Technologies, Safety, & Construction  
Poster Presentation Session #3, Constructed Objects, Poster #21  
2:30-5:00 p.m. in Ballroom B/C/D  
The purpose of this project is to build a gaming emulator using a Raspberry Pi Model B to emulate the video game systems Nintendo, Super Nintendo, Sega, and Atari 2600. In order to interact with the emulators the following peripherals have been wired in: one 8-way directional arcade style joystick, ten concave arcade style buttons with micro switches, two universal serial bus (USB) powered speakers, one 15.6 inch high definition television, and one USB powered hub. The buttons and joystick will be wired to the Raspberry Pi’s GPIO pins. Code will be obtained from an outside source and, then, modified in order to work with the gaming emulators. All parts of this project are housed inside a custom acrylic glass case. The USB hub is installed on the front panel to allow users to plug in alternative controllers or keyboards for troubleshooting. The final product will be user friendly and require minimal upkeep.  
Keywords: Programming, Microprocessor, Logic

Coastal Wetlands Surrounding New Orleans, Louisiana  
Meinhold, Andrew  
Mentor(s): Rex Wirth, Political Science  
Poster Presentation Session #2, Poster #42  
11:30-2:00 p.m. in Ballroom B/C/D  
This project consists of a remote sensing evaluation of the wetlands located in the immediate vicinity of New Orleans, Louisiana, by use of satellite imagery. This was accomplished by means of an unsupervised k-mean classification method to define wetland landcover area within the study area. In addition, normalized difference of vegetation (NDVI) and normalized difference of water indices (NDWI) were developed from differing spectral bands of light to further evaluate the nature of the wetland coverage, their outputs ohave been included for analyses and discussion. Complete documentation of data acquisition and methods applied has been recorded and expressed in the final product of this study, a poster presented at this symposium. In addition, an analysis of the outputs generated by this research has been provided, as well as a conclusion drawn from this analysis, which is in turn informed by a literature review from a variety of academic sources. These outside research works are mainly based upon study of the benefits wetlands can provide to surrounding ecosystems, both natural and human-made.  
Keywords: Coastal Wetlands, Remote Sensing, Geography
Fluid Release from Eclogite and Its Implications: North Qaidam Ultrahigh-Pressure Terrane, Western China

*Meyer, Jake*

*Mentor(s): Chris Mattinson, Geological Sciences*

**Poster Presentation Session #1, Poster #8**

8:30-11:00 a.m. in Ballroom B/C/D

Ultrahigh-pressure (UHP, depths≥100 km) eclogite samples from the North Qaidam terrane, Western China preserve evidence of significant H\textsubscript{2}O release along the pressure-temperature (P-T) path. Sample D126A (garnet + omphacite + zoisite + quartz + phengite) contains 500 to 600 µm garnet porphyroblasts, and 2 to 4 mm zoisite crystals. D126A garnet displays strong compositional zoning with decreasing Ca from core (Alm\textsubscript{43}Prp\textsubscript{25}Grs\textsubscript{32}) to rim (Alm\textsubscript{45}Prp\textsubscript{28}Grs\textsubscript{27}). Thermodynamic models of sample D126A determine a P-T path from the beginning of garnet core growth at ~368°C and ~16 kbar to peak P-T conditions at ~675°C and ~28.5 kbar. The predicted peak P-T conditions are consistent with published UHP conditions and are recorded in potential coesite pseudomorphs (UHP indicator mineral). These pseudomorphs are euhedral, tabular quartz inclusions found between the core and rim zones of garnet porphyroblasts in D126A. The whole rock H\textsubscript{2}O wt.% concentration in D126A decreases along the prograde P-T path, 5.17 to 0.50 wt.% H\textsubscript{2}O. The difference in H\textsubscript{2}O wt.% indicates that ~4.83 wt.% H\textsubscript{2}O would be released during prograde metamorphism. Based on the D126A thermodynamic model, H\textsubscript{2}O is released by the breakdown of hydrous minerals such as amphibole and lawsonite. Lawsonite breakdown and replacement is recorded as polycrystalline epidote inclusions within garnet porphyroblasts (present in another sample). These results quantify how much, and where along a P-T path, fluids are released from a subducting slab. These fluids are important because they trigger earthquakes and cause the mantle melting which feeds active volcanoes.

**Keywords:** Eclogite, Metamorphism, Fluids

Manipulating the Kinetics of Methylene Blue and Phenol Red in Thin-Film Sol Gel

*Miller, Kelsey; Langevin, Spencer*

*Mentor(s): Dion Rivera, Chemistry*

**Poster Presentation Session #1, Poster #31**

8:30-11:00 a.m. in Ballroom B/C/D

The purpose of this experiment was to observe and manipulate the kinetics of methylene blue and phenol red in thin-film sol gel. Methylene blue is an oxygen indicator and can detect if it has been exposed to the atmosphere. Phenol red is a pH indicator and can detect a change in hydrogen ion concentration. Being able to change the reaction rate from instantaneous to a significant period of time has a wide range of implementations from biomedical to sensor applications. In order to alter the kinetics the two dyes were analyzed under several different reaction conditions. The methylene blue solution was altered by changing the ratio of methylene blue to Tin (II) Chloride. The phenol red solution was changed by altering the pH to neutral, basic, and acidic conditions. The physical state of the sol-gel was also altered along with the dye/sol-gel ratio. The reaction rate of both dyes was determined by analyzing the solutions using ultra-violet visible spectroscopy. Ultra-violet visible spectroscopy was used to collect data of the change in absorption over the change in time. The data from the pH experiments show no significant decrease in kinetics while the methylene blue system has controllable changes up to several hours.

**Keywords:** Sol-gel, Indicators, Kinetics
**Cardiorespiratory Responses to High Intensity Interval Shallow Water Exercise**

*Miller, Laura; Fisher, Mitchell; Gerrish, Heather; Roemer, Karen; D'Acquisto, Debra; D'Acquisto, Leo*

*Mentor(s): Leo D'Acquisto, Nutrition, Exercise & Health Science*

Poster Presentation Session #2, Poster #23
11:30-2:00 p.m. in Ballroom B/C/D

The purpose of this study was to investigate the cardiorespiratory responses to shallow water, high intensity interval exercise (SW-HIIE). Interestingly, no studies have investigated the physiological responses of performing HIIE in a water medium. Thus, the main question of this investigation was the following: What is the physiological load imposed on the human body during an acute SW-HIIE session? Physically active females, n=9 and 26±6 yrs, volunteered for this descriptive study. Volunteers performed a familiarization trial, an incremental maximal shallow water exercise test, and a SW-HIIE session. Participants were submerged to ~75 percent of stature (axillary level). SW-HIIE consisted of 4 X 4 minute segments with one minute recovery in between each segment. Each segment consisted of 8 X 20 seconds of maximal physical effort with 10 seconds of rest between each effort. Indirect calorimetry (Parvo-Medic metabolic analyzer) was employed to assess metabolic response and heart rate was monitored via telemetry (Polar technology). SW-HIIE elicited an overall oxygen uptake response of 2.0±0.2 lO2 min-1 (73±5% of peak aerobic capacity), nearly eight times above resting metabolic rate, while overall heart rate (HR) response was 156±8 bpm (86±2% HR peak). In conclusion, the SW-HIIE session elicited cardiorespiratory responses that would be classified as vigorous on the intensity scale according to the American College of Sports Medicine’s guidelines for exercise prescription, suggesting that an acute bout of SW-HIIE imposes a great physiological load on the human body.

*Keywords: Shallow-Water, Interval, Cardiorespiratory*

**Beyond the Eyes of the Dominant: Reciprocity and Peace-Building on the Street**

*Mohamed, Saeed*

*Mentor(s): Mark Auslander, Anthropology & Museum Studies*

Panel Presentation, Session #18
11:40-1:00 p.m. in Room 271

Low-income African immigrant young men in metropolitan areas in the United States are subjected to police surveillance as well as stereotypical media representations, which emphasize violence, drug abuse, and criminality. In my fieldwork with youth in a major Pacific Northwest city, I studied the ways in which this dominant gaze is both internalized and redirected. This paper concentrates on one nighttime ethnographic incident, in which a potential gunfight between two groups of young men was narrowly averted through replacing one form of negative exchange with a positive exchange action. In this social drama, an escalation of insults led to the ominous brandishing of weapons. At a critical moment, one of the principal's attention was reoriented through the gift of marijuana, reminding him of bonds of fictive kinship with his companions and pacifying the situation. When can such gift economies co-exist with, or overcome, hegemonic structures of power and violence?

*Keywords: Low-income, Masculinity, Pacific Northwest*
“Look at Me, I Am the Captain Now”: Media Representations of Somalis and Their Implications  
**Mohamed, Saeed; Lemkus, Clint**  
*Mentor(s): Lene Pedersen, Anthropology & Museum Studies*  

Panel Presentation, Session #35  
3:00-3:20 p.m. in Room 271  

Popular media representations of Somalis, such as the Hollywood blockbuster film, *Captain Phillips*, affect both Somali and non-Somali perceptions of Somali men and women. In our research, we review such media representations, which emphasize drug abuse, violence, and criminality among and by Somalis. *Captain Phillips*, for example, depicts Somalis in a controversial light, portraying them as barbarians, savages, and uncivilized, in a storyline which glorifies American triumph. In a combined reflective and impressionistic style of video production, we use the camera as a catalyst to solicit reactions from both Somali and non-Somali students at Central Washington University. We analyze and visually represent the different stereotypical images as well as capture student reactions. Somali students in the United States retain strong ties with their homeland and, therefore, are bound to view representations like *Captain Phillips* through a more complex perspective than non-Somali students. Furthermore, they are likely to view Captain Phillips’ perspectives as one dimensional, predictable, flat and shallow, whereas non-Somali students in the United States may view this film as truth and fact, and hail Captain Phillips’ efforts as heroic and patriotic.  

*Keywords: Media Representations, Somalis, Non-Somali Perceptions*  

The Body as a Battlefield of Resistance: Cracking the Skulls of the System in a Polynesian Performance  
**Molohon, Patrick**  
*Mentor(s): Lene Pedersen, Anthropology & Museum Studies*  

Panel Presentation, Session #18  
11:40-1:00 p.m. in Room 271  

Through the analysis of a Marquesan haka performance in a touristic setting in Tahiti, this paper explores the notion of the Polynesian body as a site of struggle between the gaze and premonitions of cosmopolitan French tourists of the exotic other, and the resistance and self-interiorizing of the body by Marquesans. Many contemporary Marquesans choose to migrate to the more urbanized, popular tourist destination of Tahiti, for work, schooling, and medical procedures. Removed from their native land, Marquesans still build upon traditional cultural practices and worldviews, while simultaneously actively creating innovative aspects of their experience in the new setting. My analysis is based on stories of how tourist performances create and affirm Marquesan culture, gathered through ethnographic research, participant observation, and interviews in August, 2014, in Pape’ete, Tahiti. How does the body, prone to commoditizing processes within the tourist system, also emerge as a site of moral economy, community empowerment, and generalized reciprocity?  

*Keywords: Polynesia, Tourism, Neoliberalism*  

The Relationship Between Child Life Care and Perceptions of Pediatric Hospitalization  
**Montgomery, Lindsay**  
*Mentor(s): Duane Dowd, Family and Consumer Sciences*  

Poster Presentation Session #3, Poster #41  
2:30-5:00 p.m. in Ballroom B/C/D  

This study examines the effect of childhood hospital experiences on the perception of quality of hospital care. A sample of 268 adults completed a questionnaire, online and in person, that asked retrospective questions about their childhood experiences, ages 4 to 17, in a hospital setting. The study assessed staff-
to-patient communication and pediatric services, with many aspects specific to the Child Life profession, that minimized the impact of the pediatric environment. Results suggest that having a Child Life Specialist increases the child’s level of comfort, reduces fear and anxiety in pediatric patients, and reduces the level of trauma experienced by the child during their hospital experience.

Keywords: Child Life, Hospitalization, Pediatric Care

Environmental Perceptions of Central Washington University Students
Morton, Cris
Mentor(s): Casey Mace, Physical Education, School & Public Health; Clay Arango, Biology

Poster Presentation Session #2, Poster #19
11:30-2:00 p.m. in Ballroom B/C/D

Sustainability is becoming more important in our culture, with industry and governments working to reduce their environmental impact by instituting green initiatives, such as utilizing renewable energy or expanding recycling programs. For Central Washington University (CWU) to consider, implement, and continue new green initiatives, support from the student body is vital. However, there is currently no clear picture of how the student body perceives the importance of environmental issues, or how much it is willing to support the institution of green initiatives by volunteering time or donating money. We sent a six-question survey to the CWU student body to gain a better understanding of their perception of and support for green initiatives. Anonymity of respondents was ensured by omitting demographic questions and limiting access to survey data. The Qualtrics-based survey was sent twice to every CWU student e-mail address through CPORT, which compiled the responses and created cross-tabulations for analysis. Responses indicate that most students are interested in environmental issues, feel that it is important for CWU to institute green initiatives, and are willing to pay to institute those initiatives. Results also showed that many students are more likely to attend a university that implements green initiatives, but that CWU has lacked initiative to institute sustainable policies, or develop a culture of participation in sustainable practices. Our survey suggests that instituting green initiatives would improve the university’s marketability to prospective students, and that students would financially support those green initiatives.

Keywords: Environmental Perceptions, Sustainability, Green Initiatives

Friend or Foe: Foreign Diplomacy in 1861 Civil War America
Moser, Robert
Mentor(s): Jason Dormady, History

Oral Presentation, Session #10
10:20-10:40 a.m. in Room 271

At the beginning of the American Civil War, as the looming threat of succession hung over the Union, the United States government was commencing its efforts to seek out allies to aid in reuniting the nation. More importantly, they were searching for an answer to whether or not foreign aid would be provided to the Confederacy. In 1861, the State Department began navigating the murky depths of foreign diplomacy in an attempt to ward off foreign intervention. Desperate to preserve a nation, Secretary of State William H. Seward embarked on a political journey to seek new alliances and prevent unwarranted intervention. By examining official communications from the United States State Department, Seward and his deputies, dutifully crafted a narrative that sought Russia as a ally and attempted to stave off Britain from becoming an interventionist in support of the Confederacy.

Keywords: Diplomacy, Civil War, Russia
Cancer Survivor Rehabilitation Program: Biopsychosocial Outcomes and the Influence of Initial Fitness Levels

Mulroy, Samantha

Mentor(s): Tim Burnham, Nutrition, Exercise & Health Science

Poster Presentation Session #2, Poster #21
11:30-2:00 p.m. in Ballroom B/C/D

The purpose of the present study was two-fold: 1) to explore the effect of a comprehensive cancer rehabilitation program on biopsychosocial measures; and 2) to determine if biopsychosocial outcomes are related to initial fitness values. Research has examined the relationship between participation in physical activity and improvement in quality of life in cancer survivors. Additionally, it has been established that initial fitness level of healthy adults affects the magnitude of improvement after aerobic exercise training; however, it is unclear if similar effects are observed in older adults and cancer survivors. The evaluation of the potential relationship between initial fitness levels and biopsychosocial response has not been explored in healthy or clinical populations. Fifty-one post-treatment cancer survivors of all cancer types were assigned to the treatment group in a pre-post quasi-experimental design. The 12-week comprehensive rehabilitation program consisted of two 90-minute sessions per week. Each session was comprised of three components: an educational activity, cardiovascular training, and strength and flexibility training. Dependent measures included: aerobic capacity, body fat percent, handgrip strength, quality of life, Schwartz Fatigue Scale, and the Linear Analogue Self-Assessment Scale (LASA). A two-way analysis of variance demonstrated no differences between the two levels of fitness. A paired t-test revealed statistically significant differences pre- and post-program among all dependent variables with the exception of nonsignificant findings of anxiety and anger LASA scale measures. Overall, a comprehensive rehabilitation program for cancer survivors improves biopsychosocial outcomes and is not influenced by the participant’s initial fitness level.

Keywords: Cancer Survivor Rehabilitation, Quality of Life, Initial Fitness Level

Learning in Museums

Museum Studies students: Evans, Andrew; Anderson, Brittany; Seelye, Liz; Hammersberg, Barbara; Bair, Sarah; Bauermeister, Maggie

Mentor(s): Mark Auslander, Anthropology & Museum Studies; J. Hope Amason, Museum of Culture and Environment

Panel Presentation, Session #38
2:40-3:20 p.m. in the Theatre

Museum Studies students have been developing innovative lesson plans geared towards K-12, college, and community visitors to the Museum of Culture and Environment, which emphasize STE(A)M (Science, Technology, Engineering, Arts, and Mathematics) educational programs. This panel showcases students’ work in creating, implementing, and assessing educational strategies in the museum. We have been especially interested in activities that emphasize creative problem solving and hands on engagement by museum visitors of all ages. Student projects include: a large format puzzle about the Columbia Mammoth; pop music as a strategy for reflecting on chemical dependency, visual arts workshops in reflecting on homelessness and “what is home”; an interactive space evoking a homeless encampment to teach about life on the streets; an interactive tour of exhibition on heroin and homelessness; using puppetry to reflect on eco-connectivity across wildlife passages; an odor wheel using different chemicals to identify problems in compost piles; and teaching echolocation through auditory cues.

Keywords: Museums, Informal Education, STEM, STE(A)M, Community Engagement, Service Learning
**The ExploreCentral Mobile App: Interpreting Ellensburg through Digital Technology**

*Museum Studies Students: Anderson, Brittany; Bair, Sarah; Budde, Heather; Crosby, Nicolas*

*Mentor(s): Mark Auslander, Anthropology & Museum Studies*

Panel Presentation, Session #38  
3:20-4:00 p.m. in the Theatre

During 2014-15, students in museum studies have collaborated with computer science students to create a new mobile app called ExploreCentral for Android smart phones. The app makes interpretive materials available on points of interest (e.g., art, history, environmental, architectural) through a GoogleMap interface, allowing users to hear audio and see still images and video related to the location they are standing in front of, at the click of a button. Some of the student-authored audio segments are humorous (e.g., a spoken “commentary” by the statue, Kitt the Coyote) and other are serious (e.g., information on how to find a homeless shelter in town). Students will present their digital segments and discuss the challenges of effective navigation and information architecture through this innovative digital platform.

*Keywords: Museums, Public History, Art History*

**Show Me the Money**  
*Neff, Austin*

*Mentor(s): Michael Goerger, Philosophy & Religious Studies*

Oral Presentation, Session #3  
8:10-8:30 a.m. in Room 271

There are numerous ethical issues within the current structure of intercollegiate athletics. At present, one of the most hotly debated issues is the question of whether or not, in addition to their athletic scholarships, college athletes should receive financial compensation for playing in nationally televised games and having their likeness used to sell merchandise and concessions. This research investigates the issue from a philosophical perspective using an application of contractarian morality, an advanced ethical theory. Contractarianism analyzes ethical situations by viewing morality in terms of fairness of and agreeableness upon social contracts, such as the one between the National Collegiate Athletic Association (NCAA) and its athletes, to and from all parties involved. This research focuses on case studies, scholarly editorial pieces, and the disaggregation of primary source data. I will argue that college athletes who appear in nationally televised games are being undercompensated for the value they bring to their respective universities. This value is comprised mainly of monetary contributions from the sale of television packages and team merchandise but also includes benefits that are hard to quantify, such as increases in their university profile. The popular argument defending the current NCAA system is that student-athletes are fairly compensated through academic scholarships and other preferential treatment. I will refute this claim. It is imperative that we address this issue from an ethical perspective so we can help the NCAA to establish future policies that preserve the sanctity of higher education and are grounded in the principles of justice and equality.

*Keywords: Student-athlete, Compensation, Ethical Theory*
**Effects of Excess Testosterone on 129S1 Mouse Adipose Tissues**  
*Nelson, Raegan; Yeung, Howard*  
*Mentor(s): April Binder, Biological Sciences*

Poster Presentation Session #1, Poster #42  
8:30-11:00 a.m. in Ballroom B/C/D

Polycystic ovarian syndrome (PCOS) is an endocrine disorder that affects eight to ten percent of women at reproductive age. It is believed a combination of PCOS symptoms such as increased testosterone levels, weight gain, and polycystic ovaries may contribute to reduced fertility. The etiology of PCOS is poorly understood in women, and ethical constraints limit the ability to study the syndrome. One way PCOS can be studied is using mice models. This study investigates the effect of excess dihydrotestosterone (DHT), a testosterone analog, in 129S1/SvIMJ mice. The 129S1 strain is a common inbred mouse strain used for biomedical research. Mice were treated with DHT using a 90 day continuous release pellet, after which tissue samples were collected, sectioned, and stained using the hematoxylin and eosin technique. Examined adipose tissues included brown, inguinal, retinoperitoneal, and gonadal fat. Quantitative analysis shows that DHT treated mice had significantly increased body weights than did placebo mice. Qualitative analysis suggests increased cell sizes in DHT treated inguinal, retinoperitoneal, and gonadal adipose tissues compared to placebo tissues. DHT treated brown adipose tissues appear to have larger lipid droplets than placebo tissues, rather than larger cell sizes. This preliminary data may explain the increased weight of DHT treated mice and support the 129S1 mouse strain as a PCOS model. Quantitative analysis is currently underway to examine adipose tissue changes and how they may pertain to women with PCOS. Future research will examine 129S1 mice ovaries in placebo and DHT treated mice for polycystic ovaries often present in women with PCOS.

*Keywords: Adipose, PCOS, Testosterone*

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**The Genetic and Epigenetic Basis of Trichome Production in Yellow Monkeyflower (*Mimulus guttatus*)**  
*Neuffer, Sam*  
*Mentor(s): Alison Scoville, Biological Sciences*

Oral Presentation, Session #23  
1:30-1:50 p.m. in Room 137B

Trichomes are sticky leaf hairs that protect *Mimulus guttatus* (yellow monkeyflower) from insect herbivory. Trichome production is plastic, meaning plants produce more trichomes on new leaves in response to damage. Progeny of damaged mothers show increased trichome production even without damage, a phenomenon known as epigenetic inheritance. The genes and developmental pathways involved in *Mimulus* trichome production are not well understood. Constitutive trichome production and plasticity in response to damage was measured in two populations selected for high baseline trichome production and in two control populations. Plants in the selected populations showed significantly higher baseline trichome production. They also showed decreased plasticity, which is in accordance with optimal defense theory. Pooled DNA samples from each population were sequenced using next-generation sequencing technology and the data analyzed to find regions of the genome associated with trichome production. Multiple regions of the chromosomes showed response to selection for high trichomes, which is indicative of polygenic inheritance. These regions are concordant with the results of a related quantitative trait loci (QTL) mapping analysis. Epigenetic inheritance will be measured in future experiments. Understanding the genetics of an ecologically relevant trait not only provides greater understanding of how organisms interact with biotic factors in their environment, but it also provides more information on an emerging model organism.

*Keywords: Plant Defense, Epigenetic Inheritance, Plasticity*
Effectiveness of the McNair Scholars Program at Central Washington University from 1992 to 2002

Nevar, Pamela; Buvit, Ian
McNair Scholars Program

Oral Presentation, Session #34
3:20-3:40 p.m. in Room 201

This study seeks to evaluate the impact of Central Washington University’s (CWU) McNair Scholars Program by comparing alumni participants with non-McNair undergraduate students who attended CWU between 1992 and 2002. Specifically, the study evaluates effectiveness based on four program objectives: (1) completion of mentored undergraduate research; (2) enrollment in a post-baccalaureate degree program in the fall term following graduation from CWU; (3) continued enrollment in a post-baccalaureate degree program at the beginning of the fall term of the following year; and (4) completion of a doctoral degree or PhD within 10 years of graduation from CWU. Study results offer strong support that CWU’s McNair program has fulfilled its objectives beyond expectations as measured by stated program objectives and, with the help of outstanding CWU faculty mentors who serve as advisors and role models and strong administrative support, the program is successfully advancing undergraduate student participants in mentored research, post-baccalaureate education and, ultimately, a doctoral degree for a sizable percentage.

Keywords: McNair Scholars Program, Effectiveness, Graduate Education

Vietnamese Migration Patterns and Public Policy

Nguyen, Johnny; Vo, Binh; Treadway, Jennifer
Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #2, Poster #70
11:30-2:00 p.m. in Ballroom B/C/D

At the end of the Vietnamese War in 1975, South Vietnam natives sought to escape Vietnam from the communist reign of its North counterpart. Fueled by the former Communist revolutionary leader Ho Chi Minh’s dream of uniting Vietnam under one communist ideal, the north cemented their occupation in the Fall of Saigon in 1975 and the retreat of all American soldiers. Along with the retreat of thousands of American troops, came the many waves of Vietnamese immigrants to steadily make their way to various parts of the world including the United States, Canada, Australia, and France. The research will also explore how migration patterns of South Vietnamese have influenced public policy in the western hemisphere. The influx of South Vietnamese on United States’ soil pushed policy makers in Washington DC to create programs like the Orderly Departure Program, which moved more than 500,000 South Vietnamese to the United States. The influx also led to a great number of amendments to the famous Immigration Act (Hart-Celler Act) which continually raised the amount of visas administered to immigrants from all other eastern countries. This paved the way for not only Vietnamese immigrants but many from Indochina. Lastly, we will look at the result of these migration patterns and how it has affected the new generation of Vietnamese citizens in the United States. We will examine the densest populations of Vietnamese-Americans in states and explore their various demographics across education, socioeconomic income, and political philosophies.

Keywords: Demographics, Immigration, Refugees
Evaluation of *Trypanosoma cruzi* Strains in Jalisco, Mexico

*Nguyen, Uyen; Beck, Daniel; Wenger, Analiese*

*Mentor(s): Gabrielle Stryker, Biological Sciences*

Oral Presentation, Session #33
3:20-3:40 p.m. in Room 140

*Trypanosoma cruzi*, the causative agent of Chagas disease, is a single-celled flagellated parasite of mammals, including humans. Chagas disease is endemic throughout much of Mexico, Central and South America where an estimated eight million people are infected. The disease is transmitted by infected triatomine bugs, a blood-sucking insect. *T. cruzi* exists in at least seven unique clonal strains circulating between wild or domestic mammals and triatomine bugs. The strains are found in distinct areas and are associated with different disease pathologies in humans. Each strain can be further divided into discrete genotypes using sequence analysis. The primary objective of this research is to evaluate the *T. cruzi* strains and genotypes found in and around the dry tropical forest at Estación de Biología Chamela (EBCh) in Jalisco, Mexico. Jalisco is known to have the highest Chagas infection rate in Mexico. Triatomine bugs were collected by hand and using pitfall traps at EBCh. The gut contents were placed on FTA paper, which renders any parasites non-infectious and preserves the parasite’s DNA for testing upon return to Central Washington University. Two common gene fragments of parasite DNA, TcSC5D and intergenic region of mini-exon, were amplified using polymerase chain reaction (PCR) to identify *T. cruzi* strains. Each *T. cruzi* positive sample was sequenced to determine the parasite genotypes. DNA sequences were analyzed using a ClustalW program. Initial results demonstrate that the *T. cruzi* strain at EBCh is restricted to TcI. This research will aid in a better understanding of Chagas disease infection dynamics in Jalisco, Mexico.

*Keywords: Trypanosoma Cruzi, TcI, Mexico*

Conversion Casting from A36 Steel to Class 40 Gray Iron

*Nichols, Christopher*

*Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction*

Poster Presentation Session #3, Constructed Objects, Poster #4
2:30-5:00 p.m. in Ballroom B/C/D

Conversion castings are used in manufacturing to reduce time and costs of the production of machined parts. This project incorporated a machined production component from a local manufacturer, and designed and produced an equivalent component using the casting process. The casting material chosen needed to be able to withstand all tension and compression forces when the component is used in service, and the locations and dimensions of holes needed to be in accordance with all specified tolerances. The casting design process had to account for draft issues, shrinkage during material solidification, porosity, and internal cavities formed during solidification, and overall optimization of material used for the casting process. The use of computer-simulated solidification software aided in the design of runner and gating dimensions as well as predetermining significant problem areas for porosity and internal cavities within the castings. The manufacture of the mold pattern and core boxes was completed using the additive manufacturing process of three dimensional printing. Using this process eliminates the use of any machining processes for the manufacture of the casting along with significantly reducing the amount of man hours for fabrication. The patterns were made as well as the castings poured at Central Washington University using the 3D printers and the foundry located in the engineering building. Success of this project will be determined through comparison of all dimensions to the current machined components and performance testing when put into service.

*Keywords: Casting, Simulation, Manufacturing*
Towards the Synthesis of Novel 1,3-Azaborines as Potential HIV-1 Protease Inhibitors

Norris, Katherine
Mentor(s): Levente Fabry-Asztalos, Chemistry

Poster Presentation Session #1, Poster #27
8:30-11:00 a.m. in Ballroom B/C/D

HIV-1 protease is an enzyme responsible for creating mature HIV viral particles. Recent studies have shown that boron-modified inhibitors have a higher affinity towards the protease than their corresponding non-boronated analogs and have inhibitory affinity towards an HIV-1 protease variant that is resistant to several HIV-1 protease inhibitors. The main goal of this research is to synthesize a library of both straight chain and cyclic boronates that potentially have dual-mode, competitive and associative, inhibitory action against HIV-1 protease, mimicking the transition state analog of the natural substrate and interfering with the viral life cycle. The boronic acid target compounds are chiral 1,3-azaborines that will potentially have a greater affinity towards the enzyme and better bioavailability, less toxicity, and fewer side effects than the currently used pharmaceuticals. Both straight chain and cyclic boronates are being synthesized which will serve to expand molecular diversity, as well as organoboron chemistry in general. Due to the structural rigidity of cyclic boronates, they are expected to be better inhibitors than their straight chain analogs.

Keywords: Boronates, Synthesis, Protease

Growth Cone Mechanics

North, William
Mentor(s): Erin Craig, Physics

Poster Presentation Session #1, Poster #54
8:30-11:00 a.m. in Ballroom B/C/D

A nerve growth cone is a mechanical structure that responds to chemical signals in order to guide axon growth during nervous system development. We developed a computational model to explore the underlying mechanics of a nerve growth cone inside a fetus, and to specifically address the question of how the mechanical components of the growth cone work together to allow the cone to steer in response to external chemical signals. By developing a deeper understanding of the bio-physics of growth cones, we hope to contribute to a broader understanding of how the nervous system develops. Based on experimental observations of the movement and components of a growth cone, we wrote a computational program in Matlab using differential equations to explain the mechanics of how a growth cone moves and turns. We hypothesize that the growth cone operates through a mechanical clutch mechanism in which a group of filaments called f-actin act as the engine-clutch system and a group of filaments called microtubules provide the steering. Theoretical predictions of our model could be tested by future experiments, in order to test the validity of our hypothesis. This project has helped further research on growth cone dynamics and functions and has given me a deeper understanding of doing research with the use of computational analysis.

Keywords: Growth Cone, Mechanics, Discovery.
The Effect of Healthy Hunger-Free Kids Act on School Meals
Ogan, Dana; Bergman, Ethan; Shaw, Emily; Englund, Tim
Department of Nutrition, Exercise & Health Science; Mathematics

Poster Presentation Session #2, Poster #31
11:30-2:00 p.m. in Ballroom B/C/D

Nearly 31 million children eat National School Lunch Program (NSLP) meals each day. In order to improve the nutritional quality of the NSLP, standards for government subsidized school lunches changed in July, 2012, under the Healthy Hunger-free Kids Act of 2010 (HHFKA). In Spring of 2012, digital photographs of NSLP lunches were taken before and after meal consumption in four elementary schools, prior to enactment of HHFKA. In Spring of 2013, after enactment of the HHFKA, digital photographs of lunch were again taken in the same schools. The photos were used to make estimates of nutritional content of meals selected and consumed. Comparison between the pre-HHFKA meals and the post-HHFKA meals revealed significant differences between the 2012 and 2013 mean nutrient content selected and consumed for food energy, total fat, saturated fat, carbohydrates, protein, calcium, fiber, cholesterol, sodium, and vitamin C. Saturated fat and sodium selection was significantly different: Saturated Fat: 6.1 grams (2012) and 3.5 grams (2013); Sodium: 1148 mg (2012) and 909 mg (2013), p<.05. No significant differences between 2012 and 2013 mean nutrient content selected and consumed for iron and vitamin A were found. In conclusion, the 2013 meals using new HHFKA guidelines offered a better meal and resulted in improved intake.

Keywords: School Lunch, Nutrition, Child

Family Planning and Reproductive Health Experiences of Latina Women in a United States Border City
Ojeda, Erika; Manzo-Casio, Margarita
Mentor(s): Tishra Beeson, Physical Education, School & Public Health

Poster Presentation Session #2, Poster #16
11:30-2:00 p.m. in Ballroom B/C/D

Family planning and reproductive health services are essential protective factors against unwanted, unintended, or mistimed pregnancies. However, underserved women such as those who are low-income, uninsured, or geographically or linguistically isolated may not have optimal access to these essential services. This study explores the experiences of Latina women in a United States’ border city in accessing family planning care through focus group discussions. We conducted two focus groups with Latina women of reproductive age in a border town in the United States, n=16. Focus groups were conducted in Spanish and audio recorded for transcription. Two independent bilingual student researchers transcribed and translated the audio files for analysis. A team of one faculty member and two student researchers analyzed the translated transcripts using traditional content analysis for qualitative research until consensus was achieved on major themes. This study was approved under the Office of Human Research at George Washington University, in collaboration with the Human Subjects Research Council at Central Washington University. This study is currently in progress and undergoing the qualitative analysis of transcripts. The research team is currently collaborating to develop consensus on key themes that we will report regarding Latina women’s experiences with family planning care.

Keywords: Family Planning, Reproductive Health, Latinas
Understanding Bullying: An Analysis of Current Literature on Bullying and Prevention Programs

Olden, Hunter
Mentor(s): Heidi Bogue, Psychology

Poster Presentation Session #3, Poster #53
2:30-5:00 p.m. in Ballroom B/C/D

Bullying is an important issue in society today that impacts a large portion of the population. The topic of bullying is one that has been extensively researched over the past decade and it continues to be an important area of focus in the fields of education and psychology. With many different ways that bullying can manifest and the many contexts where it can occur, bullying has become an increasingly widespread problem. Bullying has been shown to have many negative physical and social consequences. The negative impacts of bullying have been associated with increased depression, anxiety, and higher rates of crime. As such, these negative outcomes involve factors within individuals as well as within the community. Due to the many factors at play and the complex nature of the problem, defining bullying in an accurate and reliable way can be challenging. To address all of these issues inherent to the problem, prevention programs have largely followed a social-ecological model. Programs that follow the social-ecological model focus on providing individuals with support by improving their individual skills as well as improving home and community environments. The purpose of this project is to present an analysis of the research currently available on the topic of bullying and on the prevention programs that aim at decreasing this increasingly prevalent problem.

Keywords: Bullying, Social-ecological Model, Prevention Programs

MX SnowSki
Olson, Jordan
Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #14
2:30-5:00 p.m. in Ballroom B/C/D

Living in the Pacific Northwest has many perks when it comes to enjoying the outdoors. All of the seasons can be enjoyed, as well as being completely surrounded by beautiful rolling hills and mountains. Being someone who continuously enjoys the outdoors year round, it’s always fun to try new hobbies. The problem with owning a dirt bike is that most people ride during the dryer and warmer seasons of the year. This project would enable the bike to be ridden even during the snowy winter season. Riding a dirt bike in snow has been recently explored by only a few companies. Why not design our own working system? A Honda Cr250r dirt bike became the test model and a front mount for a snow ski was designed. This ski would replace the front wheel/tire, while a paddle tire would be implemented at the rear of the bike. After all thirteen parts are machined from the CNC, table mill, band saw, and surface grinders, the device is considered complete and will be properly mounted to the dirt bike. When tested, the dirt bike should handle well in the snow by making tight turns, long sweeping turns, and tracking straight with ease. The ski mount device will also allow the front ski to pivot in the upward position from 20 to 45 degrees, while also pivoting downward at least 10 to 25 degrees. This will allow a rider to enjoy dirt biking all year round.

Keywords: Dirt Bike, Ski, Snow

Dump Bed Lifting Mechanism
Pate, Zachary
Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #2
2:30-5:00 p.m. in Ballroom B/C/D

The project was motivated by a need to create a device that would cause a small truck or trailer bed to lift up quickly and dump its contents. This would eliminate the need to use manual physical labor, which is
both slow and exhausting. Additional design constraints require the stroke and diameter of the cylinder to be 6”x 2”. A design was conceived with the intent to incorporate a less costly device onto an existing trailer frame that would lift the bed and dump the load. With this in mind, a scissor lift device would have two basic requirements, first to lift 500 pounds and second to achieve a 40 degree angle of lift. The intended design is called a scissor lift. Lifting mechanisms for dump trucks are too large and expensive for use on a small six foot trailer. Designing a lift to use a smaller cylinder to do the same task as a larger lift was accomplished with engineering design. This smaller cylinder presents a geometric challenge so there is enough lift to tilt and dump the load. To accomplish this, the lift will have to accommodate the cylinder to transfer its force through the arms. The calculations predicted that a 0.5 gpm hydraulic pump would take 62 seconds to lift 500 pounds, dump, and lower the load. Initial tests indicated a tilt goes to 39 degrees.

**Keywords:** Mechanical, Engineering, Senior Project, Dump Bed

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**The Influence of Family Upbringing on the Facial Inference Process**

*Pellegrini, Kara; Benner-Kenagy, Christopher; Gilbert, Meghan; Licea, Jacqueline; Ojeda, Jonathan; Mitchell, Jordan Segura*

*Mentor(s): Anthony Stahelski, Psychology; Mary Radeke, Psychology*

*Poster Presentation Session #3, Poster #61*

2:30-5:00 p.m. in Ballroom B/C/D

This study examined personality trait inferences on the basis of facial expressions by showing participants multiple photographs of either one young female face or one young male face, exhibiting three distinct facial expressions. Participants from two parent homes were asked to indicate which parent was more nurturing, and which parent enacted more disciplinary measures. Results demonstrated that responses to these two questions influenced participant trait responses to the angry and sad facial expressions. Results were discussed in terms of overall environmental influence on the inference causal attribution process.

**Keywords:** Facial Expressions, Personality Traits, Personality Inference

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**Student Use of Internet Video Lectures in Physics**

*Penoyar, Patrick*

*Mentor(s): Bruce Palmquist, Physics, Science Education*

*Poster Presentation Session #3, Poster #36*

2:30-5:00 p.m. in Ballroom B/C/D

This study explored efficacy of student use of cloud-based video resources in supplementing regular physics instruction. Two groups of thirty students in Physics 112 classes took part in this study. As part of the regular course curriculum, each class had assigned web based homework. During the rotational motion and angular momentum unit of each class, references to supplemental instructional materials, applicable to problems on regular course homework were provided. The 9:30 a.m. class was provided with references to specific pages and examples in the course text book. The 7:30 a.m. class was provided with links to online supplemental physics videos. Data were collected at the beginning and end of the unit, via a pre- and post-test, attitude survey, and physics concept inventory. Additionally, view counts for online video resources were counted. The study found no significant learning gains in either student population as well as limited use of online video references.

**Keywords:** Physics, Education, Learning
Engineering at 88.1 The Burg
Peretti, Nicholas
Mentor(s): Nick Elliott, KCWU staff

Poster Presentation Session #3, Constructed Objects, Poster #25
2:30-5:00 p.m. in Ballroom B/C/D

Growth and development at 88.1 the Burg is not a one-man job. I have been interning as a Broadcast Engineer Associate for 88.1 the Burg since October of last year. My task as an intern at 88.1 the Burg is to understand the systems that the radio station uses to keep our signal clear of noise and clear of Federal Communications Commission (FCC) violations. In addition to these responsibilities, I listen to the needs of our volunteer DJs and paid staff, to implement solutions to their technology needs or wants. At SOURCE, I would like to show how our digital audio processing system works, and how we take full advantage of the equipment available to us.

Keywords: Engineering, Radio, Broadcasting.

Holocene Fire History of Green Lake, Eastern Cascades, Washington, Determined Using Macroscopic Charcoal Analysis
Pilkington, Dusty; Walsh, Megan
Mentor(s): Megan Walsh, Geography

Poster Presentation Session #2, Poster #41
11:30-2:00 p.m. in Ballroom B/C/D

Wildfires are common in the dry ponderosa pine forests of the eastern Cascades, and play a vital role in maintaining ecosystem health. However, fire activity in the region has generally been suppressed during the past approximately 100 years. As a result, forests in this region have recently begun to experience larger, more damaging fire events. One such event, the Carlton Complex Fire, burned during the summer of 2014. As the largest wildfire ever recorded in Washington State history, it burned more than 130,000 hectares, consumed 300 homes, and caused considerable infrastructure damage before it was contained. In order to put recent fire activity in the eastern Cascades into perspective, long-term fire histories that span the past ~15,000 years are needed. Here, we present results from a study at Green Lake, Washington, which sits approximately 42 km from the Carlton Complex Fire. The lake was cored during summer 2012 and a 4.43 m long sediment core was recovered, providing an approximately 7,600 year-long record. High-resolution macroscopic charcoal analysis was used to reconstruct the fire history of the site, along with loss-on-ignition and magnetic susceptibility analyses. Ratios of herbaceous to woody charcoal were used to determine fuel types and fire severity. Preliminary results indicate that low-severity ground fires were frequent throughout the record, but increased substantially after ca. 1400 AD and remained high until ca. 1850 AD. Future research will involve reconstructing the fire history of a lake within the Carlton Complex burn zone to compare with the Green Lake record.

Keywords: Fire History, Paleoecology, Pyrogeography
¡A escribir! Writing strategies for Heritage Students at the College Level

Pinto, Edward
Mentor(s): Alejandro Lee, World Languages

Poster Presentation Session #3, Poster #38
2:30-5:00 p.m. in Ballroom B/C/D

I presented on heritage language education at the bi-state Washington Association for Language Teaching and Confederation in Oregon’s Language Teaching Fall Conference on October 10, 2014, in Vancouver, Washington. With the help of Professor Alejandro Lee in the World Languages Department, I presented my research on writing in the Spanish Heritage classroom in the session entitled “¡A escribir! Estrategias de redacción para estudiantes de lengua heredada a nivel universitario” to educators and administrators from Washington and Oregon. The poster will highlight the main points of why Heritage students struggle with writing. I recommend various best practices to help these students become better writers by focusing on the development of the students’ vocabulary, cultural competence, and grammar in addition to the language skills, which include reading, listening, and speaking. It is essential that students are given a variety of writing assignments that allow them to explore diverse methods of writing. Some of these writing assignments include poems, argumentative, descriptive, and narrative essays. Moreover, some of these topics include Spanglish and its controversial use, the origin of students’ names, and the stories of their parents.

Keywords: Spanish, Education, Writing

Kids in Construction (KIC): An Introduction of STEM Related Careers in Construction Management

Plugge, Warren
Engineering Technologies, Safety, & Construction

Oral Presentation, Session #25
1:50-2:10 p.m. in Room 201

There is a growing need for science, technology, engineering, and mathematic (STEM) related jobs all around the world. Students from all areas of Washington were brought to Central Washington University’s Construction Management program funded by the MOSAIC GEAR-UP program to be engaged in a three-day camp. Kids in Construction (KIC) introduced forty middle-school students in the sixth to ninth grades to the basic elements of what real constructors are engaged in on a daily basis. Students in the camp were introduced to large heavy equipment at the Ellensburg Operators Training Facility, shown a building in the process of being constructed on the Central Washington University campus, built coffee-2-coffee houses in teams provided by the Associated General Contractors of America (AGC), constructed concrete pavers by mixing and placing concrete into forms, and built and tested balsa wood bridges to test the students’ engineering skills. These activities tested the students’ management, communication, and teamwork skills; provided a hands-on environment to expose students to the means and methods of construction materials, processes, methods, and equipment; and tested students’ engineering and mathematical skills. A central focus of this project was to expose students to an area related to STEM which showcases the basic learning elements commonly found in Construction Management education and related jobs to students at an early age. This research will present on how the curriculum was developed and presented as well as provide a commentary on future areas of research related to the KIC camp.

Keywords: Construction Management, STEM, Education
The Effects of Detail and Valence on False Beliefs in Lies
Polage, Danielle
Psychology

Oral Presentation, Session #22
2:10-2:30 p.m. in Room 137A

This study examined the effects of lying on the liar’s memory for the truth. Participants filled out a Life Events Inventory that asked them to rate the likelihood that various events had happened to them before they were ten years old. Participants were interviewed by the experimenter and prompted to either lie or tell the truth about several positive and negative valence events. Participants were told to claim an event was true when prompted with the question “Tell me about the time you...” and to deny an event when prompted with the question “How do you know you never...?”. Participants lied by claiming non-experienced events had happened to them. During the interview, participants created narratives about the events and attempted to convince the experimenter that their stories were true. Half of the participants were asked follow-up questions asking for additional details of the event. Participants later filled out a second Life Events Inventory online and the change score between the pre- and post-lie manipulation was calculated. The results showed that participants inflated their belief in the lied about events as compared to controls. Overall, there was no effect of valence; however, there was a significant interaction between valence and level of detail elicited, in that positive detailed lies and negative lies without details were more likely to be believed. These results demonstrate that lying can influence memory for the truth and that providing details differentially affects participants’ memories for positive and negative lies. The potential application of these results will be discussed.

Keywords: Lying, False Memory, Valence

Methods of Assessing Streamflow and Shallow Groundwater Interactions
Presher, Jacob; Morton, Cristopher
Mentor(s): Lisa Ely, Geological Sciences; Carey Gazis, Geological Sciences

Poster Presentation Session #1, Poster #12
8:30-11:00 a.m. in Ballroom B/C/D

In recent years, the importance of groundwater-surface water interactions to stream ecology has been increasingly recognized. Interactions between stream flow and hyporheic flow, which is shallow groundwater connected to stream water, are important to stream ecology by moderating surface-water temperatures, slowing stream velocity, increasing nutrient residence times, and providing water to the ecosystem beyond the immediate area of the stream channel. The purpose of our research was to determine if and how stream restoration efforts impact interactions between stream flow and hyporheic flow. We collected stream stage and hyporheic potentiometric elevation data from sites in the Reecer Creek Floodplain Restoration project and an unrestored section of Reecer Creek. We installed a piezometer, a perforated hollow steel pipe, to a depth of one to two feet in the stream substrate, and inserted a water pressure sensor within the piezometer. Comparing piezometer water depth to stream depth allowed us to determine the extent of the interaction between the stream and the groundwater within the hyporheic zone. Discharge of hyporheic flow to stream flow (i.e., upwelling) is indicated by a higher water level within the piezometer, while stream flow discharge to hyporheic flow (i.e., downwelling) is indicated by lower water levels in the piezometer. We predict more interaction between stream and hyporheic flow in restored reaches due to higher permeability of the stream bed, resulting from less silt and more gravel in the substrate. Ultimately, we hope to determine if restoration efforts measurably improved stream flow interactions with the hyporheic zone, which directly affects stream ecology.

Keywords: Stream Restoration, Hyporheic Flow, Stream Ecology
Bellingham Coal Trains
Prpich, Matthew
Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #2, Poster #66
11:30-2:00 p.m. in Ballroom B/C/D

This is a policy analysis of the proposed Gateway Pacific Terminal and its potential environmental and economic impacts on Bellingham, Washington and the greater Puget Sound region. SSA Marine, a major shipping company, proposed the construction of a shipping terminal off the coast of Bellingham, Washington, to greatly reduce the time it would take to transport coal from the central United States to Asia. As a consequence, the amount of rail line traffic would increase. An additional eighteen trains a day, up from the usual seven, would pass through the city that would cut off businesses major intersections. Some roads accessing the waterfront would be closed for up to two hours. This has raised concerns over the potential negative economic impacts of trains blocking businesses multiple times a day, and access to the waterfront in the event of an emergency. There is also the environmental impacts of having thousands of open air coal train cars passing through the coastal city every day. This policy analysis covers all the effects of the proposal using similar examples of other coal rail lines and how they affect the surrounding communities and environment.

Keywords: Bellingham, Coal, Train

Political Science Nobel Laureates
Prpich, Matthew; Hodgins, Jeremiah; McCullough, Tommy; Galvan, Eric
Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #2, Poster #65
11:30-2:00 p.m. in Ballroom B/C/D

Four political scientists and one fellow traveler have won Nobel Prizes since the founding of the discipline in 1880. This study examines their personal achievements and works, as well as the Nobel Laureates collective contributions influencing the field of political science, the United States, and the world. The poster uses a timeline to highlight their achievements and show how they are still relevant in the field today.

Keywords: Political, Science, Nobel

Governmental Responsibility for Public Health: The Road Traveled and What Lies Ahead in Public Health System in China
Pu, Zhenghao
Mentor(s): Rex Wirth, Political Science

Oral Presentation, Session #9
10:20-10:40 a.m. in Room 201

In 2008, the Chinese government launched reforms that would consolidate public health responsibilities in a single decentralized multifunctional department. At the same time, the mission of public health was broadened. This new understanding is very similar to the definition used by Institute of Medicine (IOM): “fulfilling society’s interest in assuring conditions in which people can be healthy” and as “organized community efforts aimed at the prevention of disease and the promotion of health.” Since these broad definitions encompass the interventions of a wide variety of public and private-sector entities in the United States, an understanding of these complex yet integrated arrangements can inform China’s reform efforts. This project is an initial mapping of arrangements in the United States that pays special attention to the institutional arrangements that effectively deal with current reform problems in China and draws some lessons from the American model.

Keywords: Comparative, Public Health Systems, China, United States
A popular idea in society is that success of a collegiate sport team is based on the recruitment of players that have marginal academic qualifications. I would like to examine this proposition by investigating whether grade point averages of student-athletes are correlated with the team's performance as measured by the team's win-loss records. Collecting data from schools participating in the Pacific 12 (PAC-12) and the Greater Northwest Athletic Conference (GNAC) football programs will also allow for a comparison across types of football programs (Div. I vs. Div. II). Data collected will be in the form of unidentifiable and anonymous grade point averages (GPAs) of the 110-man rosters of the twelve teams in the PAC-12 and the seven teams in the GNAC. Once collected, the data will be analyzed to determine if those teams with higher average GPAs are more likely to have higher or lower win percentages as an overall team.

Keywords: Athletics, Academics, Football

The unprecedented increase of technology in the classroom has brought new modes of instruction that are yet to be determined as effective or ineffective. This project tests the effects of hands-on versus computer-simulated learning on content retention and critical thinking. We predicted that students would have higher content retention and critical thinking as a result of the hands-on lessons. We led students through one of two learning segments. In the first segment, half of the class studied circuits through a simulation, and half studied circuits through hands-on interaction. In the second segment, students switched to the opposite lesson style. In between each of these segments, students received an assessment to test their content retention and critical thinking gains. The lesson plan used was a 5E lesson plan model, where students are led through an inquiry process to explore concepts. During the first learning segment, students receiving the hands-on mode of instruction received higher scores than the PHET simulation by 15 percent. During the second learning segment, students receiving the hands-on mode of instruction saw a three percent increase compared to the PHET simulation group. While the results showed increased scores in hands-on instruction, the margins were not large enough to be a significant factor in test scores. Further refining and exploring the effectiveness of online simulations and, in particular, the effectiveness of the teacher delivering the mode of instruction is required to determine the effectiveness of new age technology.

Keywords: Education, Technology, Phet
An Analysis on the Effects of Burn Severity on Organic Matter in the Snag Canyon Fire

Pygott, Hannah; Mueller, Kelsey
Mentor(s): Clay Arango, Environmental Studies

Poster Presentation Session #1, Poster #25
8:30-11:00 a.m. in Ballroom B/C/D

Depending on severity, wildfires can slow forest regrowth, the more intense fires removing soil organic matter and, in turn, leaving the soil less fertile. We analyzed the effect of fire severity on soil organic matter and texture within the Snag Canyon Fire which was caused by lightning in extremely dry conditions in the summer of 2014. We hypothesized an inverse relationship between fire severity and soil organic matter in burned areas and a change in soil properties. We first analyzed satellite imagery to identify low, intermediate, and high intensity burned areas within the overall fire boundary. Next, we collected 30 soil samples from each burn severity to measure organic matter via mass lost on ignition. In addition, we conducted a soil texture test in the field to infer soil type. We found significantly less organic matter within the high burn severity zone compared to the low and intermediate burn severity zones, ANOVA p<0.005. We also found that soil texture was coarser in the high burn severity area due to the lack of finer organic content compared to the area’s normal soil type. Our findings support the idea that fire severity can have significant effects on soil characteristics and organic content. This information is important for land managers focused on post-fire landscape rehabilitation and erosion control. Lastly, the satellite data did not accurately represent what we found in the field, which emphasizes that field work is required to ensure accuracy of burn severity analysis when using remotely sensed data.

Keywords: Fire, Soil, Organics

The Effects of Marijuana Decriminalization on Youth

Ramírez Hernandez, Nancy
Mentor(s): Nelson Pichardo, Sociology

Poster Presentation Session #3, Poster #55
2:30-5:00 p.m. in Ballroom B/C/D

Research suggests that physical and psychological health problems, as well as the inability to perform well academically and professionally, can be attributed to marijuana use, especially when individuals start smoking or consuming at an early age. Cannabis is not a federally legal substance, thus no regulatory agency exists that assures marijuana and marijuana-laced products are efficient and safe for the public. The lack of this substance’s control has lead to the accidental consumption of marijuana edibles by children, which are a population of particular concern along with adolescents due to the drug’s greater negative effect on their developing brain. Opponents also fear that use and crime will incremently increase with legalization. Statistics, however, prove that these beliefs are erroneous. On the contrary, supporters agree that the legalization of marijuana will greatly benefit society, for example, by decreasing crime rates and allowing law enforcement officials to focus on protecting citizens from real dangers. This argument might be accurate. Studies show that in states where marijuana has been decriminalized, delinquency has declined. Although adults in four American states can legally use marijuana recreationally, the drug is far from being licit at the federal level.

Keywords: Marijuana, Decriminalization, Youth
It’s easy to overlook the persuasive strategies used in board game instructions. An instruction sheet serves so many practical purposes, after all, that something like clarity might seem a more immediate and sensible metric for assessment. The same is true of assignment sheets in the post-secondary academic setting. Like board game instructions, assignment sheets outline a process for an intended audience to complete. Easy-to-follow instructions are great. Dense instructions are a chore. But the language of board game instructions and assignment sheets can sustain a more critical approach. What are the implicit arguments made by instruction sheets and the processes they describe? Are those arguments rhetorically persuasive? Are the intended audiences addressed as static participants or individuals with agency? Through a rhetorical analysis of Trivial Pursuit board game instructions, this project presents a practical schema for persuasive process design in academic assignment sheets. A key aspect of persuasive process design, particularly in the pedagogical context, is the acknowledgment of student agency. That is, the opportunity for intellectual curiosity and self-directed learning. I argue that the traditional language of assignment sheets often communicates restrictive processes that subordinate participants and, therefore, inhibit student agency. Early Trivial Pursuit instructions exhibit similar shortcomings. However, due to its reliance on pop culture, Trivial Pursuit has had to continuously revise instruction sheets in order to persuade contemporary audiences. I explore the persuasive strategies used in 30 years’ worth of Trivial Pursuit instructions, and consider how this history might inform the design of academic assignment prompts.

Keywords: Rhetoric, Play, Composition

Therapy

Ranniger, Johnny
Mentor(s): Michael Ogden, Film and Video Studies

Video and Creative Expression Presentation, Session #20 12:00-12:20 p.m. in Theatre

Therapy is a short film that’s been in the works since last July, and I’m planning to present it in its entirety at SOURCE. Jackson Kelso recently lost his wife and son in a highway accident. Overcome with grief, he calls for an in-home therapist. The film will explore how debilitating a critical loss is to his humanity.

Keywords: Short-film, Psych-thriller, Tragedy

Substrate Temperature Preference in Pygmy Short-Horned Lizards (Phrynosoma douglasii)

Rathburn, Elizabeth; Skjerping, Elena; Westervelt, Laura
Mentor(s): Jason Irwin, Biological Sciences; Daniel Beck, Biological Sciences; Steve Wagner, Biological Sciences

Poster Presentation Session #1, Poster #46 8:30-11:00 a.m. in Ballroom B/C/D

Lizards, as ectotherms, rely on external heat sources such as solar radiation, substrate temperature, and air temperature to regulate body temperature using common behaviors such as shuttling, baskning, and burrowing into the substrate. Few studies have been done to observe thermoregulation in the pygmy short-horned lizard (Phrynosoma douglasii), which inhabits eastern Washington State. During this study, lizards were captured from the Quilomene Recreation Area near Vantage, Washington. To observe thermoregulatory responses we placed the lizards in an artificial enclosure (i.e., the ectothermatron), which contains a sandy substrate, wooden shelters, and food and water. The ectothermatron contains heating elements and cooling coils to create a thermal gradient from approximately ~11 to 50°C and timed...
lighting to simulate a natural photoperiod. We measured body-surface and substrate temperatures with an infrared thermometer every hour between 0900 h and 1300 h from mid-April to mid-May, 2014. We hypothesized that \textit{P. douglasii} would: (1) select relatively high temperatures; (2) prefer lower temperatures at night; and (3) show more burrowing behavior into substrate than use of shelters. \textit{Phrynosoma douglasii} actively thermoregulated, maintaining, for example, an average body temperature of 35.8 ± 0.8°C at 1400 h but only 22.5 ± 1.4°C at 2100 h. Substrate usage also differed throughout the 24-hour period with lizards on the surface for 83 percent at 1400 h but only 6.3 percent at 2100 h. We conclude that \textit{P. douglasii} actively thermoregulates, preferring higher substrate temperatures during the day than at night, and frequently burrows at night. Future studies could investigate whether photoperiod or temperature factors influence burrowing behavior in \textit{P. douglasii}.

\textit{Keywords: Lizards, Thermoregulation, Temperature Preference}

\textbf{Production, Taxation and Sale of Legalized Marijuana}

\textit{Reid, Curtis}

\textit{Mentor(s): Rex Wirth, Political Science}

Poster Presentation Session #2, Poster #67  11:30-2:00 p.m. in Ballroom B/C/D

In this modern era, we are faced with a dilemma. Due to outdated and archaic legislation and policy, money that is being generated by legal marijuana producers in Oregon, Colorado, and Washington cannot legally enter the fiscal stream. This is due to states legalizing the production and sale of marijuana, but federal legislation prohibits banking institutions from accepting this legalized cash flow. In addition to this, the criminal status of marijuana and the ensuing tax code law creates several massive negative externalities at the local, state, and federal level. There is a massive disconnect between what the federal government is saying, what the state governments are doing, and a power struggle happening between the federal and state government agencies. This needs to be resolved in a timely and efficient manner to resolve the externalities and begin proper taxation and efficient revenue collection at all levels.

\textit{Keywords: Marijuana, Economics, Tax}

\textbf{The Effects of a Vegetarian Diet on Dietary Iron Intake in Adolescent Female Endurance Athletes}

\textit{Reiley, Tucker; Gerrish, Heather; Varner, Meghan}

\textit{Mentor(s): Ethan Bergman, Nutrition, Exercise & Health Science; Tim Englund, Mathematics}

Poster Presentation Session #2, Poster #32  11:30-2:00 p.m. in Ballroom B/C/D

A chief concern for female endurance athletes is adequate iron status which is partially determined by iron and vitamin C intake. This study examines the impact of diet on iron intake in adolescent female cross country runners. Animal-based iron sources are recognized as being better absorbed and more bioavailable than non-animal-based sources. Additionally, vitamin C promotes iron absorption. In this study, the independent variable was defined as a vegetarian diet (one excluding meat, fish, and poultry), with the control being a non-vegetarian diet. The hypothesis was that vegetarian cross country runners would have lower mean iron intakes than non-vegetarians. Data were collected via a Food Frequency Questionnaire (FFQ) and a 3-Day Diet Log (3DL) provided to the subjects. Scores based on servings per week were assigned to the FFQ to create an estimate of each subject’s daily iron and vitamin C intake. 3DLs were analyzed using ESHA Research Solutions Food Processor Diet Analysis software to form a representative picture of various nutrients over time, with the primary focus on iron and vitamin C. Permutation tests were used to analyze the dietary data. No significant differences in average iron intake or other key nutrients were found to exist between groups for 3DL data. A commonly attended running camp during the administration of this study may have been a factor. Analysis of the FFQ dietary data, indicating longer term intakes, revealed vegetarians had statistically significant higher intakes of vitamin C, \(p=0.0389\), and iron, \(p=0.0135\), than did non-vegetarians.

\textit{Keywords: Iron Status, Endurance Athletes, Dietary Intake}
Downtown Ellensburg and Surrounding Residential Areas

Richards, Anita; Kempf, Daniel; Ellingsen, Keanna; Mayfield, Daija; Wolitarsky, Myrinda
Mentor(s): Tim Melbourne, Geological Sciences; Anne Egger, Geological Sciences; Pamela McMullin-Messier, Sociology

Poster Presentation Session #1, Poster #5
8:30-11:00 a.m. in Ballroom B/C/D

The purpose of our project was to add recommendations to the existing Federal Emergency Management Agency approved Kittitas County Hazard Mitigation Plan. This included hosting a survey for community members to participate in, as well as performing rapid visual screening around the city of Ellensburg, which involved viewing the structural stability of all homes and businesses from the street. Our group was assigned the greater downtown area of Ellensburg. After screening our area, we found that light-wood-frame residences would fare better than the unreinforced masonry buildings found in the commercial industry. In addition, we took into account the liquefaction zone in our area and how it places certain structures in potentially dangerous situations if a major seismic hazard were to occur. Most of our area was unaffected by the liquefaction zone, but we felt that it was important to educate Ellensburg residents about how to prepare for an earthquake on an individual level. Through our survey results, we found that the majority of people are not very concerned about earthquakes in Ellensburg. Taking this into account, we developed our poster to educate the public about potential hazards of living in houses with unreinforced chimneys, or the dangers posed by operating businesses in unreinforced masonry buildings. We recommended that people prepare emergency kits, develop a personal mitigation plan, and seismically retrofit their homes.

Keywords: Earthquake, Hazard-Mitigation, Rapid-Visual-Screening

Auditory Reaction Time and Behavioral Working Memory Differences Between Musicians and Non-Musicians

Richardson, Benjamin; Felke, Zach; Medrano, Marisha; Whorley, Grace; Williams, Hannah
Mentor(s): Ralf Greenwald, Psychology

Poster Presentation Session #3, Poster #51
2:30-5:00 p.m. in Ballroom B/C/D

Previous research investigating working memory functioning between musicians and non-musicians has demonstrated differences related to music experience in auditory reaction tasks. This body of research suggests music experience may be related to faster reaction times to auditory stimuli. In addition to reaction times recorded by clicking a mouse while listening to a tonal oddball, participants in the current study performed six subtests of the TOMAL-2, a standardized measure of working memory ability, documenting participants visual, auditory, and executive functioning modules of working memory. Our hypotheses are that means of performance on all three subtests of the TOMAL-2 will be higher in the musician group compared to non-musicians, and that musicians will, on average, record faster reaction times to various tonal difference conditions. Results of the current study will contribute to the understanding of differences in cognitive processing related to long-term music experience.

Keywords: Music, Cognition, Reaction Times
Electrophysiological and Behavioral Working Memory Differences Between Musicians and Non-Musicians
Richardson, Benjamin; Felke, Zach; Whorley, Grace; Medrano, Marisha; Williams, Hannah
Mentor(s): Ralf Greenwald, Psychology

Poster Presentation Session #3, Poster #50
2:30-5:00 p.m. in Ballroom B/C/D

The current study is an examination of P300 differences between musicians and non-musician groups during a visual oddball task, in addition to behavioral subtests of the TOMAL-2 measuring visual and auditory working memory. Previous research has demonstrated higher amplitude P300 waveforms with shorter latencies of P300 onset in musician groups, indicating a more sensitive and accurate stimulus detection system. Fluctuations of P300 amplitude and latency activity near parietal areas have been used to quantify differences in updating processes of working memory possibly associated with differences in amounts of music experience. The current study is designed to partially replicate a method previously implemented by George and Coch (2011) in order to contribute to the body of research describing how music experience may be associated with differences in visual processing as well as auditory working memory. Behavioral data will be collected using six standardized subtest measures of the TOMAL-2, followed by event-related potential (ERP) recordings during a large and small circle visual oddball task. The current study hypothesizes musicians will score significantly higher on the TOMAL-2 and record shorter latency with higher P300 amplitudes associated with greater amounts of music experience in areas previously associated with working memory processing.

Keywords: Working Memory, Cognitive Psychology, Oddball

Veterans Homelessness and the Housing Environment
Rivera-Diaz, Teodoro
Mentor(s): Michael Mulcahy, Sociology

Des Moines Center - Poster Presentation, Poster #2
Tuesday, May 19; 2:00-5:30 p.m. in Higher Education Center Bldg 29 - Des Moines Center

Does the housing environment effect homelessness among veterans? The purpose of this paper is to investigate the possible correlation between housing environment and homelessness among veterans. In 2014, veterans account for nine percent of the total adult population, but veterans account for 11.3 percent of the adult homeless population in the United States. Nationally the percentage of veteran homelessness has been decreasing; however, in Washington State veteran homelessness has increased by 8.7 percent from 2013 to 2014. We examine the effects of the distribution of veterans and the housing environment on rates of veteran homelessness. It is true that veterans have many impediments that hinder their well-being, hence, most people concentrate their effort to understand this issue. However, the contribution of housing availability and quality to veteran’s homelessness has been neglected. We fill this gap in the research with tract and county level analysis of the distribution of the veteran population, and the characteristics of the housing stock. We use data from the American Community Survey (United States Census Bureau), the Department of Veterans Affairs, and the Department of Housing and Development. We show that, above and beyond known predictors of homelessness, such as employment status and disability status, the distribution of the veteran population and the characteristics of the housing stock have independent effects on veteran homelessness.

Keywords: Veterans, Homelessness, Housing
**theatre people: Representing Live Artists and Radical Hope**  
Roberts, Chelsea  
*Mentor(s): Lene Pedersen, Anthropology & Museum Studies*

Panel Presentation, Session #26  
1:30-1:50 p.m. in Room 271

*theatre people* is a visual project which attempts to represent a radical point of view for a non-specialist audience. I explore the changing role of the performing arts as a vehicle for social change by contrasting conversations with Millenial-aged theatre students and interviews with Living Theatre founder, Judith Malina. Now 88 years old, Malina has been jailed under a brutal dictatorship in Brazil; was on the front lines of political theatre in Gaza, Berlin, and Prague; and has contributed invaluably to the culture of American and global performance through anarchist, anti-capitalist performance practices. This short documentary creates a conversation with and between these generations of artists, and it is a project which has generated more hope than I expected. I have not employed the traditional expository style. Due to the subject matter, an authorial voice seemed out of the question. The film, thus, utilizes collage aesthetics as a way to represent the collective style of the Living Theatre, and the collaborative nature of theatre-making.

*Keywords: Theatre, Experimental, Documentary*

**An Argument Against Descartes’s Vivid and Clear Ideas**  
Rogers, Alysia  
*Mentor(s): Gary Bartlett, Philosophy & Religious Studies*

Oral Presentation, Session #3  
8:30-8:50 a.m. in Room 271

In his *Third Meditation*, René Descartes claims that he can know that God exists because he has a vivid and clear idea of God’s existence, and that that idea is truer than any other idea he has in his mind. I will argue three different points that show that Descartes has not established a firm basis by which he can claim proof of God’s existence. First, I will show how uncertain the reliability of Descartes’s understanding is in general, and also in comparison to the understanding of other competent philosophers. Second, I will argue that dreams and hallucinations could serve to bring doubt to Descartes’s vivid and clear ideas, but that preconceived notions are far more likely to have occurred with Descartes, leaving him unable to fully relinquish the beliefs of his upbringing and culture. Lastly, I will argue that Descartes seems to be operating on a scale of degrees of certainty, that this is problematic, and that it actually only makes his argument about clear and vivid ideas uncertain. Based on these three main arguments, I will show that since his beliefs about vivid and clear ideas are unreliable, doubtful, and uncertain, then these beliefs are not a solid base on which to prove any other beliefs, such as the existence of God.

*Keywords: Descartes, God, Vivid*
Technology Usage and Relationship Satisfaction
Rogers, Michaela; Jaenicke, Kirsten
Mentor(s): Amy Claridge, Family and Consumer Sciences

Poster Presentation Session #3, Poster #40
2:30-5:00 p.m. in Ballroom B/C/D

Technology has increasingly become a part of daily life, so it is important to identify how its use impacts relationships. Previous studies have found correlations between various types of technology use and relationship satisfaction. For instance, frequent cell phone use is associated with low relationship satisfaction (Coyne et al., 2011). Another study found that making the relationship official on a Facebook profile is associated with high relationship satisfaction whereas talking about relationship disagreements on Facebook is associated with low relationship satisfaction (Papp et al., 2012). The current study adds to the existing literature by further examining the association between technology and relationship satisfaction, but by specifically examining technology use while with one’s romantic partner and perceptions of partners’ technology use. The study involved collection of anonymous surveys from 124 participants between the ages of 18 and 45. Survey links were posted on social media sites. All participants were in romantic relationships during the study and responded to 21 questions about technology usage and relationship satisfaction. Results indicated no association between personal technology use and relationship satisfaction; however, there was a negative association between perceived partner technology use and relationship satisfaction, and between technology satisfaction and relationship satisfaction. Specifically, when participants perceived that their partner used technology often, they reported lower relationship satisfaction. Participants who reported satisfaction with their technology use tended to report high relationship satisfaction. The results suggest that perceptions and evaluations of technology use may be more important than actual use in predicting relationship satisfaction.

Keywords: Relationships, Satisfaction, Technology

Dowry Death and the Caste System in India
Rombough, Sonya
Mentor(s): Anne Cubilié, Douglas Honors College

Oral Presentation, Session #36
3:20-3:40 p.m. in Room 301

Social and religious cultural norms and practices have a heavy impact on the experience of people existing within their boundaries. In a culture that still widely practices arranged marriages and dowries, despite them being outlawed over fifty years ago, the effects of these cultures may have a stronger impact on the experiences of victims of domestic abuse. In India, domestic abuse and violence against women has taken a turn toward the extreme in the form of dowry death, which is defined as the murder of a bride within her first seven years of marriage, usually as the end result of unmet demands for monetary or material gains. This paper offers an in-depth analysis of the direct relationship between the caste system and the proliferation of dowry death in India. Some studies have gone so far as to indicate that one’s place within the caste system effects the ease of access to justice resources such as police and courts. This paper also seeks to draw connections between such studies and the overarching social norms that allow such imbalances to continue.

Keywords: Dowry Death, Caste System, India
Electric Vehicle Front Suspension

Romine, Adam
Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #18
2:30-5:00 p.m. in Ballroom B/C/D

Each year, electric vehicles become more and more popular. The electric vehicle that the Central Washington University Electric Vehicle Club is building needs a front suspension. The vehicle is being built to compete in the Electrathon America Race in May, 2015. The suspension attaches to the wheels and attaches to the frame of the vehicle and provides bump dampening. The suspension was built using a single swing arm type design. This design consists of six parts that are welded and bolted together to connect the wheel to the frame. The shock absorber that is attached to the single swing arm absorbs the shock of the vehicle’s weight as it goes over irregularities in the road. The design of the suspension had to fit within the constraints of the preexisting frame. The suspension was manufactured using the tools in the Central Washington University Machine Shop and Power Lab for under $140. The suspension weighs 9.6 lbs per side and is made of steel. Initial tests so far have shown that it is strong enough to hold the static load of the vehicle plus the driver. The suspension provides the wheels with the 50 ft turning diameter requirements. The shock travel requirement will need some modifications before it meets the desired specification. The suspension is operational and is ready to undergo testing, and eventually be ready to compete in the Electrathon America Race.

Keywords: Electric Vehicle, Suspension, Engineering


Rushton, Zoe; Walsh, Megan
Mentor(s): Megan Walsh, Resource Management

Poster Presentation Session #2, Poster #36
11:30-2:00 p.m. in Ballroom B/C/D

Many of the forests in the Long Lake watershed (LLW) have been subjected to twentieth century fire suppression and various other timber practices that have resulted in dense forest stands, leading to disease and pest outbreaks, and are at risk of large fire events. A more thorough understanding of past fire frequency in the LLW will aid land owners and forest managers in planning for future fire events. In the summer of 2014, a nine meter long sediment core was extracted from Long Lake, which is located approximately 5 km southeast of Rimrock Reservoir and 45 km west of Yakima. Fire event frequency was determined using macroscopic charcoal analysis, which quantifies the changing abundance of charcoal particles >125 μm taken at contiguous 1 cm intervals throughout the core. Past fire severity is indicated by the ratio of woody to herbaceous charcoal, which was visually determined for each charcoal particle. Preliminary charcoal results show frequent fire episodes for approximately the last 9,000 years, with a noticeable decrease in fire occurrence in recent centuries.

Keywords: Holocene, Paleoecology, Fire History
Geographic Information System (GIS) Cost Surface Analysis for Forager Travel: Archaeological Settlement Models, Frank Church River of No Return Wilderness, Idaho
Saunders, Anthony
Mentor(s): Steven Hackenberger, Resource Management

This analysis predicts the caloric cost to travel across the Frank Church River of No Return Wilderness. A cost surface analysis will be conducted using ARCmap geographic information system (GIS) software to determine how many calories prehistoric hunter-gatherers expended traveling across the terrain over a given route. The data derived from this study will be incorporated into an archaeological predictive model that predicts archaeological site locations based on the caloric costs of accessing an area and the caloric benefits of utilizing that area. Since the model predicts the patterns of Native Americans, it will assume that travel is conducted on foot.

Keywords: Archaeology, GIS, caloric expenditure

Creating Entangled Photons by Spontaneous Parametric Down Conversion
Savisky, Blake
Mentor(s): Michael Braunstein, Physics

The purpose of this project is to set up a system for creating entangled photon pairs for use in various quantum mechanical experiments, including the testing of Bell's inequalities which demonstrates the fundamentally indeterministic nature of quantum mechanics. The photons are created by pumping a beta barium borate crystal with 405 nm laser light then, due to a process called type 1 spontaneous parametric down conversion, a single pump photon can be converted into two 810 nm photons in an entangled state. In the same lab, a similar set up has already been achieved using a 474 nm pump laser, but by using a shorter wave length, a higher detection rate can be achieved. Two collimators are set up to collect the down converted photons and send them to two photon counting modules. The collimators need to be positioned precisely to detect any down converted photons because they emerge from the crystal in a narrow beam that is at an angle with respect to the pump beam and only a miniscule fraction of pump photons are down converted. The angle at which the down converted photons emerge is a function of how the crystal is prepared and the polarization orientation of the pump beam. It was calculated using a program by National Institute of Standards and Technology.

Keywords: Quantum Mechanics, Entanglement, Lasers

Examining the Intersection of Sexual Orientation and the Right to Marry: Obergefell v. Hodge and Equal Protection
Sayre, Elizabeth
Mentor(s): Cody Stoddard, Law & Justice

The legal and political climate surrounding sexual orientation and the right to marry is riddled with conflict and questions. Various states currently do not allow nor recognize marriage between same-sex couples. Hence, these couples are denied the legal privileges under the law that are guaranteed to married couples of the opposite sex. In order to address this legal conflict, the United States Supreme Court has agreed to hear arguments on two separate questions regarding equal protection and the right of marriage: 1) are
states that have same-sex marriage bans required to recognize legal marriage licenses from other states; and 2) is marriage a fundamental right that should be extended to same-sex couples? This presentation will discuss the previous case law surrounding same-sex marriage, explain the legal issues at hand, discuss the implications of the courts decisions, and make a prediction of how the court will rule.

**Keywords:** Marriage, Equal Protection, Sexual Orientation

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**A Night of Cabaret: Be The Change**  
**Schaffroth, Kayla**  
*Mentor(s):* Terri Brown, Theatre

Creative Expression Presentation, Session #37  
2:40-3:00 p.m. in Ballroom A

The goal of this project is to produce a show that encourages young adults to attend live theater more frequently. The show will consist of musical numbers that this age group will be able to understand and relate to. The older musical numbers will have a modern twist to them to keep their appeal fresh and invigorating. Some of the topics we will be covering in the show are the following: transgender and gay awareness, bullying, suicide, dating, sex, relationships, college financial struggles, porn and much more. In order to ensure that all college-age adults will be able to attend, tickets will be free. This project is designed to demonstrate to younger audiences the magic and power of theater and to cement their continued support of the arts.

**Keywords:** Cabaret, Musical Theatre, Dance

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**An Overreaching State: How Capital Punishment Goes Beyond the Role of Government**  
**Schmit, Riley**  
*Mentor(s):* Matthew Altman, Philosophy & Religious Studies

Oral Presentation, Session #3  
9:10-9:30 a.m. in Room 271

This will be a presentation of my senior thesis in philosophy. It is a moral argument against retributivist justifications for capital punishment, which focus solely on desert (i.e., what the criminal offender deserves). I argue that although retributivism is not necessarily wrong, it cannot justify the government sentencing criminal offenders to death. It may be that certain individuals deserve to die, but this in itself is not a justification for capital punishment. I show this by first discussing the history, implications, and applications of retributivism so that the position itself is well understood before continuing. I then argue that the role of the state, regarding criminal justice, is to protect its citizens from harm and reasonable threats of harm, which can be achieved by sentencing an offender to life in prison. I show how prison is punishment in itself, and why it is the case that life in prison is sufficient punishment in lieu of the death penalty. Thus, I conclude that the death penalty cannot be justified with retributivist principles because it is beyond any obligation of the government.

**Keywords:** Death Penalty, Retributivism, Justifications
Sale Seekers
Schuster, Galya
Mentor(s): David Douglas, ITAM; Dwayne Douglas, ITAM

Business Plan Competition, Oral Presentations, Session #4
9:00-9:30 a.m. in Room 301

Sale Seekers will offer customers an easy and manageable method to finding the best “bang for their buck” by giving customers the choice to be notified of only the most cost-effective sales available in their area on the products they desire. While similar service providers offer notifications on all of the top deals available, they do not cater their reports to each and every customer’s specific needs. By offering customers a series of surveys and analysis questions upon registration, these records will allow voluntary customer-specific data on the time-frame, price-limits, quantities, types of products or services customers are in search of, and the total value of these items, including the frequency in which customers want to be notified.

Keywords: Business Plan Competition, Shopping, Customer Relations

Satire of Religious Education in Lewis Carroll’s Wonderland Texts
Sedlacek, Cameron
Mentor(s): Lila Harper, English

Oral Presentation, Session #21
1:50-2:10 p.m. in Room 135

In Alice’s Adventures in Wonderland and Through the Looking-Glass, Lewis Carroll both parodies and satirizes various forms of Victorian religious education. As the son of an Archdeacon of the Church of England and a Fellow at Christ Church College, Oxford, Carroll was very familiar with both religion and education. By parodying various popular religious forms, figures, and texts and associating these with the nonsense of Wonderland, he effectively offers an alternative to the standard, rote forms that dominated nearly all aspects of Victorian education.

Keywords: British Literature, Children’s Literature, Victorian Culture

The New Radicals: Education and Literature for the Emancipation of Russian Women
Seelye, Elizabeth
Mentor(s): Roxanne Easley, History

Oral Presentation, Session #10
10:00-10:20 a.m. in Room 271

Russian literature of the 1860s served as a catalyst for upper-class Russian women to question the trajectory of Russian society and their place in it. Literature became one of the few outlets for young women to identify and articulate dissatisfaction with the inequality of educational options offered to them. Empowered by the literature of the 1860s that inspired women to step outside the sphere of domesticity, they became active members in the Russian revolutionary currents that were sweeping through the empire. They demanded equal educational rights, and when that was denied, they found ways to work around the oppressive bureaucratic system that was the Russian autocracy. Literature taught women that they should no longer view themselves as lesser members of society, but as individuals who were just as capable as their male counterparts. By demanding equal access to education along with literature that was inspiring women to become active in politics, women were becoming part of the radicalism that was sweeping through the empire.

Keywords: Russian Women, Radicalism, Literature, Education
Invasive plants decrease native plant diversity and alter ecosystem structure and function, and controlling their spread represents a significant cost to taxpayers. Most exotic species are not invasive in their native range, so successful invasive management requires understanding the biological mechanisms that allow exotic plants to gain advantage over native plants and become invasive. The Novel Weapons Hypothesis postulates that exotic plant exudates, compounds released from plant roots, have an allelopathic effect on native plants that reduces their fitness and decreases their ecological success. The allelopathic compounds could thus allow an exotic plant to become a superior competitor over native species and reach invasive status. Spotted knapweed (Centaurea stoebe), an introduced European annual, produces the racemic chemical (±)-catechin, which has allelopathic qualities on the native grass Idaho fescue (Festuca idahoensis), although the severity of the allelopathy is contentious and uncertain. Much research has focused on extreme (±)-catechin concentrations unlikely to be found in nature, but instead, we tested the dose-dependent effects of environmentally relevant (±)-catechin concentrations on root growth of Idaho fescue. Using germination paper, three replicates of 120 Idaho fescue seeds were placed into rows and grown in (±)-catechin solution concentrations of 20 ppm and 80 ppm. Catechin was found to significantly inhibit root growth in both concentrations compared to control solutions of water, t test, $p<0.05$. This finding supports the Novel Weapons Hypothesis by offering evidence of spotted knapweed’s allelopathic nature at environmentally relevant (±)-catechin concentrations, and it offers insight into proactive invasive plant management.

**Keywords:** Invasive Plants, Allelopathy, Knapweed

The Effects of Acoustics on Music Performances and Recordings

**Shelton, Katie**

*Mentor(s): Hal Ott, Music*

Poster Presentation Session #2, Creative Works, Poster #2

11:30-2:00 p.m. in Ballroom B/C/D

As a musician and flutist, I have had many opportunities to perform, attend live performances, and listen to recordings of performances. I have found that I have been both pleased and displeased with both live and recorded performances in terms of overall sound quality of the music and how clearly musical details including articulations, dynamics, and clarity are perceived. Architectural acoustic studies date back to ancient Greece when the philosopher Vitruvius designed the outdoor amphitheater that would send sound upward to the audience members. Some of the first music written for organ sounds best when performed in cathedrals with reverberant stone walls and high ceilings. Today, concert halls built for orchestras are designed to have wet acoustics, meaning that the building allows for sound to reverberate. Desirable venues for jazz bands have dry acoustics, with little to no sound reverberation, allowing for amplification and electronic enhancement of the sound. Ultimately, one of the most important skills for a musician to develop is the ability to effectively communicate with their audiences. I would like to discover the ideal venues for me as a classical performer as I play and record my flute. I will learn a piece for unaccompanied flute that I can play and record in a variety of venues. This will allow me to evaluate how different musical characteristics sound during performance and on a recording in each of the venues. I will choose venues with a wide variety of sizes, shapes, and materials. I will document the presence and absence of people, objects, and extraneous noise in the room, and will document my evaluations on the clarity of my live performances and recordings of the piece.

**Keywords:** Music, Flute, Performance
Studies on the Mechanisms of Forced Transport of Dye through Solution Modifications to a Polymerized Surface
Siegenthaler, James
Mentor(s): Dion Rivera, Chemistry

Oral Presentation, Session #24
1:30-1:50 p.m. in Room 140

The design and implementation of a controlled macromolecular chemical transport system could greatly advance switchable chemical reactions. To better understand the mechanisms for a switchable macromolecular transport system, preliminary work has been completed that studies the transport of bromothymol blue (BB) facilitated by cetylpyridinium bromide hydrate (CPBM) to a silica surface that has been modified with Poly(styrene-co-maleic anhydride), a pH switchable polymer. Ultraviolet spectroscopic trials were conducted measuring the absorbance of BB and CPBM at two pH levels, while holding BB at a constant $1 \times 10^{-5}$ M, varying CPBM between $1$ and $10 \times 10^{-5}$ M. Under acidic conditions at pH 3.5, BB and CPBM were attracted to the silica surface, however CPBM had a lower surface concentration, varying from 0.7 to 1.7 times lower. Additionally as the concentration of CPBM was increased, the time to surface of the BB and CPBM also increased by doubling in time at an eight-fold concentration increase. Under basic conditions at pH 9.5, initial attraction of the BB was observed to the silica surface above a concentration of $3 \times 10^{-5}$ M; however, as CPBM concentration increased at the surface, the BB concentration decreased. A concentration of $4.5 \times 10^{-5}$ M of CPBM was needed before a low concentration of BB would remain on the silica surface. Further work is to be completed by investigating the reversibility of BBs attraction/repulsion to the silica surface using polyelectrolytes as vehicles of removal as well as further to be work done on the effect of surface coverage of the bound polymer on the silica surface.

Keywords: Transport, Surfactant, Macromolecular

Eating Behaviors Associated with Higher Risk of Chronic Disease in Youth at Guam Summer Activity Camps
Siler, Johanna
Mentor(s): Nicole Stendel-Hollis, Nutrition, Exercise & Health Science; Stefan Ward, Physical Education
School and Public Health

Poster Presentation Session #2, Poster #33
11:30-2:00 p.m. in Ballroom B/C/D

This research assessed the eating behavior of sixth-to-twelfth grade participants in summer activity camps in Guam and aimed to correlate dietary patterns with chronic disease risk. Diets high in fat or sugar, and/or low in fruits and vegetables, are considered to be at a higher risk for obesity-related chronic diseases, such as Type 2 diabetes. Diabetes is the third leading cause of death in Guam compared to seventh for the United States, overall. Additionally, the majority of youth in Guam report inadequate fruit and vegetable consumption. Due to the increased risk in this population, it is critical for research to identify behavioral strategies that may effectively reduce risk through low-risk dietary interventions. Participants included eight females and seven males, aged 9 to 13 years, and were recruited from Guam Youth Summer camps. The sample represented mainly Asian/Pacific Islander, Native Hawaiian, and White/Caucasian populations. Anthropometric and descriptive dietary data were obtained through food frequency questionnaires. Average body mass index (BMI) was 24.62 (weight ranged from 56 to 162 pounds). Data analysis revealed fruits and vegetables were consumed on average about one to three times a month. Reported fiber intake indicates low whole grain consumption. Additionally, fat consumption was 28 percent of total energy intake. Due to sample size, a correlation between chronic disease risk and dietary patterns was not identified. Additional research, including a larger sample size, to examine the associations and effects of specific dietary patterns of children living in Guam needs to be conducted.

Keywords: Guam, Diet, Youth
The Effect of Testosterone on Gene Expression in White and Brown Adipose Tissue  

Simianer, Courtney  
Mentor(s): April Binder, Biological Sciences  

Poster Presentation Session #1, Poster #43  
8:30-11:00 a.m. in Ballroom B/C/D  

Polycystic ovarian syndrome (PCOS) is a disease characterized by high levels of testosterone; it affects one in three women in their reproductive age. Non-obese diabetic mice were treated with dihydrotestosterone (DHT) to induce PCOS-like symptoms. Symptoms of PCOS include excess testosterone, polycystic ovaries, and/or increased weight gain. There was an increase in the body weight among the DHT treated mice over the course of the study. Hematoxylin and eosin staining of the four different types of adipose tissues demonstrated an increase in adipocyte cell size when treated with DHT. Additionally, there was a morphological change in the brown adipose tissue observed after DHT treatment. The brown adipose tissue in DHT treated mice resembled white adipose tissue, suggesting the cells may have differentiated.  

The purpose of this current study is to determine whether the DHT treatment causes alteration of gene expression in the brown adipose tissue, so that it expresses genes typically expressed in white adipose tissue. Research is currently underway to determine the differences in gene expression, using RNA isolated from the four different types of adipose tissues collected. The RNA is then converted to cDNA in order to quantitate the level of gene expression using real-time PCR. The expression of several genes, including Rbp-4, Fabp-4, Ucp-1, and Glut-1, was examined. This project may provide insight as to why women with PCOS have a higher chance of developing metabolic dysfunction.  

Keywords: PCOS, Testosterone, Gene Expression

Konjac Glucomannan as an Effective Fiber Additive in Gluten-Free Scones  

Skala, Philip; Allen, Ian; Sykes, Elijah  
Mentor(s): David Gee, Nutrition, Exercise & Health Science  

Poster Presentation Session #2, Poster #27  
11:30-2:00 p.m. in Ballroom B/C/D  

It is a common theme in today’s market that many gluten-free baked products traditionally contain less fiber. To address this problem, three types of gluten-free scone formulations were baked with varying amounts of konjac glucomannan (control: 0 g konjac; low: 20.0 g konjac; high: 40.0 g konjac), tested with a sensory analysis session (extended triangle difference tests and preference test), and underwent objective testing (percent moisture, compression force, and penetration force). A random sample of 28 Central Washington University students volunteered for the sensory analysis session. The extended triangle difference tests were analyzed using a triangle test, difference analysis chart. And, from this test, the results showed that no significant difference was found between the three types of scones. The results from all objective tests were analyzed using ANOVA. It was also revealed that the control scones had significantly higher percent moisture than the low and high konjac formulations. The average penetration force of the control scone was significantly lower than that of the high konjac formulation. No significant differences were found in compression force among the three formulations. These results suggest that successful dietary fiber fortification with konjac glucomannan in gluten-free baked products can be accomplished.  

Keywords: Celiac, Fiber, Gluten
Water in the Diet of the Great Basin Pocket Mouse

Skewis, Robin

Mentor(s): Kristina Ernest, Biological Sciences

Oral Presentation, Session #32
3:00-3:20 p.m. in Room 137B

The Great Basin pocket mouse (Perognathus parvus) is an inhabitant of arid regions that can obtain all its water needs from food sources (mainly seeds) instead of from drinking water. I tested the hypothesis that the Great Basin pocket mouse prefers seeds with higher water content. I compared preferences of a captive pocket mouse for different seed types with varying water content as well as dried seeds versus pre-moistened seeds. Six different dried seed types were tested in two groups of similar sized seeds: Millet, Milo, Flax (Group 1, small seeds); and Sunflower, Wheat, and Cracked Corn (Group 2, large seeds). Each group was offered to the pocket mouse twice a day for two weeks. Among the smaller dry seeds, the pocket mouse preferred millet over milo, and did not select any flaxseed. Among the larger seeds, the pocket mouse preferred wheat, which was the seed type with the highest water content. In a second experiment, a control (dry) seed mixture (equal parts of all six seed types) and an experimentally moistened group (same seed mixture) were offered to the pocket mouse. The pocket mouse preferred dried seeds over pre-moistened seeds. These results suggest that the pocket mouse prefers dried seeds over rehydrated seeds. The dry seeds preferred by the mouse had 8 to 12 percent water (by weight), and may have provided some water through metabolic breakdown of lipids.

Keywords: Water, Diet, Arid Organisms

Modeling Humor Within Text: Data Mining and Visualization Strategies for Automated Joke Detection

Smigaj, Andrew

Mentor(s): Boris Kovalerchuk, Computer Science

Oral Presentation, Session #7
10:40-11:00 a.m. in Room 137B

The goal of this project was to investigate the use of data mining and visualization as an approach to modeling humor within text. In particular, we developed algorithmic and automated approaches to visualizing and detecting belief shifts as they occur as intelligent agents parse meaning from garden path jokes. Garden path jokes can occur when a reader’s initial interpretation of an ambiguous text turns out to be incorrect, leading them down the wrong path to a semantic dead end. Given new information, semantic incongruities arise that require resolution, often triggering a humorous response. For both humans and computers, parsing of meaning requires an ontology describing what type of things exist in the world and how they are connected, as well as methods for establishing belief given uncertainty and ambiguity. One major aim of this project has been to explore automated methods for identifying what things exist in this world and how they are related, using the world wide web as a massive corpus of natural language data for knowledge discovery. The methodology and tools resulting from this project offer a new approach to testing and generating hypothesis related to theories of humor, as well as many other incongruity-based linguistic phenomena.

Keywords: Computational Humor, Natural Language Processing, Data Visualization
**Far-Infrared Laser Emissions of Optically Pumped Methanol Isotopologues**  
*Smith, Michael; Gerke, Clarissa; Barajas, Jose*  
*Mentor(s): Michael Jackson, Physics*

Oral Presentation, Session #16  
11:40-12:00 p.m. in Room 140

Historically, a rigorous study of the far-infrared portion of the electromagnetic spectrum has been difficult due to a lack of sensitive detectors and powerful sources in this region. However, technological advances in the past several decades, such as the optically pumped molecular laser, have provided invaluable tools which allow us to better explore the far-infrared region informally defined for wavelengths between 0.025 mm and 2 mm. Studies of the far-infrared region using the optically pumped molecular laser could prove invaluable for many areas of science. For instance, these lasers can be used in high resolution spectroscopic investigations whereby researchers study the fundamental interaction between light and matter. At Central Washington University, this past summer, an optically pumped molecular laser system was used to generate laser radiation in the far-infrared region. Using heterodyne, or frequency mixing techniques, the frequencies of more than 80 far-infrared laser emissions have been measured using methanol isotopologues as a lasing medium. This presentation will focus on providing an overview of the experimental system along with the methodology used for measuring far-infrared laser frequencies. Several examples of frequencies measured for the CD$_3$OH, CH$_3$OD, and CHD$_2$OH methanol isotopologues will also be provided.

*Keywords: Far-Infrared, Optically Pumped Molecular Laser, Heterodyne Frequency Measurement*

**Fluid Intake and Sweat Rate During Hot Yoga Participation**  
*Stalder, Amanda; Campbell, Stephanie; Pritchett, Kelly*  
*Mentor(s): Robert Pritchett, Nutrition, Exercise & Health Science*

Poster Presentation Session #2, Poster #28  
11:30-2:00 p.m. in Ballroom B/C/D

Purpose: To investigate the pre-exercise hydration status, fluid balance, perception of sweat loss, and sweat sodium loss in hot yoga participants. Methods: Male and female participants, \( n = 21, 33 \pm 10.5 \text{ yr}, 173.1 \text{ cm}, \text{mass: } 70.7 \pm 11.0 \text{ kg} \), were examined during a one-hour hot hatha yoga class, 38.7 ± 2.6°C, 36 ± 13 percent relative humidity. Urine specific gravity (USG) was measured to assess pre-exercise hydration status. Sweat rate was calculated using pre and post-session weight and fluid intake. Sweat sodium concentration was analyzed via a sweat patch sample. After the hot yoga session, participants were asked to fill an empty one liter container with the amount of water with which they perceived they lost as sweat during the class. A paired \( t \) test was used to identify significance between measured sweat loss and perceived sweat loss and Pearson’s correlation analyses were used to assess any relationship between selected variables, \( p \leq 0.05 \). Results: Seventy-six percent of participants began hot yoga euhydrated, USG<1.020. Sweat rate was 0.9 ± 0.6 L·h⁻¹, and despite free access to fluids during class, consumption was low (0.2 ± 0.2 L·h⁻¹), and 33 percent did not consume any fluids. Consequently, mean percent body mass loss was 0.9 ± 0.6 percent from pre-exercise body mass, and about half of the participants lost at least one percent of body mass. There was a significant difference between perception of sweat loss and measured loss, \( p = 0.01 \). Mean sweat sodium concentration was 49.1 ± 19.2 mmol·L⁻¹. Conclusion: These findings highlight the individual variability in hydration management among hot yoga participants. Therefore, a need for personalized hydration guidelines and individual education is warranted to prevent hypohydration.

*Keywords: Hydration, Sweat Rate, Hot Yoga,*
An Examination of Italian *Commedia dell’Arte* in Mozart’s Opera Buffa

**Stave, Caitlin**

*Mentor(s): Gayla Blaisdell, Music*

Oral Presentation, Session #28
1:50-2:10 p.m. in Ballroom A

The operas of Wolfgang Amadeus Mozart are fascinating examples of the genre as it existed in the Classical Period. As the creators of the first operas drew upon the example of Greek tragedy, so was Mozart influenced by dramatic traditions of the past. In particular, there is considerable evidence of the influence of the Italian Renaissance dramatic tradition known as *commedia dell’arte* on his operatic dramas and the characters within them. This presentation will demonstrate that elements of *commedia dell’arte* are strongly present in several of Mozart’s operas, namely *Le nozze di Figaro*, *Don Giovanni*, and *Così fan tutte*. I will address the origin of *commedia dell’arte* and identify the character archetypes that grew out of this art form. I will then provide a brief synopsis of each opera after which I will discuss the characters and their similarities to their corresponding commedia archetypes. My presentation will also examine the similarities between commedia scenarios and comedic opera plots and I will briefly discuss the voice types, called fachs, which evolved in collusion with character and scenic archetypal development.

*Keywords: Opera, Comedy, Commedia dell’Arte*

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The Illustrated Alphabet of Roman History

**Stephenson, Pamela; Baumgart, Eryn**

*Mentor(s): Michael Johnson, World Languages*

Creative Expression Presentation, Session #13
12:00-12:20 p.m. in Room 135

The idea to create a Latin picture book of Roman history grew out of our passion for history and our study of Augustan Latin with Dr. Johnson and our Latin study group. The result is the book *The Illustrated Alphabet of Roman History/Abecedarium Illustratus Historiae Romanorum*, which provides a brief introduction to the history of Rome’s government, religion, military, and daily life. We will be presenting a reading of the book in Latin with an English translation and accompanied by illustrations from the book.

*Keywords: Latin, Roman History, Illustrated Book*

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Predicting Solar Sigmoid Lifetimes Based on Shearing in the Photosphere

**Stone, Austen**

*Mentor(s): Darci Snowden, Physics*

Poster Presentation Session #1, Poster #59
8:30-11:00 a.m. in Ballroom B/C/D

This project’s purpose was to study how the speed at which the plasma in the photosphere of the sun affects the lifetime and shape of a solar sigmoid. Solar sigmoids are S-shaped, twisted magnetic structures that are due to the shifting magnetic field lines emerging from the surface of the sun. The photosphere is the visible layer of the sun’s surface and is made up of cells of plasma that are highly conductive and influenced by the magnetic field of the sun. Sigmoids form when shearing (a lateral shift between two objects in directions opposite each other) occurs in the photosphere plasma, causing ropes of magnetic flux to break and reconnect in S shapes. I predicted that when higher velocity shearing occurs in this plasma, solar sigmoid structures will be stretched out and as a result be less stable, extending just above the surface of the sun, and at a lower shearing velocity a sigmoid will stay stable longer and be able to extend much further above the surface of the sun. The shear velocity of the photosphere at the base of
the sigmoid was measured using the physics-based Tracker software, which takes user-uploaded videos and helps measure changes in position of an object within the video. This project was carried out using the Helioseismic and Magnetic Imager (HMI) and atmospheric Imaging Assembly onboard the Solar Dynamics Observatory (SDO) to retrieve magnetogram time lapse data and both partial and full solar view time-lapse data.

*Keywords: Astrophysics, Solar Physics, Sigmoid*

**Collapsible Bicycle Frame**  
**Stone, Keith**  
*Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction*

Poster Presentation Session #3, Constructed Objects, Poster #27  
2:30-5:00 p.m. in Ballroom B/C/D

Traveling with a full size bicycle can be problematic. A lightweight bicycle frame was designed to collapse to be able to fit into carry-on luggage for transport on an airplane. The required dimensions of the suitcase are 22 by 14 by 9 inches. This bicycle was also designed to be able to sustain a load of 200 pounds, with minimal deflection throughout the frame. The frame was constructed using aluminum 6061-T6 tubes that were cut to a specific size to be used for telescoping tubes along the front triangle of the frame, known as the top, down, and seat tubes. The telescoping tubes are pin locked when extended to ensure the structural integrity of the frame. These hitch pins were selected due to the ball bearing at the end of the pin, which helps keep the pin in place while the bicycle is being used. The frame along the chain and seat stays of the frame use pin locking tube hinges. These hinges were specifically chosen for this project so that they could assist in easily collapsing the bicycle, while keeping the structural integrity of the bike intact. The designed frame was not to exceed 15 pounds and the finished product was successful, weighing in at less than 13 pounds. While the dimensions of the frame are 38 by 22 by 6 inches when fully extended, the final dimensions of the frame when it is collapsed are 22 by 14 by 5 inches. Other results include load and deflection testing.

*Keywords: Collapsible, Bicycle, Frame*

**Self-Sustaining Greenhouse**  
**Storaasli, Ryan**  
*Mentor(s): Lad Holden, Engineering Technologies, Safety, & Construction*

Poster Presentation Session #3, Constructed Objects, Poster #22  
2:30-5:00 p.m. in Ballroom B/C/D

My project creation along with my colleague is a self-sustaining greenhouse. The purpose of this project is for an individual to grow several plants with limited involvement. The greenhouse has temperature sensors, humidity sensors, fans, lighting, and a water reservoir. It is controlled and regulated using the sensors to alert a program in LabVIEW when to operate fans or lighting to regulate the heat. The water reservoir also has a sensor to alert the owner when the water level is low and needs to be filled. This is the only physical work that will need to be done by the owner. Besides filling the reservoir the greenhouse can be set for a certain temperature for desired plant growth and simply left alone for days while the plant is completely taken care of.

*Keywords: Convenience, Reliability, Stress-Free*
Analysis of an Electric Bicycle Conversion

Strand, Amber

Mentor(s): Nathan Davis, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #24
2:30-5:00 p.m. in Ballroom B/C/D

This is an investigation into the feasibility and practical use of the electric conversion of a standard bicycle while keeping the ability to return to a manual situation. By simply applying a motor to the front wheel of a bicycle, attached to a battery pack and a throttle, it is possible to convert a plain bicycle into a primitive electric motorcycle. While a plain bicycle is already green and environmentally friendly, some of us need that extra help in getting to our destination faster and easier. While the motor is attached to the front wheel and the pedals are already attached to the back wheel, conversion between the two is simple and easy, allowing versatility for the user. Thorough testing will be needed to determine how long a fully charged battery can be used before recharging is necessary. While wide distribution of pre-made kits are available, building and testing these kits will help determine the actual practicality of using a kit and the potential of becoming useful and simplistic enough to be used by the average American.

Keywords: Green, Electrically Powered, Versatility

Manners of the City of Edo

Takei, Hideki

Oral Presentation, Session #10
10:40-11:00 a.m. in Room 271

The City of Edo was one of the largest cities in the world in the eighteenth century. As the capital city of Japan in the Tokugawa Shogun era, samurai were initially the dominant residents of the city. However, as samurai did not have ways to produce their own food and products for their life, many retailers and manufacturers in Kyoto and Osaka were invited to the city by the Tokugawa. Soon, as the retailers bridged between samurai and manufacturers, the retail industry became the dominant industry of the city. As the dominance became obvious, business manners for the retailers became general manners of the people of the city. This presentation will show examples of such manners.

Keywords: Manners, Edo, Japan

Reflections of Colonialism in Algeria: An Analysis of Four Films

Talbot, Jordan

Mentor(s): Lene Pedersen, Anthropology & Museum Studies

Panel Presentation, Session #26
2:10-2:30 p.m. in Room 271

In this paper, I analyze the representation of French-Algerian relations in four French-language films: The Battle of Algiers, Intimate Enemies, Of Gods and Men, and Outside the Law. Each of the films explores the dynamic between the colonial presence of France in Algeria and the native population. The films present fictionalized versions of true events. For example, Outside the Law features the massacre in Sétif, and Of Gods and Men focuses on the events preceding the 1996 kidnapping of seven Trappist monks by violent radicals in Algeria. Representing the military presence of France seems to be the primary concern of each of the filmmakers. Violent images are the central focus, as three of the four films are set during the Algerian War of Independence. The religious presence of French Catholics is represented more extensively in the film Of Gods and Men. Although the filmmakers represent similar eras, each director shows varying levels of sympathy and disdain for the Algerian National Liberation Front, as well as the contemporaneous French government. The films allow the audience to discover a variety of perspectives on a singular moment of history.

Keywords: Film, Algeria, Colonialism
Qui est français?: Negotiating National Identity in Alain Badiou's *Ahmed philosophe*

*Talbot, Jordan*

*Mentor(s): Jay Ball, Theatre*

Oral Presentation, Session #30
3:40-4:00 p.m. in Room 135

Alain Badiou’s character Ahmed is often compared to Molière’s classic character Scapin. Both characters are tricksters who use their lower-class status in order to speak truth to power. However, Badiou uses Ahmed to challenge the political climate of France, while Scapin merely pokes at the silliness of the French bourgeois. Scapin is assumed to be an intellectual because he is already French. Ahmed must advocate for his status as an intellectual. In this paper, I conduct a close reading of *Ahmed philosophe*, looking at the relationship between Ahmed and Madame Pompestan. Ahmed’s conversations with Madame Pompestan explore the construction of French identity and French intellectualism. Through their interactions, the audience can understand that Ahmed has as much of a right to the intellectual, philosophical, and political traditions of France as the most elite members of the French government, represented by Madame Pompestan.

*Keywords: Identity, Immigrant, French*

Spherical Shell Resonance and Applications as a Model for the Human Skull

*Tangocci, Adam*

*Mentor(s): Andrew Piacsek, Physics*

Poster Presentation Session #1, Poster #60
8:30-11:00 a.m. in Ballroom B/C/D

Previous research performed by students and faculty at Central Washington University has shown that changing pressure inside a spherical aluminum shell can shift the resonance frequencies of the shell. This property may be applied to the human skull and allows for a non-invasive method of measuring intracranial pressure. To more closely resemble the environmental conditions of the human skull, a new mount was used with a smaller point of contact at the base of the sphere and the change in pressure, compared to previous experiments, was decreased by at least an order of magnitude from over 40 to less than 1 pound per square inch. Expected frequency shifts due to the smaller pressure changes are less than 0.0001 percent; therefore, extensive testing was done to quantify and identify sources of experimental uncertainty. Results indicate that the current experimental design cannot produce reliable measurements of such small frequency shifts. Specific sources of uncertainty and possible improvements to the experimental design will be discussed.

*Keywords: Skull, Resonance, Shift*

Ethnic Cleansing in America

*Tankersley, Hailey*

*Mentor(s): Nelson Pichardo, Sociology*

Poster Presentation Session #3, Poster #56
2:30-5:00 p.m. in Ballroom B/C/D

The topic that I would like to present at SOURCE is the phenomenon of banishment and ethnic cleansing in the Pacific Northwest. More specifically, focusing on Washington, Oregon, and Idaho, I will gather bicentennial census data to find evidence of racial population shifts in cities and towns where the population is more than 10,000 people. The population change I will be looking for is a 50 percent reduction due to a dramatic or drastic event.

*Keywords: Race, Diversity, Ethnicity*
How Your Phone Can Make You Happy

*Thomas, Jennifer*

*Mentor(s): Filip Jagodzinski, Computer Science*

Oral Presentation, Session #7
10:20-10:40 a.m. in Room 137B

Researchers have shown that happiness is influenced by level of gratitude, a healthy amount of giving, and a more internal, rather than external, locus of control. Current mobile phone applications meant for increasing happiness provide generic tips on how to be happier, but are not tailored to each individual user. Our work centers on the premise that a mobile phone application can be more successful if it provides the user with recommendations based on his or her input. We are developing android and iOS mobile phone applications that will aid in increasing the user’s happiness. The core functionality of our mobile phone applications, which sets them apart from those already in existence, is based on a custom algorithm that incorporates the measurement of the three determinants for a user’s current level of happiness and makes suggestions of specific tasks the user could do to be happier. The algorithm is designed to output tasks that account for 27 unique happiness profiles, and also accounts for individual input, or preferences, such as whether or not the user will visit a store that day, will be at work, or is able to purchase a gift as a part of giving to others. These suggestions are provided on a daily basis, one per day, and change based on continuing user input.

*Keywords: Happiness, Android, IOS*

Constant Vector Curvature in Three Dimensions

*Thompson, Albany*

*Mentor(s): James Bisgard, Mathematics*

Oral Presentation, Session #17
12:20-12:40 p.m. in Room 201

Differential geometry is the use of the techniques and tools of calculus to study the geometric properties of manifolds. One of the most commonly studied properties of manifolds is their curvature. We can measure the curvature of a manifold at a point by using a metric called an algebraic curvature tensor and a geometric object known as a model space. A model space is formed when a manifold, inner product, and algebraic curvature tensor are grouped together. There are several curvature conditions that a model space can satisfy. This research is concerned with the necessary and sufficient conditions for a model space in three dimensions with positive definite inner product to have the specific curvature condition of constant vector curvature. This presentation summarizes the background for this research along with its findings.

*Keywords: Geometry, Curvature, Vectors*

Dmitri Shostakovich’s *The Nose*: A False-Start on Russian Avant-garde Modernism

*Thornton, William*

*Mentor(s): Gayla Blaisdell, Music*

Oral Presentation, Session #28
2:10-2:30 p.m. in Ballroom A

Following the 1917 Russian Revolution, the performing arts were greatly impacted on nearly all fronts except for opera. Left to the wayside, expanding the operatic canon into a more modern format and finding a truly Soviet voice was not even considered by composers for a multitude of reasons. These omissions from Soviet cultural life seemed to change with the publishing of Dimitri Schostakovich’s avant-garde masterpiece *The Nose*. Within this presentation, a survey of the social and cultural climate surrounding *The Nose* will be discussed, as well as the Soviet culture following *The Nose* which made modernity in Russian opera a near impossibility for many years to come.

*Keywords: Russian, Opera, Shostakovich*
Measurement of Motor Drive Characteristics for Automobile Application

Tiffany, Elizabeth

Mentor(s): Lad Holden, Engineering Technologies, Safety, & Construction

Oral Presentation, Session #25
1:10-1:30 p.m. in Room 201

Due to environmental concerns and goals to reduce dependency on foreign oil, regulations of automobile fuel economy have been strengthened. As a result, the market demand for efficient vehicles is growing and automakers are tasked with making improvements to engine fuel efficiency in the industry. Under these circumstances, the mechanical parts in the automobile industry are being replaced by electronic methods. The main idea of the electric vehicle is to reduce the engine size and power for fuel consumption and meet the necessary energy from the carbon-free energy sources. Power is transferred electrically instead of mechanically from energy sources to the wheels to reduce the loss of energy.

Research has been concerned with various characteristics of motor drive options for selection in electric vehicles (EV) or hybrid electric vehicles (HEV), including torque, speed, energy efficiency, and cost. The most common motors used in industrial application of hybrid electric vehicles and electric vehicles are: induction, permanent magnet synchronous, switched reluctance, and brushed and brushless DC motors. The intention of this project is to create a method for analysis of speed-torque profiles of various microcontroller-controlled motor drives, allowing for comparison and selection for application for future cross-departmental student collaborations.

Keywords: Energy-Efficiency, Microcontroller, Motor Drives

Real-Time Temperature Sounding in Ellensburg

Tinedrebeogo, Iliass

Mentor(s): Razvan Andonie, Computer Science; Anne Johansen, Environmental Studies

Poster Presentation Session #1, Poster #24
8:30-11:00 a.m. in Ballroom B/C/D

The change of ambient temperature with height above ground is an indicator of atmospheric stability. Air quality forecasters need to know whether an airshed is stable or not, as the dissipation of air pollution depends on this. While meteorological models predict stability, a lack of vertical temperature measurements makes it difficult to ground truth such forecasts. We aim to make a real-time plotting of temperatures with height easily available via interfaces for all devices using the internet. Our contribution is a web dashboard application that monitors the real-time status of the temperature in regard of the height. We are able to visualize temperature at each vertical height.

Keywords: Real Time Dashboard, Temperature Sounding
Comparative Effects of Supplemental Folic Acid on Normal Versus Breast Cancer Growth Rate, Viability, and Morphology

Tracy, Sarah; Bernstein, Ryan; Mallory, Shannon; Weldon, Cassandra

Mentor(s): Ian Quitadamo, Biological Sciences

Poster Presentation Session #1, Poster #48
8:30-11:00 a.m. in Ballroom B/C/D

The Federal Drug Administration has mandated the fortification of the American food supply with folic acid to reduce neurological defects in unborn children. On the surface, this seems like a good idea, but recent research indicates that folic acid may unintentionally accelerate existing breast and other cancerous growth in a subset of the human population, potentially affecting cancer patients, survivors, and postmenopausal women. Preliminary research conducted to assess a possible relationship between folic acid concentration and human breast cancer growth was inconclusive due to not including normal cells as a comparison group in the initial study. We hypothesized that folic acid may have differential effects on normal and breast cancer cell growth rate, viability, and morphology. To emulate folic acid exposure nationally, including those individuals with pre-existing cancer, we conducted follow up experiments comparing folic acid effects on MCF-7 human breast cancer and CHO ovarian cell lines. Results showed a decrease in human breast cancer viability and growth rate as folic acid concentrations increased, while CHO cell viability and growth rate increased.

Keywords: Folic Acid, Breast Cancer, Growth Rate

Like Something Out of Stephen King

Tranchell, T.J.

Mentor(s): Liahna Armstrong, English

Oral Presentation, Session #21
2:10-2:30 p.m. in Room 135

In the world of popular American literature, there is arguably no author more popular than Stephen King. Since the release of his first novel Carrie in 1974, there has rarely been a year without a new King book and invariably these books reach the bestseller lists. But Stephen King has not always been a household name. He has not always been America’s bogeyman. In this paper, I will seek to discover how Stephen King became Stephen King. More than just an author, King has become a brand, and a subgenre unto himself. King can also be read as text. Like the work he has produced, King is wrought with connections: from text-to-text and author-to-text. King is not only self-referential within works bearing his name, but has referenced himself in books published under a pseudonym, and has even become a character. Like Michel Foucault, I will not be “examining how the author became individualized in a culture like ours. . .” but rather exploring “the relationship between text and author and with the manner in which the text points to this ‘figure’ that, at least in appearance, is outside it and antecedes it.”

Keywords: Stephen King, Metafiction, Literature

**Tunnell, James**

*Mentor(s): John Anvik, Computer Science*

Oral Presentation, Session #1
8:50-9:10 a.m. in Room 137B

To produce a high-quality software release, sufficient time should be allowed for testing and fixing defects. Otherwise, there is a risk of slip in the development schedule and/or software quality. A time series model is used to predict the number of bugs created during development. The model depends on the previous numbers of bugs created. The model also depends, in an exogenous manner, on the previous numbers of new features resolved and improvements resolved. This model structure would allow hypothetical release plans to be compared by assessing their predicted impact on testing and defect-fixing time. The VARX time series model was selected as a reasonable approach. The accuracy of the model appeared low for a single dataset, but the error was found to be normally distributed.

*Keywords: Software Defect Prediction, Release Planning, Time Series Model*

Site Specific Project

**Turner, Marie**

*Mentor(s): Crystal Fullmer, Physical Education, School & Public Health*

Creative Expression Presentation, Session #19
12:20-12:40 p.m. in Ballroom A

I created this work in the choreography class of Fall 2014. For this project, we had to find a location on campus and create a dance phrase of one to two minutes, in which the movement strongly correlates with the geography. Music was not used in the project and this made the choreographic process interesting because the atmosphere changed each day. I chose a bridge as my site which presented its own challenges. With people walking by, cars driving in the background, and ducks quacking, they unintentionally became part of my choreography. Throughout the creative process, I used many compositional devices and choreographic tools to create a cohesive dance. Using Rudolf Laban’s Basic Efforts as guidelines helped me focus on the actions of pressing, slashing, flicking, gliding, and wringing. I found the compositional devices to be the most useful in this project in which we needed to use a minimum of six devices out of the ten we learned. I chose to focus on using repetition, acceleration/deceleration, accumulation, retrograde, active stillness, and dynamic variation. Not having music and using the different efforts and devices was a new method of creating dance for me. I discovered new potential for movement invention because I was not tied to music. Overall, I learned how important movement is by itself because people are given the freedom to interpret the dance without the help of music to give them the story.

*Keywords: Dance, Site Specific, Choreography*
**Dualities**  
*Turner, Marie*  
*Mentor(s): Therese Young, Physical Education, School & Public Health*

Creative Expression Presentation, Session #19  
12:40-1:00 p.m. in Ballroom A

This piece was created in *Orchesis* during fall quarter and will be a part of the annual *Orchesis* end-of-the-year dance performance. This piece began as a series of movements that I gradually put together to create a long unified movement. I found the song “Breathe Me” by Sia and decided to use this for my choreography because the music accented the movements perfectly. I originally planned on having six dancers but came to a final decision of eight. An even number was essential for this piece because the dance is based on finding yourself and fighting between who you are and who you want to be. The pathway to finding oneself can be difficult and can sometimes lead you in many directions, which is why I decided to name this piece *Dualities*. Throughout this dance, there is a lot of partnering or movements that are soft and fluid while other movements are fast and strong to show the conflicting feelings people go through when finding their way through life. The dance starts off slow and peaceful and gradually becomes more chaotic and conflicting. Toward the end the dance, the movements slow down again as some dancers run or slowly walk off stage to show different ways of coping with change within oneself. The dance ends with the last two dancers facing each other to show that it is possible to overcome obstacles and find your true self.

*Keywords: Dance, Performance, Contemporary*

**Unequal Development at the Local Level: A Case Study of Lakewood, Washington**  
*Turner, Stefan*  
*Mentor(s): Michael Mulcahy, Sociology*

Des Moines Center - Poster Presentation, Poster #1  
Tuesday, May 19; 2:00-5:30 p.m. in Higher Education Center Bldg 29 - Des Moines Center

How can we explain the emergence and persistence of extremely uneven urban development? The concept of uneven development is most often used at the national level of analysis, but we argue that it not only has application, but serves to identify even more striking inequalities, at the local level. The community of South Lakes, formerly Tillicum, in Lakewood, Washington, is one of the poorest in the United States. It has endured decades of poverty and neglect. It is, however, within easy walking distance of the Lakewood community of Gravelly Lake which is a residential neighborhood where the median household income is above the 75 percentile for the United States as a whole. How can we make sense of this stark juxtaposition of affluence and need, deprivation and luxury? To unravel this puzzle, we draw on two bodies of sociological theory, Domhoff’s theory of local power elites, and Logan and Molotch’s theory of growth coalitions, to analyze the political economy of uneven development in Lakewood, Washington. Our data are drawn from the United States Census Bureau’s Decennial Census 2000 and 2010, and various years of the American Community Survey between 2005 and 2013, as well as Census Bureau data on local government finances. We also analyze City of Lakewood City Council voting records, Lakewood City Council Meetings Minutes, local election campaign contributions, project reports, and vendor contracts.

*Keywords: Unequal Development, Community, Growth Coalition*
Geographical Analysis of Peoples' Perceptions of a Political Campaign for County Auditor

Turner, Trinity

Mentor(s): Elvin Delgado, Geography

Oral Presentation, Session #8
9:40-10:00 a.m. in Room 140

Local elections often have a greater effect on people than national elections. However, very little research in electoral geography has been done to examine small-scale local elections in the United States. This paper attempts to fill this gap and offer suggestions for further research and analysis. This paper examines peoples’ perceptions of a local political campaign in Spokane County to see if there are significant differences between rural and urban voters. The researcher used a mix of ethnographic methods to collect data during the 2014 campaign for Spokane County Auditor. Preliminary findings suggest that location was not a significant factor shaping voters’ perception, but rather their political involvement was. Further research should be done in this area to gain a better understanding of the perceptions and effects of local elections and their outcomes.

Keywords: Electoral Geography, Perceptions, Politics.

Light Curve of 383 Dodona

Ullery, Dylan; Fulkerson, Jordan

Mentor(s): Michael Braunstein, Physics

Poster Presentation Session #1, Poster #51
8:30-11:00 a.m. in Ballroom B/C/D

Photometric data were collected for several asteroids in order to obtain light curves. A variety of web-based astronomical research tools were utilized to identify candidate asteroids and their astronomical coordinates. Candidate asteroids were chosen to have relatively short rotational periods, and magnitude variations of 0.25 or greater. Using the 30 cm telescope on the roof of Lind Hall at Central Washington University, photometric data were obtained for the asteroid 382 Dodona for approximately five rotational periods over the course of four clear nights. Using Maxim DL, the images were analyzed to produce light curves. The light curves were consistent with the available literature on Dodona.

Keywords: 382 Dodona, Light Curve, Asteroid

Effects of Temporary Agencies on Poverty Change

Ulrich-Strickland, Russell

Mentor(s): Michael Mulcahy, Sociology

Des Moines Center - Poster Presentation, Poster #3
Tuesday, May 19; 2:00-5:30 p.m. in Higher Education Center Bldg 29 - Des Moines Center

The temporary help services industry is doing exceptionally well, but is it doing any good? Previous research on the temporary help services industry tends to fall into two basic categories: 1) research by mainstream labor economists emphasizing the beneficial effects of the industry for workers and consumers of temp labor; or 2) analyses by radical labor economists and sociologists that, in contrast, emphasizes the vulnerability of the temp industry workforce to direct economic exploitation, and employers’ use of temp labor to bust permanent workers’ labor unions. Some sociological research has examined the temporary services industry in the context of the welfare reform legislation of the late 1990s, arguing that the dominant narrative of the success of Personal Responsibility and Work Opportunity Act needs to be reconsidered in light of evidence that large numbers of former Temporary Assistance for Needy Families recipients have transitioned from welfare-to-temp work. Our research extends this line of inquiry with an investigation of the relationship between the temp services industry...
and local level poverty rates and welfare spending. To some extent, our analysis is inspired by research by Goetz and Swaminathan on the local-level effects of Walmart stores and store openings on poverty rates. In a similar vein, we ask whether changes in the local density and size of the temporary help services industry predict subsequent changes in local poverty rates and local government welfare spending. We analyze these relationships in all counties in the contiguous United States between 2002 and 2007, and include controls for potentially confounding variables, and corrections for endogeneity and spatial dependence. Methods: Using a two-stage regression model, we use a similar method to Goetz and Swaminathan to show the year-to-year change of temporary help service agencies which helps to reduce potential endogeneity bias in the poverty-change equation.

*Keywords: Poverty, Temporary Work and Statistical Modeling.*

**The Temporal and Directional Dependencies of Sway During 10 Seconds of Single Leg Stance in Young, Healthy College Students**

*Vanderheyden, David*

*Mentor(s): Karen Roemer, Nutrition, Exercise & Health Science; Eric Foch, Nutrition, Exercise and Health Science*

Poster Presentation Session #2, Poster #22
11:30-2:00 p.m. in Ballroom B/C/D

**Background:** Single Leg Stance (SLS) testing is used in clinical assessments of balance, but little is known about the temporal structure of sway parameters during this test. SLS research is equivocal on the effects of sway over time and the direction of balance initiation. Sway data in a healthy young population may provide insight on how balance is initiated and maintained in relation to the initial step direction. This may lead to novel approaches to help healthy elderly populations decrease fall risk and fall-related mortality. **Purpose:** The purpose of the study was to examine the temporal and directional dependencies of sway parameters during 10 seconds of SLS in young, healthy adults. **Methods:** Six healthy, young college students (five male, one female) performed 10 seconds of SLS on their dominant leg, stepping from a frontward and sideward direction. Ground reaction forces measured with a force platform were used to calculate the sway parameters: sway area, sway velocity, anterior-posterior and medio-lateral sway, and sway path. **Preliminary Results:** Compared to the final second, the sway area, path and velocities were significantly higher in seconds one and two in the forward and sideward directions. Anterior-posterior sway was lower during seconds one and two in the forward direction. Medio-lateral sway was higher in second 2 in the forward direction, and lower at seconds one, two, and four in the sideward direction.

*Keywords: Balance, Fall-risk, Biomechanics*

**The Guiding Factor: Music In American Cinema**

*Vidmore, Jordan*

*Mentor(s): Anne Cubilié, Douglas Honors College*

Oral Presentation, Session #27
2:10-2:30 p.m. in Room 301

In this presentation, I examine the ways in which music has been incorporated into some of America’s best and worst films, and the effect this has had on the viewers perception of the story. Through consideration of the diegetic and non-diegetic use of music in film, case studies of the relation of human nature to music, and the association between the musical, dialogical, and visual elements of film in the cognitive framework, I argue that music has a guiding factor in the viewers perception of the visual and dialogical elements of the film. In the words of director Steven Spielberg, “[T]he eye sees better when the sound is great.”

*Keywords: Film, Music, Consciousness*
Composite Snowmobile Suspension System

Villarma, Michael
Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #13
2:30-5:00 p.m. in Ballroom B/C/D

Snowmobile technology is constantly evolving and incorporating new ideas into products for the consumer to enjoy. After-market manufacturers are competing among themselves for the top position in suspension technology, yet none have broken the boundaries and really pushed to the next level until now. The objective of this design was to provide the consumer with a lightweight and simple suspension system that would meet the performance demands of the consumer market. In order to meet the strength-to-weight ratio requirements of this design, composites were implemented to provide the necessary structural strength for the overall system. A one piece carbon fiber subframe is the first of its kind and provides a foundation for all other components to fasten too. By replacing structural materials that were initially made from a high strength steel with a lightweight carbon fiber, the weight savings are substantial and can be observed throughout the system. In order to determine the success of this design, a series of tests both on and off the vehicle were performed to accurately describe the behavior of the material under load. Three-point bending, load analysis, and weight comparison are examples of the test processes that will provide conclusive data on the overall performance of this design.

Keywords: Composites, Lightweight, Suspension

Sweet Goddess

Villasenor, Karina
Mentor(s): Andrea Eklund, Family and Consumer Sciences

Poster Presentation Session #2, Creative Works, Poster #12
11:30-2:00 p.m. in Ballroom B/C/D

Purpose: Through designing this garment, I wanted to challenge myself by advancing my sewing skills to create a garment that makes the wearer feel beautiful. Process: When I first started to design my garment, I did a lot of research on Pinterest for inspiration. Japanese fashion is a particular interest of mine and I was inspired by many of the up-and-coming street styles that are currently being reported on along with designs by Atsusi Nakshime. Going through many sketches, I finally decided on this garment which features a corset, which was a challenge to construct properly. Techniques: Draping was used to create this garment. From the draping, a pattern was made and, from the pattern, a sample was constructed. The sample was put on my model and final changes were made from the fitting to the paper pattern. Once this was done, I was able to cut my final fabric and carefully make my final garment. Contribution to Fashion: It contributes to fashion by revering the beauty of female deity. By making a good appearance, young women feel younger and confident. Materials: Polyester satin fabric, polyester sheer plain weave fabric, plain weave lining, zipper, polyester thread. This is one in a line of three garments; the entire line can be seen at the Apparel, Textiles, and Merchandising spring fashion show, May 30, at 3:00 p.m. and 7:00 p.m. in Milo Smith Theater in McConnell Hall.

Keywords: Designer, Sweet, Goddess

An Investigation of the Relationship Between Childhood Maltreatment and Rape Myth Acceptance Scores

Waggoner, Danna
Mentor(s): Heidi Bogue, Psychology

Poster Presentation Session #3, Poster #52
2:30-5:00 p.m. in Ballroom B/C/D

The purpose of this proposed study is to investigate the relationship between childhood maltreatment and later scores on a rape myth acceptance inventory. These scores are often used as a predictor of
sexual aggression and will be used as such for this research. The study aims to further understand any relationships between childhood maltreatment and an individual’s sexual aggression seen here as rape myth acceptance. Second, is there a relationship between gender and the childhood maltreatment on rape myth acceptance? The hypothesis states that increased occurrences of childhood maltreatment will correlate with increased scores on the rape myth acceptance inventory. The understanding of a correlation between these variables can lead to better understanding of individuals who may benefit from sexual aggression prevention programs. The results of this study can also provide more information about some of the side effects of child abuse and the long-term lasting effects. The instruments that will be used in this study are the Illinois Rape Myth Acceptance Inventory and the Adverse Childhood Experience (ACE) Study. This is a proposed study. No research has been collected at this time.

**Keywords:** Rape Myth, Aggression, Maltreatment

**Touchscreen Coding: Reversi**

*Walker, Andrew*

*Mentor(s): Lad Holden, Engineering Technologies, Safety, & Construction*

Poster Presentation Session #3, Constructed Objects, Poster #17
2:30-5:00 p.m. in Ballroom B/C/D

The purpose of the project is to run a touchscreen application on a 32-bit microcontroller. Reversi was chosen as the application to be developed for the project because it is a rules-light board game that requires a small amount of graphical resources, and it can be used to test the display of images and correlation to where the screen is touched and how the program responds by changing the display. The primary objectives include implementing the device libraries and drivers for the chosen microcontroller and display, getting the application to display the correct image in the correct place, and detecting a screen touch to correlate to the correct place on the touch screen.

**Keywords:** Microcontroller, Touchscreen, Reversi

**Investigating Rigidity Properties and Atomic Content of Proteins**

*Walling, Christian*

*Mentor(s): Filip Jagodzinski, Computer Science*

Oral Presentation, Session #15
12:20-12:40 p.m. in Room 137B

Proteins are three-dimensional molecules that bend and flex to perform a multitude of functions, ranging from cellular repair, to mediating the immune response, to aiding in neuronal signal propagation. Drugs are designed to regulate protein functions and their interactions, which they do by closely associating with cavities or other structurally important features on a protein’s surface. Because the properties of protein cavities have not been analyzed in a dataset large enough, it is unclear how, or to what extent, the geometric properties and atomic content of a cavity play in facilitating a protein’s interaction with other molecules. Analyzing the rigidity properties and atomic content of protein cavities from a large database would allow development toward a deeper understanding of how proteins interact with other molecules. Preliminary results from a dataset of about 20,000 cavities have already indicated a dominant region for cavity size and the number of rigid clusters within. For our work, we are trying to determine if the molecular content of rigid bodies within cavities can be used to distinguish them from other proteins by using metrics gathered on the size of cavity, the number of atoms in the cavity, and the types of those atoms. To accomplish this, we have created a series of custom BASH scripts to calculate metrics based on information gathered from calculated cavity data and the biological data of the protein.

**Keywords:** Proteins, Rigidity, Scripts
Middle School Field Investigations (Multiple Titles)

Walter Strom Middle School Students

Faculty Mentor(s): Trish Griswold, Walter Strom Middle School

Poster Presentation Session #1, Posters # 62-69
8:30-11:00 a.m. in Ballroom B/C/D

Using forestry tools and student-developed quantitative comparative research questions, group projects were created. Students collected data once a week. They gained a greater awareness of our place as they used statistical analysis to accept or reject the null hypothesis.

Keywords: Walter Strom, Forestry, Statistical Analysis

The Port of Liuzhou: Problems and Prospects

Wang, Xifang

Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #2, Poster #59
11:30-2:00 p.m. in Ballroom B/C/D

The poster is a graphic depiction of the problems that rapid economic development created for the Port of Liuzhou. As the industrial economy of Liuzhou City expanded, the port was increasingly unable to keep up with the import and export demands of the Liuzhou foreign trade market. The upgrading of the Port of Liuzhou has become a key factor in supporting the city’s economy and sustaining its growth. This task falls to the Liuzhou Port Administration Office. As is the case everywhere, expansion requires both authorization and the adequate appropriation of funds. Since the port is located in the West River Economic Zone, its recent upgrading at the National Development and Strategic Level will greatly facilitate Liuzhou’s efforts to establish a comprehensive bonded zone. The Port of Liuzhou as an inland port faces a unique set of problems that requires the integration of three key components: the inland river port, the dry port, and the airport. The poster illustrates the problems and prospects involved in establishing the future integrated port and comprehensive bonded zone.

Keywords: Comprehensive Bonded Zone, Port, Prospects

An Evaluation of Behavioral Skills Training to Teach Assertiveness Skills to College Students

Warrington, Savannah; Lovett, Sadie

Mentor(s): Sadie Lovett, Psychology

Poster Presentation Session #3, Poster #54
2:30-5:00 p.m. in Ballroom B/C/D

Assertiveness skills are related to a variety of life factors including stress levels, social relationships, social fears, and anxiety. Previous research has shown that engaging in nonassertive behavior can have negative effects, and assertive behaviors can lead to a healthier life (Eldeeb, Enstar, & Eldosoky, 2014; Elliot & Gramling, 1990; Morgan, 1974; Larijani, Aghajanie, Baheriraei, & Neiestanank, 2010). The purpose of the current research was to determine if behavioral skills training (BST) was effective in teaching assertiveness skills to college students and if the skills would generalize to novel situations. BST is a method for teaching skills that uses instructions, modeling, rehearsal, and feedback. In the current study, BST was used to identify and teach nine different assertive behaviors and help the participants differentiate between nonassertive, assertive, and aggressive behavior. The current study used a multiple baseline design to implement the BST intervention for three participants. It is expected that participants will show an increase in assertiveness skills, and that those skills will generalize to novel scenarios.

Keywords: Behavioral Skills Training, Assertiveness, College Students
Humanitarian Aid for the Occupied Palestinian Territories: A Policy
Weber, Madelyne; Coryell, Brayana; Rombough, Sonya; Gerrish, Heather
Mentor(s): Anne Cubilié, Douglas Honors College

Poster Presentation Session #2, Poster #55
11:30-2:00 p.m. in Ballroom B/C/D

The international community is well acquainted with the ongoing problems among Israel and the occupied Palestinian territories. As the years march onward, conditions in Palestine continue to degrade. Palestinians face many problems with respect to humanitarian and developmental aid. Conditions are harsh, both because of the extreme weather and continued conflict with the Israeli military and diplomatic policies. Lack of communication and travel abilities between Gaza and the West Bank, and even between neighboring villages in each region, continue to lead to wider disparity between the two geographic regions creating dramatically different levels of need depending upon location. The policy proposed by this project includes a scale developed to provide flexibility in assessing the needs of communities on a case by case basis. This project focuses on the current issues faced in the Gaza Strip and the West Bank in regards to education, food, and water security, as well as a proposed plan of action that involves the assistance of the United Nations and partner non-governmental organizations that are already active in the region. The scale developed herein is targeted specifically at these issues in this region; however, it can easily be broadened to address needs in other categories of aid as well as in other states in need of aid as the global political and geological climate alters over time. The overarching goal of the scale is to provide a ground for assessment that can lead each region through the stages of humanitarian aid, to developmental aid, and onward to stability.

Keywords: Humanitarian Aid, Policy, Occupied Palestinian Territories

The Effects of Stigma on the Mentally Ill Students’ Educational Success
Weiner, Melissa
Mentor(s): Michael Mulcahy, Sociology

Oral Presentation, Session #14
11:40-12:00 p.m. in Room 137A

Previous research shows that people with a mental illness (MI) diagnosis face social stigma. The social stigma of mental illness figures in analyses of the effects of MI on social networks, and a range of other outcomes, including recovery. I address this issue in the context of the postsecondary educational trajectories of students with MI. For students with MI, academic success is an important correlate of recovery. Yet, we lack studies that focus explicitly on the association between the stigma of MI, social networks, and academic outcomes. When students with MI interact with professors, fellow students, and staff, such as disability services staff, the social networks formed by those interactions may reflect the stigmatized nature of their condition. My research looks at: (1) the effects of MI on academic and social networks and support; and (2) the effects of these students’ social and academic networks and support on educational persistence and attainment. My research question is whether the negative effects of stigmatized MI on their educational outcomes are mediated by social and academic networks. I apply these ideas to an analysis of the Beginning Postsecondary Students (2004) dataset, a publicly available, anonymized panel dataset from interviews with beginning college students in 2003/04, again in 2005/6, and again in 2008/9. The dataset includes measures of my key independent variables, including MI and academic and social integration, as well as a range of academic outcomes, from which I draw the dependent variables of my analyses.

Keywords: Mental Illness, Stigma, Education
How Social Factors Limit American Access to Abortion

Weishaar, Cheyenne

Mentor(s): Judith Hennessy, Sociology; Dominic Klyve, Mathematics; Anne Cubilié, Women’s and Gender Studies, Douglas Honors College

Oral Presentation, Session #12
10:20-10:40 a.m. in the Theatre

Female reproductive health care, primarily access to contraceptives and abortions, has been a hot topic for the past few years, and will continue to be an important issue that needs to be addressed in the United States. Though abortion has been legal since the Roe v. Wade Supreme Court decision forty-two years ago, access to legal and safe abortions is not widespread in all states. This presentation will utilize secondary research to explore the social and cultural structures that prevent women from obtaining abortions and will analyze cultural beliefs including religious views, and the moral beliefs surrounding the fetus, that may inhibit some women from obtaining abortions. I will also consider legislation, how it may be related to religious and moral issues, and how these can affect access to reproductive health care as well as the roles education and socioeconomic status play in women’s access to abortion. My presentation will demonstrate that abortions are not equally accessible to all women in the United States, and that social factors do limit the accessibility of this procedure.

Keywords: Abortion, Reproductive Health, Women’s Health

Detection of Leishmania Parasites via Flow Cytometry

Wenger, Analiese

Mentor(s): Gabrielle Stryker, Biological Sciences; Blaise Dondji, Biological Sciences

Oral Presentation, Session #33
3:00-3:20 p.m. in Room 140

Leishmania species cause a spectrum of diseases collectively referred to as the Leishmaniases. These unicellular parasites generate 1.3 million new cases of infection worldwide as well as cause an approximated 20,000 to 30,000 deaths annually. Current techniques for studying Leishmania in laboratory animals require laborious serial plating of dilution series, incubations of samples for weeks, followed by microscopic screening of each individual well in 96 well plates. Through the generous funding of both the W. M. Keck Foundation and the Murdock Fund, Biological Sciences recently obtained a flow cytometer. This study aimed at assessing if flow cytometry could differentiate cells infected with Leishmania parasites from uninfected cells. Two species of the parasite, L. infantum and L. major, were stained with an antibody conjugated to a fluorescent fluorochrome, using both flow cytometry and photomicroscopy to detect the parasites. Fluorescent staining of parasites illustrated a shift in fluorescence intensity using flow cytometry and easily visualized parasites using microscopy. However, a modified protocol for intracellular staining of the murine macrophage cell line, J774A.1, did not reveal a separation between the infected cells and uninfected cells using flow cytometry. The parasites within cells were also undetectable using fluorescent microscopy. Although the hypothesis that there would be a detectable segregation between infected and uninfected cells was not met, this work will continue to attempt to develop what would be a time saving tool in Leishmania research.

Keywords: Leishmania, Flow Cytometry, Macrophage Infection
The Effects of Testosterone on Adipose and Uterine Tissue in a PCOS Mouse Model

Wenz, Sierra
Mentor(s): April Binder, Biological Sciences

Poster Presentation Session #1, Poster #44
8:30-11:00 a.m. in Ballroom B/C/D

Polycystic Ovarian Syndrome (PCOS) affects women of reproducing age and is characterized by polycystic ovaries, obesity, and unusually high levels of testosterone. In this experiment the effects of dihydrotestosterone (DHT) on female C57Bl/6 mice were observed in retroperitoneal, inguinal, gonadal, and brown adipose tissue as well as uterine tissue. For a twelve-week period, each mouse was either untreated or treated with DHT through a pellet inserted under the skin. The weight of each mouse was measured weekly. After twelve weeks, the mice were euthanized and adipose and uterine tissue samples were removed and embedded in paraffin wax. The tissues were sectioned, and stained using a hemotoxylin and eosin staining protocol. The weight of the DHT mice were significantly higher than the weight of the untreated mice, suggesting that excess DHT causes an increase in body weight for C57BL/6 mice. We hypothesize that DHT treated mice will have larger adipose cells and altered uterine tissue compared to the untreated mice. The difference in cell size for each tissue was examined, and we observed that the brown and inguinal fat cells of the DHT mice were qualitatively larger compared to the untreated cells. Preliminary results suggest there may be a difference in the number of uterine glands between the two treatment groups. This experiment aims to achieve a better understanding of the effects of DHT on the body mass and reproductive cycle of mice to gain a better understanding in relation to PCOS.

Keywords: PCOS, Testosterone, Adipocytes

Lily of the Valley
Wescott, Rachael
Mentor(s): Andrea Eklund, Family and Consumer Sciences

Poster Presentation Session #2, Creative Works, Poster #10
11:30-2:00 p.m. in Ballroom B/C/D

Purpose: The purpose of this garment is to bring wonderment, beauty, and imagination back into our lives. When we were young, princesses, fairies, and mermaids were an everyday occurrence and they brought daydreams and joy. This garment shows that even as an adult, a woman can put on a fairytalesque dress and be in her own world of beautiful scenery, singing songbirds and her own Prince Charming. This dress is for dreamers who go after their bliss and don’t let anything stop them. Every woman is beautiful in her own wonderful way, and this dress is suited for any woman who knows her true beauty and wants to show it to the world. Process: During the design process of this project, wedding dress designers were reviewed and future bridal trends were analyzed. This dress resembles a bridesmaid dress, because prints are becoming particularly popular among bridesmaids, especially watercolor and floral prints. I chose to do a strapless bridesmaid-like dress because most bridesmaids’ dresses have straps, while most wedding dresses are strapless, and I wanted to do switch dress design roles. Technique: This dress was created using the draping technique. Fabric was draped over a dress form and a pattern was created from the draping. A sample garment was made from the pattern and fittings on a model were done in order to create a proper fit. Once the fit was correct, final alternations to the pattern were made and the final garment was created. The garment is lined and has an invisible zipper and features flowing fabric for the skirt and a silk bodice. Innovation: The innovation of this design is the bias cut bodice that includes unique triangular shapes that form a unique silhouette on the wearer. By incorporating these design lines, the woman wearing the garment can feel unique and beautiful in a style and dress all her own. Materials: 100 percent polyester, 100 percent silk, 100 percent cotton, invisible zipper, polyester thread, hem tape. This is one in a line of three garments; the entire line can be seen at the Apparel, Textiles, and Merchandising spring fashion show, May 30, at 3:00 p.m. and 7:00 p.m. in Milo Smith Theater in McConnell Hall.

Keywords: Draping, Lace, Chiffon
Experimental Investigation of Nonlinear Wave Behavior in a Tensegrity Mast  
Westland, Joy  
Mentor(s): Andrew Piacsek, Physics; Peter Zencak, Physics

Poster Presentation Session #1, Poster #61  
8:30-11:00 a.m. in Ballroom B/C/D

Tensegrity structures are made up of load-bearing elements, called rods, and tension-bearing elements, called cables, held together in static equilibrium via a balanced distribution of compression and tension. First conceived in the mid-twentieth century, tensegrity structures have been analyzed and studied by mathematicians, civil and aeronautic engineers, and biophysicists, among others, generally with the goal of understanding static behavior. The focus of this study is the dynamic properties of a tensegrity structure when acting as medium for longitudinal and torsional vibrational waves. The first phase consists of the construction of the tensegrity tower while the second phase is to measure and characterize the wave pulses that propagate through the tower. This presentation will focus on the process of constructing a tensegrity tower through various methods. The approach to building the tower involves creating sections of the tower and then uniting them. Using aluminum rods connected by strings, the tower is formed with overlapping structural units or layers of three rods each. The primary challenge has been to control the amount of tension within the strings of the tower in order to create the balanced ratio between the rods and strings. Other challenges involve working with small scale hardware to tighten or loosen the structure to maintain equilibrium. Future experiments on the completed tower will investigate nonlinear wave behavior when compressional and torsional wave pulses are propagating through the structure.

Keywords: Tensegrity, Longitudinal/Torsional Waves, Nonlinear Equilibrium

Site Specific Project  
White, Katelyn  
Mentor(s): Crystal Fullmer, Physical Education, School & Public Health

Creative Expression Presentation, Session #19  
11:40-12:00 p.m. in Ballroom A

This work is from the choreography class in which I had to create and perform a movement phrase in a location on campus. Creating this project really challenged me as a choreographer because we had to learn to work with objects in the environment while using at least five compositional devices. Growing up a dancer, there was always music to dance with; however, in this project we had to use the background noise of our location as accompaniment. There is no meaning behind this dance. When I chose my site, near the green house facing D Street, I was trying to imagine movement that would compliment the trees, the bench, or the light pole. There were some aspects that were almost overwhelming because I had so many options in the space with which to work. One thing that helped me create this dance was focusing on the fun aspects. When I am told what I need to create I get stressed, but remembering simple things like playing in the park as a child really helped me. I focused on accumulation, dynamic variation, active stillness, and acceleration and began to have fun with simple movements, such as running from a tree to the light pole and spinning around. At one point, I sat down on a bench and began to play and from there I was able to complete my dance.

Keywords: Dance, Site Specific, Creative
American Society of Mechanical Engineers (ASME) R/C Baja Car
Wilhelm, Nathaniel; Dowdell, Chelsea
Mentor(s): Charles Pringle, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #6
2:30-5:00 p.m. in Ballroom B/C/D

The American Society of Mechanical Engineers (ASME) holds regional student design competitions each year with both a reoccurring RC Baja competition with a new challenge course each year. This project covers the design and manufacturing of components for a radio-controlled car to race in the annual ASME RC Baja competition. For this project, the car was broken down into its component subsystems and divided between two partners. It was then determined which components of each respective subsystem could be purchased and which required design and manufacture within the rules set forth in the ASME Baja competition rule book. All of the parts, both to be purchased and to be manufactured, were first drawn in SolidWorks to check alignment and for ease of FE analysis before manufacturing began. Parts and systems that were designed include: chassis of the car, differential and gear train, steering system, and the suspension system. Diverse manufacturing methods were used, including waterjet cutting, 3D-printing, and the use of manual mills and lathes, which in the future will be converted to CNC operations for ease of manufacturing. Both hands-on and computer testing thus far has shown that the car will be successful in completing the tasks that are required of it at the RC Baja competition. To conclude, after the design and manufacturing of this car was completed, a functional vehicle that starts, stops, and turns without issue was successfully created and functional testing will be completed at the competition.

Keywords: RC Car, Engineering, Manufacturing

Analysis of the Use It or Lose It Policy
Wilkinson, Taylor
Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #2, Poster #69
11:30-2:00 p.m. in Ballroom B/C/D

The use it or lose it policy was designed to encourage continual beneficial use of water. Since water is considered a public resource, a water right can be revoked whenever a user fails to meet the beneficial use test. Water is a scarce resource in the eastern part of Washington State and if it is not being used beneficially or if only a portion of the water allotted in the right is used, it theoretically would be allotted to another user who would utilize the water more efficiently. This use it or lose it policy has had negative effects, both economically and ecologically. To avoid relinquishing water rights, holders will often waste water by using it in ways that are not beneficial in efforts to protect their allocations. Fortunately, this problem can be mitigated by adopting market based solutions such as water markets, which would change the basis from beneficial use to willingness to pay. Policy alternatives examined will include (1) redefining of beneficial use, (2) altering the time associated with the relinquishment statue, and (3) restructuring of water right allocation from prior appropriation to willingness-to-pay.

Keywords: Market Based Alternatives
The Intermingling of Art and Science

Willard, Alyssa

Mentor(s): Stephen Robison, Art; Anne Cubilié, Douglas Honors College

Oral Presentation, Session #30
2:40-3:00 p.m. in Room 135

From prehistoric times to the Renaissance, there was little distinction drawn between art and science. Today, they continue to influence each other but are becoming increasingly separated. The intermingling of the arts and sciences are essential for technological advancements within our society; both are important aspects of culture, driven by creativity and their influences on each other are profound and diverse. In science, as in art, it is necessary to tap into imagination and creativity in order to rise above accepted knowledge to create new models and theories that can accommodate new knowledge. Art that explores technological and scientific frontiers asks questions about the possibilities and implications of technological innovation just like scientific research would. They differ in their perceptions and concepts that they explore, but are similar in that both artists and scientists contribute to developing new ideas. In the body of work I am creating in conjunction with this analysis, I am melding nature and technology. This relates to the blending of art and science because science is the study of nature, and constructed objects are art. Although the point of this thesis is to show how these two subjects rely on one another to advance, my artwork will be used to highlight the shift in our mindsets toward nature and how we attempt to emulate the complex beauty of nature with unnecessary advanced technologies. Therefore, these new scientific advancements and their implications have become the inspiration for my artwork.

Keywords: Art, Science, Technology

Women’s Roles as Tradition-Bearers: Equality and Revitalization

Williams, Diane

Mentor(s): Tracy Andrews, Anthropology & Museum Studies

Oral Presentation, Session #12
10:00-10:20 a.m. in the Theatre

At the very core of anthropology is the ongoing question of how cultures develop, change, and adapt. Cultural perspectives on gender roles, for example, can change based on decisions made by both men and women as the members of emigrant populations navigate ways to survive in new environments. For centuries, the contributions of Scottish women as active tradition-bearers in Scotland have often been overshadowed by a focus on the many public roles of men. Since arriving in Cape Breton Island in the mid-eighteenth century, the culture of the original Scottish settlers has experienced significant changes relative to the political and economic changes in the larger context of the region. Previous research from the 1970s predicted the Gaelic language and culture would disappear from the island by the year 2000. My research examines the changing roles of contemporary Cape Breton Highland women (1950 to 2014) in the maintenance and transmission of Scottish culture and traditions, and challenges the assumptions of previous scholars that the language and culture are dying out. Data were collected over a seven-week period through participant-observation at cultural events, archival research at the Beaton Institute, and thirteen face-to-face interviews with women of Gaelic descent. The analysis clearly indicates that not only have women’s roles as tradition-bearers changed, but their contributions are being acknowledged and supported by the Gaelic community in the movement towards maintenance and revitalization of the language and the culture.

Keywords: Gender, Culture, Tradition-bearers
Measuring the Bias of the Media’s Many Voices
Williams, Paul
Mentor(s): Filip Jagodzinski, Computer Science

Oral Presentation, Session #7
10:00-10:20 a.m. in Room 137B

Breaking news is often delivered by various sources of media, but the wording used can elicit a specific response from the readers, creating bias. We have created a suite of tools for conducting media bias research. Our beta version uses an open source web spider toolkit called Scrapy to obtain the media website’s text. This web spider is implemented by custom built back-end Python and Bash scripts. These scripts generate an XML file containing the text gathered from the media websites. Our web tool calculates metrics for performing media bias analysis by use of a large library of adjectives that are rated as either positive or negative. Finally, the tool displays those metrics for the user on a web graphical user interface. Using this first version of our tool, we are able to demonstrate a ranking of the bias of the text of two media sources.

Keywords: Media, Bias, Metric

Synthesis and Testing of Possible Antimicrobial Agents from Breakdown Products of Lasalocid A
Wilson, Parker; Handley, Alex; Baluca, Diana
Mentor(s): P. Whitney Swain, Chemistry

Poster Presentation Session #1, Poster #33
8:30-11:00 a.m. in Ballroom B/C/D

Increased antibiotic resistance has led to increased demand for new antibiotic development. Completely synthetic libraries currently in production lack much of the structural complexity necessary for biological activity. This research focuses on the synthesis of natural product-like compound libraries. The products are derived from lasalocid, a naturally produced antibiotic primarily used as an additive in cow feed. This parent material was selected for its large degree of structural complexity. A Baeyer-Villiger oxidation will be performed to isolate the most complex portion of the molecule. The functionality of this core scaffold will then be chemically modified. The resulting chemical products will then be tested for antibiotic activity against several pathogenic bacteria including Staphylococcus aureus, the Gram-positive bacterial species responsible for staph infections, using a Kirby-Bauer disk diffusion assay.

Keywords: Antibiotic, Synthesis, Staphylococcus aureus

Eight Thousand Years of Sedimentation and Arroyo Formation, Hanson Creek, Yakima Training Center, Washington
Windingstad, Levi
Mentor(s): Lisa Ely, Geological Sciences

Poster Presentation Session #1, Poster #10
8:30-11:00 a.m. in Ballroom B/C/D

The causes and timing of cycles of sedimentation in the Hanson Creek drainage in central Washington provide insight into changes in channel morphology and paleoenvironment within the region over the last 8,000 years. Using LiDAR imagery and field surveys, recent processes such as degree of modern channel incision, accumulation of valley floor sediment, and channel morphology and gradient were evaluated. The spatial distribution of these channel characteristics was assessed in relation to proximal land forms such as spring mounds, colluvial deposits, and basalt outcrops. Sixteen stratigraphic profiles in the arroyo walls were used to delineate and correlate past depositional episodes based on sediment characteristics. Basal ages of the earliest documented depositional period were constrained using geochemical analysis.
of tephra beds. Intermediate dates were obtained from 14C analysis of charcoal. Stratigraphic evidence suggests multiple transitions from an aggrading braided system to an expansive, fine-grained, alluvial step-pool sequence that aggraded a minimum of 3.5 m throughout the last 8,000 years. Low gradient, fine-grained, organic-rich, sediment suggests prolonged periods of saturation at three locations throughout the incised reach, adjacent to evidence of groundwater springs. The intervening reaches exhibit comparatively high gradients for unconsolidated alluvium. A single and unprecedented 9 m deep incision of a 1.8 km reach occurred around AD 1900. The timing and physical environmental conditions associated with Holocene sedimentation in the Hanson Creek watershed will supplement the minimal data available on arroyo formation in the northwestern United States, and allow a comparison with the timing of archaeological occupation sites adjacent to Hanson Creek.

Keywords: Arroyo, Hanson Creek, Sedimentation

Stock Analysis of Hasbro
Wold, Alex
Mentor(s): Thomas Tenerelli, Finance & Supply Chain Management

Oral Presentation, Session #17
12:00-12:20 p.m. in Room 201

The purpose of the current study was to quantitative analyze the toy-making company Hasbro’s prospects to come up with an investment rating. Only publically available information such as news reports, known competitors actions, and income statements were used to create a basis of understanding for the company. The next step is to go deeper and use the obtained information to approximate Hasbro’s market share in each of its subsidiaries and estimate any possible growth potential. This leads to a rough valuation of the company in terms of dollars. The final piece of our analysis will be an examination of some other reports. Have professional analysts changed their recommendation recently? Has management been buying a bigger stake in the company? Either of these could mean the stock price is expected to change soon. A quantitative analysis of the company’s earnings moving forward will allow us to calculate an estimated future price per share of the company, resulting in a recommendation to buy, sell, or hold the stock based on our in-depth research.

Keywords: Stock, Analysis, Professional

Maternal Labor Force Participation and Attitudes About Work-Family Balance
Wold, Brittany
Mentor(s): Sarah Feeney, Family and Consumer Sciences

Poster Presentation Session #3, Poster #42
2:30-5:00 p.m. in Ballroom B/C/D

The purpose of this investigation was to determine whether maternal labor force participation in childhood impacts later attitudes about how families should balance work and family responsibilities. Participants completed an anonymous online survey, n=177. Results showed that some attitudes differed depending on maternal labor force participation. Children of mothers who were employed full time were more likely to endorse statements in support of stay-at-home fathers and mothers’ participation in the workforce. Similarly, children of working mothers also endorsed that mothers should prioritize their participation in the labor force to the same degree that fathers do. Those whose mothers stayed home were more likely to agree to a statement in support of mothers taking as much time off work as they feel necessary. Findings suggest that maternal labor force participation may shape their child’s later views towards how men and women should divide work and family responsibilities.

Keywords: Labor Force, Maternal
Seat Jack
Worden, Justin
Mentor(s): Roger Beardsley, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #32
2:30-5:00 p.m. in Ballroom B/C/D

Many people around the world struggle with mobility. One of the biggest obstacles for those who may struggle in this area is the simple task of moving from a sitting position to their feet. For some, this is the only thing that keeps them from walking around. Creating a portable device to help move a person from their chair to their feet would extremely aid the efforts of completing this simple task at any given moment. This report provides a proposed solution for this simple reoccurring task that countless people painfully struggle with every day. In order to make this device portable, two main parameters were of concern, size and weight. Tests on the device's range of motion, support/rigidity, propulsion capacity, and difficulty of use are discussed. Assessment of the test results will provide evidence backing the proposed design of a device that will lower the difficulty of this task. This portable device will become a benchmark for alternative designs that will further improve possible aid to the user in need.

Keywords: Portable, Aid, Rigidity

Barriers to Breast and Cervical Cancer Screenings for Underserved Women: Results From the Health Information National Trends Survey
Wylie, Janelle
Mentor(s): Tishra Beeson, Physical Education, School & Public Health

Oral Presentation, Session #9
10:00-10:20 a.m. in Room 201

Breast and cervical cancer screenings are effective early detection measures for reducing cancer mortality among women. Following the United States Preventative Services Task Force guidelines, this study aims to examine the utilization of the recommended mammogram and cervical cancer screenings among subgroups of women using the Health Information National Trends (HINTS) dataset. We used the most recent iteration of the HINTS Cycle 3 survey to conduct unpaired t-tests and multiple regression models of mammogram rates among women over age 50, \( n=1,105 \), and cervical cancer screening rates among women age 21-65, \( n=1,353 \). It was found that nearly one in four women over age 50 did not receive the recommended mammogram, while 19 percent of women age 21 to 65 did not get the recommended cervical cancer screening. Age, \( p<0.001 \) and \( p<0.001 \), being unemployed, \( p=0.033 \) and \( p=0.047 \), being uninsured, \( p<0.001 \) and \( p<0.001 \), not having a regular provider, \( p<0.001 \) and \( p<0.001 \), having less than a college degree, \( p<0.001 \) and \( p=0.001 \), and not being married, \( p<0.001 \) and \( p<0.001 \), were all associated with not receiving the recommended mammogram or cervical cancer screening, respectively. Compared to uninsured women, those who have health insurance are 1.93 times more likely to receive a mammogram, \( p=0.042 \), and 2.45 times more likely to receive a cervical cancer screening, \( p=0.033 \), when accounting for all covariates in the multivariate models. Understanding which sub-groups of women are less likely to receive essential cancer screenings will help guide public health interventions aimed at improving early detection among at-risk women.

Keywords: Women, Prevention, Screenings
A Prosperous Hispanic Population Equates To a Robust America
Zamora, Edgar
Mentor(s): Stefanie Wickstrom, Political Science

Oral Presentation, Session #31
3:00-3:20 p.m. in Room 137A

For the last decade, the American political, economic, and educational landscape has weathered a destructive storm. That period of time left a large amount of Americans battered, but those effected managed to make it through. As a new age dawns in the United States, so does a new challenge. The crisis is that American leaders are omitting the Hispanic population to the point that their influences on politics, economics and education are being overlooked. These actions toward the Hispanic population need to be rectified. The reason is that according to the United States Census, Hispanics will constitute about 30 percent of the entire population by 2050, making their influence greater as the years go by. There is less chance of Hispanic influence on politics, economy, and education being utilized correctly if this information is not realized. Thus, change through policies has to be made in politics, economics, and education to allow Hispanics to improve their status. These areas have to be split into subsections for evaluation. Politics will be addressed through voter turnout, local and national elections, and the 2016 presidential election. For economics, Hispanics’ influence on labor force and buying power within the United States will need to be addressed. Lastly, education will address Hispanic college attainment and immigrant students within the United States. By analyzing the elements of politics, economy, and education, one will begin to understand why Hispanics are critical for the future of America.

Keywords: Hispanic, United States, Future

Revitalization of the Urban Core in Liuzhou
Zeng, Huanhuan
Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #2, Poster #60
11:30-2:00 p.m. in Ballroom B/C/D

Liuzhou City is a successful industrial city in southwest of China. It is the second largest city and the largest industrial base in Guangxi Zhuang Autonomous Region. Over the past twenty years, the processes of industrialization and urbanization have resulted in pollution and a shortage of the land that pose barriers to further development. To cope with these problems, Liuzhou City has devised a strategy for the transformation for the city’s economic development known as the Revitalization of the Urban Core Plan. Transformation involves extending the urban core through the creation of new districts, conversion of rural to urban space, and development of peripheral industrial parks. Once new space is available, old polluting industries can construct and move to new less polluting facilities and the space they vacate can be revitalized, cleaned up, and used to develop high end technology and service sectors in the old core. As one of the urban areas of Liuzhou City, Yufeng district is a primary target for transformation. This analysis deals with the problems and the revitalization measures used to address them, the progress and current status of these efforts, and the challenges of the revitalization that remain for Yufeng district and Liuzhou City.

Keywords: Revitalization, Urbanization, Industrialization
Cell Phone in the Sky: Quadcopter for Aerial Photography

Zhang, Hengwei

Mentor(s): Roger Beardsley, Engineering Technologies, Safety, & Construction

Poster Presentation Session #3, Constructed Objects, Poster #10
2:30-5:00 p.m. in Ballroom B/C/D

With the development of aircraft model technology, quadcopters equipped with cameras are more frequently used for aerial video. Cell phones, moreover, allow people to share photos online immediately, so many people prefer to take photos or videos by cell phones instead of expensive cameras. Thus, the purpose of this project is to design and build a lightweight quadcopter frame and select the system components that allow the quadcopter to fly smoothly while carrying a cell phone for aerial video. The method for creating the quadcopter is separated into three steps: design, build, and test. The design part includes frame design on the SolidWorks and Thrust/Weight ratio calculation with a safety factor of 1.0 to 1.5. The build consists of a center plate made of carbon fiber plate. Aluminum sheet metal arms are formed into a U-shape and attached to the plate. A drill press, treadle shear, and manual turret punch are used during the building process. The remaining parts, such as cellphone carrier, battery, motors, speed controller, and control board were purchased after the analysis. The frame and electric parts were assembled with screws, nuts, and glue. During the testing section, two different propellers are tested to determine which size and type provide maximum thrust with the least battery consumption. Additional testing will evaluate stability of flight and payload capacity.

Keywords: Quadcopter, Frame, Aerial Video, Thrust/Weight Ratio, Motor

Liuzhou’s Housing Supply: Affordable Quality Housing for Everyone

Zhang, Huazhi

Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #2, Poster #64
11:30-2:00 p.m. in Ballroom B/C/D

Liuzhou is known throughout China, even the world, as a livable industrial city. An adequate supply of quality housing for all citizens is the most essential factor in livability. This is especially true in China where home ownership has been a prerequisite for happiness since ancient times. Because basic housing, as a necessity of life, is now guaranteed by the state, the government must supervise and adjust the housing market. At the same time, experience has shown that adequate housing for different income categories cannot be provided by the government alone. This analysis examines the policies and strategies adopted by Liuzhou over the past 10 years to maintain the city’s livability in the face of a population explosion caused by urbanization. For instance, the municipal government has been implementing urban redevelopment and construction of new districts to ensure the supply of construction land. Careful monitoring and adjustment of financial and tax policies have successfully regulated the real estate market to keep basic housing prices affordable and prices at all levels reasonable. The effectiveness of these policies for different income strata is explored in depth, as is the city’s construction of indemnificatory low-income housing for the citizens of Liuzhou.

Keywords: Affordable Housing Supply, Home Ownership, Indemnificatory Housing
Using Entangled Photons for Single Photon Interference

Zimmerer, Nathan
Mentor(s): Michael Braunstein, Physics

Poster Presentation Session #1, Poster #52
8:30-11:00 a.m. in Ballroom B/C/D

Entangled photons and single photon interference are prime examples of quantum mechanics and are useful in evaluating the theory. To find entangled photons, an apparatus was built and optimized that used heralded detection. The apparatus produced entangled photons using a pump laser producing 474 nm radiation, and a β-Barium Borate (BBO) crystal. The entangled 948 nm photons were produced in two separate beams arbitrarily known as signal and idler photons. Each beam was detected by an avalanche photodiode (APD). When the signal photons reached the APD, electronic pulses were produced and sent through a delay line, while electronic pulses from the idler photon APD were not. Then the pulses from the APDs were used as a start and stop for a time-to-amplitude converter (TAC). A multichannel analyzer was used to evaluate the TAC spectrum, and showed a large amount of coincidences at time intervals consistent with that of the delayed signal pulses. These coincidences provide evidence that the apparatus was producing entangled photons. After the apparatus was optimized, a double slit was placed in the path of the signal photons and used to search for heralded single photon interference. The results were inconclusive within measurement uncertainty.

Keywords: Entangled, Photon, Interference
SOURCE 2015 ACKNOWLEDGMENTS

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SPECIAL THANKS TO STUDENTS IN EVENT PLANNING CLASSES IN CWU’S DEPARTMENT OF FAMILY AND CONSUMER SCIENCES

Special thanks to Dr. Carla Jellum and students in the Event Planning specialization classes in the Recreation and Tourism Program, Department of Family and Consumer Sciences.

In particular, we are grateful for the work of our two SOURCE Event Planning Practicum Students, Blake McBride and Emily Waag. We are also grateful to the Event Planning student team who organized and hosted the SOURCE 20th Anniversary Social Event for mentors and judges in the Grupe Faculty Center: Mallory Campbell, Kyla Swanson, Monica Cumiskey, Wes King, Emily Waag, Haley Smasne, and Kirsten Alter.

The Event Planning specialization prepares students for positions in special events coordination and operation, lodging sales and marketing, convention centers, destination marketing organizations, tourism planning, recreation and sports centers, and many others. SOURCE is grateful for their energy and expertise, especially on the day of the event.

Tina Allenbaugh  Katie Focher  Haley Smasne
Kirsten Alter  Rachel Ford  Hayden Spevacek
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2015 STUDENT BUSINESS PLAN COMPETITION JUDGES

Judges for the 2015 Student Business Plan Competition (BPC) are listed below. They served as judges for written business plans and/or oral presentations of the business plan by finalists. All of the judges are members of the Advisory Group for the Central Washington University Institute for Innovation and Entrepreneurship (I4IE).

The CWU Student Business Plan Competition is sponsored by the Herbert B. Jones Foundation (Seattle).

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