PROGRAM AND PROCEEDINGS

SOURCE

SYMPOSIUM ON UNIVERSITY RESEARCH AND CREATIVE EXPRESSION (SOURCE)

19TH ANNUAL CONFERENCE

CENTRAL WASHINGTON UNIVERSITY
STUDENT UNION AND RECREATION CENTER
ELLENSBURG, WASHINGTON

MAY 15, 2014

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SOURCE 2014

This year, SOURCE celebrates the 19th year of annual multidisciplinary conferences dedicated to student scholarship at Central Washington University.

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.
SOURCE: A History and the Present

In 1996, CWU sponsored the first Undergraduate Research Symposium with twenty-three presentations of faculty-mentored undergraduate student research. In 2005, the undergraduate symposium merged with the Conference of Graduate Student and Faculty Scholarship, creating the current incarnation of SOURCE – the Symposium On University Research and Creative Expression. All forms of research, scholarship, and creative activities by students, faculty, and staff are welcome.

SOURCE 2014 celebrates 361 presentations with 604 listed authors and co-authors. All presentations are also mentored by faculty or staff at CWU with many presentations having more than one listed mentor. This year, we welcome mentors from Lawrence Livermore National Laboratory, Yakima Valley Community College, and Pacific Northwest University of Health Sciences as well as Ellensburg High School, Selah Junior High School, Walter Strom Middle School, Chief Joseph Middle School in Richland, and Chief Kanim Middle School in Fall City.

Many distinct types of presentations are supported by SOURCE, including 138 oral presentations, 3 panel presentations, 22 creative expression performances or presentations, 143 poster presentations with 9 more at satellite campuses, 27 constructed objects, and 13 creative works that includes a fashion show with 8 designs.

This year, 52 academic and administrative units are participating: Actuarial Science; Africana & Black Studies; Anthropology & Museum Studies; Apparel, Textiles and Merchandising; Art; Asia/Pacific Studies; Biological Sciences; Center for Leadership and Community Engagement; Chemistry; Communication; Computer Science; Craft Brewing Certificate; Douglas Honors College; Disability Services; Economics; Educational Foundations & Curriculum; Engineering Technologies, Safety, & Construction; English; Environmental Studies; Ethnic Studies; Family and Consumer Sciences; Family Studies; Film and Video Studies; Finance & Supply Management; Geography; Geological Sciences; Global Wine Studies; History; Information Technology and Administrative Management (ITAM); Language, Literacy, & Special Education; Law and Justice; Management; Mathematics; McNair Scholars Program; Music; Nutrition, Exercise and Health Services; Philosophy and Religious Studies; Physical Education, School & Public Health (Dance Program); Physics; Political Science; Primate Behavior & Ecology; Psychology; Public Relations; Recreation & Tourism; Resource Management; Science Talent Expansion Program (STEP); Science Education; Science Honors Research Program; Sociology; Student Success; Theatre; Women’s and Gender Studies; & World Languages.

We continue to welcome additional growth in numbers of presenters and participants, as well as an expanded roster of participating colleges, departments, and programs. Our vision continues to be one of creating an event showcasing all realms of scholarly work at CWU, and sharing them across disciplines and with the outside community.
May 15, 2014

I would like to extend my personal welcome, and that of everyone at Central Washington University, to the university’s 19th annual Symposium On University Research and Creative Expression (SOURCE). SOURCE is the university’s largest, multidisciplinary event. It offers us a yearly opportunity to celebrate the tremendous quality and quantity of research and creative achievements produced by our undergraduate and graduate students, faculty, staff, alumni, and other members of the community.

The first SOURCE was held in 1996 and it showcased the work of 23 undergraduate students, along with their faculty mentors. By way of comparison, SOURCE 2014 will feature more than 360 presentations by undergraduates, graduate students, faculty, staff, and community members. This year’s program represents the intellectual and creative activities of 52 different academic and administrative programs and units.

SOURCE is dependent upon the faculty and staff who mentor students throughout the year in research, scholarship, and creative projects that are presented at SOURCE. This year, we are pleased to welcome mentors from regional and national institutions, including Lawrence Livermore National Laboratory, Yakima Valley Community College, Pacific Northwest University of Health Sciences, Ellensburg High School, Selah Junior High School, Walter Strom Middle School, Chief Joseph Middle School, and Chief Kanim Middle School.

While SOURCE highlights the university’s incredible academic vitality, it would not be possible without a team of dedicated university personnel who work behind the scenes, putting the pieces in place for the spring symposium. It is through the work of this year’s SOURCE Committee, chaired by Kara Gabriel, CWU associate professor of psychology, that SOURCE continues to be considered a “model of inclusiveness” as it “encourages and rewards innovative and entrepreneurial discovery, fosters faculty/staff-student relationships, and contributes to whole student development.”

SOURCE also would not be possible without key contributions from administrators, faculty and staff members, and other volunteers who offer their valuable time and expertise to serve as session judges and chairs, or the generous financial contributions from a variety of university academic and administrative units, individuals, and corporate sponsors.

Again, welcome to SOURCE. It is truly a community effort of which we can—and should—all be proud.

Sincerely,

James L. Gaudino, PhD
President
Manastash is an annual literary magazine, highlighting the best creative writing and art 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 magazine is housed in the English department and has been published annually for more than 40 years. Katharine Whitcomb is the current coordinator for this program. Joseph Johnson 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 and 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.

Take time to visit the Museum’s current exhibit, “How Did the Cougar Cross the Road? Restoring Wildlife passages at Snoqualmie Pass.”

Join us at SOURCE for two special Museum Studies panel sessions from 2:40 to 4:00 and 4:10 to 5:30 p.m. in Room 137A, presenting a digital audio tour of Central Washington University art and architecture.
STUDENT FASHION SHOW

The CWU Apparel, Textiles and Merchandising program is proud to present the 18th annual spring fashion show, **CATACLYSM**. Come see the latest trends featured in our ready-to-wear categories: Rebellion, Revival, and Rebloom. Seven 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, June 7, 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 CWU 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 email professor Andrea Eklund at aeklund@cwu.edu. Show details can also be found on the Apparel, Textiles and Merchandising Facebook page.

BUSINESS PLAN COMPETITION

The Institute for Innovation and Entrepreneurship (I4IE) Business Plan Competition is generously sponsored by the Herbert B. Jones Foundation. 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 May 21 at noon in the SURC Pit.

PROGRAM COVER DESIGN

Senior graphic design student, Travis Rossignol, is this year’s SOURCE poster designer under the direction of Professor Glen L. Bach in the Department of Art. The SOURCE poster and program cover is one of many academic service learning projects that students undertake in Prof. Bach’s curriculum. Travis’ design represents the merging of every corner of the academic world, showing that no individual field is more important than the other and that all are equally involved in the growth of art and intellect.

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. Found out more at: [https://www.cwu.edu/music/trombone-choir](https://www.cwu.edu/music/trombone-choir)
RESEARCH OPPORTUNITY SHOWCASE ON THE MEZZANINE BRIDGE

Interested in research opportunities or support for your research or scholarship at Central? Check out the following tables on the 2\textsuperscript{nd} floor mezzanine bridge during SOURCE: the Science Honors Research Program, the Academic & Research Commons at Brooks Library, McNair Scholars Program, the Science Talent Expansion Program (STEP), and the Center for Excellence in Science and Mathematics Education (CESME).

In addition, SOURCE welcomes Eastern Washington University representatives who can answer questions and provided information for students interested in attending the National Conference on Undergraduate Research (NCUR) in April 2015 at Eastern Washington University.
SOURCE WELCOMES WASHINGTON FIRST ROBOTICS COMPETITORS

SOURCE 2014 invites presentations from regional schools in order to better promote interdisciplinary science teaching and research. This year, we are honored to have demonstrations by teams from Chief Joseph Middle School in Richland and Chief Kanim Middle School in Fall City that competed in the First Lego League robotic competition.

The First Lego League (FLL) is a robotic competition developed for middle school age students and designed to inspire students to take an interest in science and technology. This year’s FLL competitors investigated the Nature’s Fury℠ challenge. For the challenge, each team selected, researched, and proposed a solution to a real-world problem posed by natural disasters by building, testing, and programming an autonomous robot using Lego Mindstorms® to solve a set of missions in the robot game.

Join us in the SURC Pit for demonstrations by the First Lego League teams on Hydroshield: No Hassle Sandbag Solution for Flood Protection and One Spark! Start an Idea, Not Fires! between 11:40-1:00 and 1:10-2:30 in the SURC Pit.
### PROGRAM AT A GLANCE

<table>
<thead>
<tr>
<th>Time</th>
<th>Room</th>
<th>Session Details</th>
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<tbody>
<tr>
<td>Varies-9:30</td>
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<td>(Check program for start of each session)</td>
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<td>9:30-9:40</td>
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<td>10 MINUTE BREAK</td>
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<td>9:40-11:00</td>
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<td>10 MINUTE BREAK</td>
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<tr>
<td>11:00-11:30</td>
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<td>MUSICAL WELCOME &amp; FASHION SHOW on the SURC mezzanine outside the Ballrooms</td>
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<td>11:30-1:10</td>
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<td>10 MINUTE BREAK</td>
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<td>1:10-2:30</td>
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<td>10 MINUTE BREAK</td>
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<td>2:30-4:00</td>
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<td>10 MINUTE BREAK</td>
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<td>4:00-5:30</td>
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<td>10 MINUTE BREAK</td>
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### Poster Session #1 - Topics
- Actuarial Science
- Biology
- Chemistry
- Computer Science
- Environmental Studies/Earth Science
- Geology
- Physics
- NEHS
- STEP, Science Education
- Ellensburg High School

### Poster Session #2 - Topics
- Anthropology
- Economics
- Environmental Studies
- Geography
- Political Science
- Resource Management
- Walter Strom Middle School
- Selah Junior High School

### Poster Session #3 - Topics
- Communications
- Economics
- Educational Foundations & Curriculum
- Engineering Technologies, Safety & Construction
- Family and Consumer Science/Family Studies
- Language, Literacy & Special Education
- Psychology
- Sociology
- Primate Behavior & Ecology
- World Languages

### Constructed Objects:
- Engineering Technologies, Safety & Construction
STUDENT UNION AND RECREATION CENTER MAP
(First Floor)

Entrance

C-Store

Food Court

Expresso Bar

Men's 135 Sessions
Women's

137A Sessions

137B Sessions

Men's

140 Sessions

Women's

Registration 2nd Floor

Coffee & Juice Bar

Entrance

Info
### ORAL PRESENTATION AND CREATIVE EXPRESSION SCHEDULE

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

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<thead>
<tr>
<th>SESSION 1</th>
<th>Room 135</th>
<th>Session Chair: Katharine Whitcomb</th>
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<tbody>
<tr>
<td>8:50-9:10</td>
<td><em>Epiphany</em>&lt;br&gt;Morrow, Ebonesiah</td>
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<tr>
<td>9:10-9:30</td>
<td><em>cleave</em>&lt;br&gt;Mooney, Molly</td>
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<tr>
<th>SESSION 2</th>
<th>Room 137A</th>
<th>Session Chair: Gilberto Garcia</th>
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</thead>
<tbody>
<tr>
<td>8:50-9:10</td>
<td>Parental Involvement and the Engagement of Youth in Property Crimes&lt;br&gt;Ramirez, Laura</td>
<td></td>
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<tr>
<td>9:10-9:30</td>
<td>Effects of Father’s Involvement on Men’s Attitudinal Measures Regarding Parenting&lt;br&gt;Smith, Keith</td>
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<tr>
<th>SESSION 3</th>
<th>Room 137B</th>
<th>Session Chair: Anthony Gabriel</th>
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<tbody>
<tr>
<td>8:10-8:30</td>
<td>HopeSource Weatherization and Conservation Services: An Analysis of Program Effectiveness&lt;br&gt;Harris, Stephanie</td>
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</tr>
<tr>
<td>8:30-8:50</td>
<td>Using GIS to Model Potential Salmon Habitat Restoration in the Swauk Creek/Highway 97 Corridor&lt;br&gt;Hess, Jared; Ishimitsu, Kylie; Mueller, Kelsey; Salmons, Lucas; Shinn, Allison</td>
<td></td>
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<tr>
<td>8:50-9:10</td>
<td>Modeling Elk Habitat Suitability in the North Cascades&lt;br&gt;Yost, Anna</td>
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<tr>
<td>9:10-9:30</td>
<td>Influence of Saltwater Intrusion, Climate, and Population Changes on the Ground Water Supply of San Juan Island&lt;br&gt;Adolphson, Scott</td>
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</table>
SESSION 4  Room 201  
Session Chair: Raymond Hall  
8:30-8:50  Cultural Capital in Our Schools  
Athan, Stavroula; Duval, Brittney  
8:50-9:10  The Quest for Equality: African American Males Breaking Barriers in Professional Sports (1920-2013)  
Patterson, Mia  
9:10-9:30  El Salvador  
Abuhudra, Lana; Gregson, Ryan; Welch, Alysaa; Vidaurri, Elizabeth; Arevalo, Esme

SESSION 5  Room 202  
Session Chair: Timothy Englund  
8:10-8:30  Abundant Weirdness: Our Journey to Breaking a World Record  
Klarich, Jeremy; Darst, Jacob; Cockrum, Anna; Campbell, Luke; McDonald, Michael  
8:30-8:50  A Confidence Interval for the Density of Abundant Numbers  
Pidde, Melissa  
8:50-9:10  Poincare Doughnuts: An Investigation of Non-Euclidean Orthogonal Circles in Euclidean Space  
Mailhot, Daniel  
9:10-9:30  Directed Graph Cryptosystems  
Boberg, Kurt

SESSION 6  Room 271  
Session Chair: Daniel Herman  
8:10-8:30  Let Them Eat Grass: The Media and the Sioux Uprising of 1862  
Bergstrom, Jordan  
8:30-8:50  Territorial Identity: How Newspapers Covered the Civil War in Washington Territory 1861-1865  
Griffith, Adam  
8:50-9:10  Army of Liberation, Army of Terror: Rape as a Weapon of War  
Hedgers, Kellie  
9:10-9:30  Free Speech, Critical Thinking and Anti-Communism on a College Campus  
Miller, Scott
SESSION 7
Room 301
Session Chair: Roy Savoian

9:30-10:00  Wildcat Cafe & Brewpub
            Brookhart, Ryan

10:00-10:30 Yeah Buddy Brewpub and Theater
              Dahlin, Alex

10:30-11:00 DM Card Storage Innovations
              MacAdam, David

11:00-11:30 MightyTieton BeerWorks
              Newstead, Peter

11:30-12:00 Growler Galaxy
              Smith, Austin

12:00-12:30 Trung Institute of English as a Second Language
              Van Sickle, Tyler

12:30-1:00 CLOSED TO PERMIT BUSINESS PLAN COMPETITION JUDGES’ DELIBERATION

SESSION 8
Ballroom A
Session Chair: Laila Abdalla

8:50-9:30  “L’Homme en animal”, Human Animals
           Johnson, Michael; Burkette, Lyndsey; Andrus, Natalie; Zencak, Victoria

SESSION 9
Room 135
Session Chair: Joseph Johnson

9:40-11:00 Manastash Showcase
           Allen, Brittany; Allmand, Chloe; Dougherty, Steven; Epperson, Megan;
           Fisher, Daniel; Gould, Shaylynn; Landoe, Kathryn; Zalischi, Natalia

SESSION 10
Room 137A
Session Chair: Cody Stoddard

9:40-10:00 It Could Have Been the Mountain Dew: Burrage v. US and the Limits of
           Legal Liability for Illicit Drug Distribution
           Sayre, Elizabeth
SESSION 10  Room 137A (continued)

10:00-10:20  Navarette v. California: Fourth Amendment, Vehicles, and Anonymous Tips
Nguyen, James

10:20-10:40  Fernandez v. California
Marri, Tanya

SESSION 11  Room 137B
Session Chair: Patrick McCutcheon

9:40-10:00  A Faunal Sample from Pre-Mazama Levels of the Bernard Creek Rockshelter,
Hells Canyon, Idaho
Day, Lianne

10:00-10:20  Radiocarbon Dating of Calcined Bone: Pacific Northwest
Brown, James

10:20-10:40  A Diachronic and Synchronic Comparison of Sites 45PI0429, 45PI0438,
45PI0406, and 45PI0408, at Mount Rainier, Washington
Ferry, Joy; McCutcheon, Patrick

10:40-11:00  Results from the Continued Lithic Analysis of the Sunrise Ridge Borrow Pit Site
(45PI0408), Mount Rainer National Park, Washington
Lewis, Patrick; Davis, David; McCutcheon, Patrick

SESSION 12  Room 140
Session Chair: Laura Portolese Dias

9:40-10:00  Canvas Training Program
Betz, Amber; Guinotte, Sarah

10:00-10:20  Spam Filtration Using Massively Parallel kNN in CUDA
McElroy, Patrick; Smithrud, Joshua

10:20-10:40  Central Access Reader: The Next Generation Text to Speech Program
Holden, Wendy; Sunens, Marshall

SESSION 13  Room 201
Session Chair: Loretta Gray

9:40-10:00  Assessing the Expectations for Learning Commons Tutoring
Hirschey, Olivia

10:00-10:20  Introducing “Like” in Discourse to EFL Students through Corpora
Koughan-Thornburg, Karlyn
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<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
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<tr>
<td>10:20-10:40</td>
<td>Bob or Bop? A Phonological Investigation into the Markedness Differential Hypothesis and the Subset Principle</td>
<td>Hodges, Clara</td>
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<td>10:40-11:00</td>
<td>Theocracy, It’s a Piece of Cake. Really!</td>
<td>Kaviani, Khodadad (Khodi)</td>
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<td><strong>SESSION 14</strong></td>
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<td><strong>Room 202</strong></td>
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<td></td>
<td><strong>Session Chair:</strong> Yvonne Chueh</td>
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<td>9:40-10:00</td>
<td>Mathematical Modelling of Highway Traffic Policies</td>
<td>Squire, Benjamin; Mann, John-Paul; Minor, Nathan</td>
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<td>10:00-10:20</td>
<td>On Cyclic Decompositions of $K_{n-n-1-n-1}$ into a 2-Regular Bipartite Graph with at Most Two Components</td>
<td>Carmona Herrera, Maira</td>
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<td>10:20-10:40</td>
<td>Analyzing the Seahawks’ Offensive Play-Calling</td>
<td>Brand, Adam</td>
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<td>10:40-11:00</td>
<td>Actuarial Model Outcome Optimal Fit (AMOOF) 3.0: Free Research Software for Data Analyses and Advanced Probability Modeling</td>
<td>Smigaj, James</td>
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<td><strong>SESSION 15</strong></td>
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<td><strong>Room 271</strong></td>
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<td></td>
<td><strong>Session Chair:</strong> Roxanne Easley</td>
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<td>9:40-10:00</td>
<td>Bananas Painted Red: US Neo-Colonialism in the Colombia 1927-1928</td>
<td>Moser, Robert</td>
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<td>10:00-10:20</td>
<td>Building a Myth: Testaments of the Kievan Rus’ Grand Princes as Origin Myths</td>
<td>Seelye, Elizabeth</td>
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<td>10:20-10:40</td>
<td>The Russian Paradox: Kropotkin’s Influence on International Eugenics</td>
<td>Melton, Joseph</td>
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<td>10:40-11:00</td>
<td>Beautiful and Bound</td>
<td>Graham, Catherine; Hautamaki, Lauren; Macdonald, Crystal; Glasman, Elizabeth</td>
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<tr>
<td>SESSION 16</td>
<td>Ballroom A</td>
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<tr>
<td>Session Chair:</td>
<td>Laila Abdulla</td>
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<tr>
<td>9:40-11:00</td>
<td>“Feast Your Eyes” Performance in American Sign Language</td>
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<td>Loudenback, Jer</td>
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<tr>
<th>SESSION 17</th>
<th>SURC Theatre</th>
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<tr>
<td>Session Chair:</td>
<td>Michael Ogden</td>
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<tr>
<td>9:40-11:00</td>
<td>Building Bridges with Music and Documentary</td>
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<tr>
<td>Ogden, Michael; Sanders, Maria; Blink, David</td>
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<tr>
<th>SESSION 18</th>
<th>Room 135</th>
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<tr>
<td>Session Chair:</td>
<td>Raymond Hall</td>
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<tr>
<td>11:40-12:00</td>
<td>The Effects of Native American Folklore on Contemporary Nonfiction Literature</td>
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<tr>
<td>Epperson, Megan</td>
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<tr>
<td>12:00-12:20</td>
<td>The Ego-Function of Rhetoric in Leaves of Grass</td>
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<td>Rampa, Peter</td>
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<tr>
<td>12:20-12:40</td>
<td>Who Is Alice?: Parody, Education, and Identity in Lewis Carroll’s Alice’s Adventures in Wonderland</td>
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<td>Sedlacek, Cameron</td>
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<tr>
<td>12:40-1:00</td>
<td>Dystopian Cinderellas: “I Follow Him Into the Dark”</td>
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<td>Lear, Courtney</td>
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<tr>
<th>SESSION 19</th>
<th>Room 137A</th>
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<tr>
<td>Session Chair:</td>
<td>Stefanie Wickstrom</td>
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<tr>
<td>11:40-12:00</td>
<td>Non-School Activities and the Hispanic/White Achievement Gap</td>
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<td>Medina, Darla Davey</td>
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<tr>
<td>12:00-12:20</td>
<td>Corporate Style Education Reform and the Latino Community</td>
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<tr>
<td>Pray, Steven</td>
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<td>12:20-12:40</td>
<td>Effects of Funding on Public School Graduation Rates</td>
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<tr>
<td>Purkey, Krystelle</td>
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</tbody>
</table>
SESSION 20  Room 137B  
Session Chair: Lucinda Carnell

11:40-12:00  AWC<sup>CN</sup> Mediates Navigation to Preferred Range of Field Strength in a DC Electric Field  
Chrisman, Steven; Waite, Christopher; Foss, Eric

12:00-12:20  Characterizing PKC-1’s Role in 5-HT Dependent Behavioral Adaptation and Depressed Foraging in <i>Caenorhabditis elegans</i>  
Ronk, Seth

12:20-12:40  Temperature Sex Determination and the DMRT1 Gene in <i>Gekko japonicas</i>  
Mullen, Lisa-Marie

12:40-1:00  Resolving Gnetum Evolutionary History  
McFadden, Angela

SESSION 21  Room 140  
Session Chair: Mike Jackson

11:40-12:00  Analyzing Operational Amplifiers in Chaotic Circuits  
Huss, Christopher

12:00-12:20  Far-Infrared Laser Emissions from Optically Pumped Methanol  
McKnight, Mark; Penoyar, Patrick; Pruett, Matthew; Palmquist, Nathan; Ifland, Sumaya

DeShano, Brad; Olivier, Kerry; Cain, Breeanna

12:40-1:00  Measurement of Far-Infrared Laser Frequencies  
Mehl, Patrick

SESSION 22  Room 201  
Session Chair: Shu-Fei Tsai

11:40-12:00  Reducing the Amount of Swearing by Using a Token System  
FitzGerald, Kristen

12:00-12:20  Challenges of College Students with Asperger’s Syndrome  
Tsai, Shu-Fei

12:20-12:40  Effective Learning Strategies for College Students with Asperger’s Syndrome  
Gilbert, Jamie

12:40-1:00  Supporting a Student with Asperger’s Syndrome: Perspectives from the Student, Sibling, and Non-Familial Tutor  
Gilbert, Meghan; Carlson, Amanda; Gilbert, Dylan
SESSION 23  
Room 202  
Session Chair: David Gee  
11:40-12:00  
Effects of Sleep Quality on Depression and Anxiety Symptomology  
Celori, Anthony  
12:00-12:20  
Exposure to the Pesticide Chlordane Is Associated with Increased Risk of Metabolic Syndrome  
Nikolaus, Cassandra  
12:20-12:40  
Muscular Activity in Collegiate Football Linemen with and without a Prefabricated Functional Knee Brace  
Gembol, Shea  
12:40-1:00  
Reduction in the Incidence of Type 2 Diabetes with Shared Medical Appointments: A Patient Centered Outcomes Research Study  
Landreth, Stephanie; Watkins, Justin; Hoffman, Daniel

SESSION 24  
Room 271  
Session Chair: Jeffrey Dippmann  
11:40-12:00  
Epistemology through Buddhist Poetry: A Real Challenge to Western Thought  
Littman, Sarah  
12:00-12:20  
Women, Role Ethics, and Phenomenology: A Critique and Expansion  
Gustafson, Megan  
12:20-12:40  
Confucian Role Ethics for Women: A Response to Roger Ames  
Godwin, Ashlee  
12:40-1:00  
Confucian Role Ethics: Reflections from a Global Perspective  
Zemanek, Zoey

SESSION 25  
Ballroom A  
Session Chair: Crystal Fullmer  
11:40-12:00  
How She Sees Me  
Sande, Elizabeth  
12:00-12:20  
Do They Make a Sound?  
Stone, Jackie  
12:20-12:40  
A Prayer for Purpose  
Tinhof, Sierra  
12:40-1:00  
Stages  
Bir, Taylor
SESSION 26  SURC Theatre
Session Chair:  Maria Sanders
11:40-12:00  Speak in Rounds
    Coté, Jeffrey
12:00-12:20  Editing: Beyond Cutting the Scene
    Eagon, Emily
12:20-12:40  A Rabbit in the Bike Shed
    Sylvester, Alexander

FIRST LEGO LEAGUE ROBOTICS DEMONSTRATIONS
11:40-1:00 and 1:10 to 2:30 in the SURC Pit

    Hydroshield: No Hassle Sandbag Solution for Flood Protection
    Rathnam, Hari; Gandhi, Shyam; Chaliparambil, Rahul; Tamhane, Sanya; Puram, Manjesh

    One Spark! Start an Idea, Not Fires!
    McKinnon, Kimberly; Sandy, Elizabeth; Webber, Jonathan; Walton, Anneka; McKinnon, Camilla

SESSION 27  Room 135
Session Co-Chairs: Alejandro Lee and Eric Mayer
1:10-1:30  Se puede, y se debe: Educating Heritage Students
    Luna, Itzia; Pinto, Edward; Meza, Isaac
1:30-1:50  Se puede y se debe: Educating Heritage Students
    Meza, Isaac; Luna, Itzia; Pinto, Edward
1:50-2:10  Se puede y se debe: Educating Heritage Students
    Pinto, Edward; Luna, Itzia; Meza, Isaac

SESSION 28  Room 137A
Session Co-Chairs: Lixing Sun and Hideki Takei
1:10-1:30  The Silent Massacre: A Game
    Pace, Terri
    Gilman, Michael
SESSION 28  Room 137A (continued)

1:50-2:10  How Sustainable Becomes Unsustainable in Resource Use: Insights from Behavioral Economics  
Sun, Lixing; Takei, Hideki

2:10-2:30  Economics with a Human Face  
Takei, Hideki

SESSION 29  Room 137B
Session Chair:  Blaise Dondji

1:10-1:30  Application of Dalea ornata (Fabaceae) Extractives Toward Inhibition of the Hookworm Ancylostoma ceylanicum  
Ray, William; Winterstein, Eric; Koppinger, Kaitlin

1:30-1:50  Northwestern United States Plant Extracts Show Anthelminthic Activity Against the Hookworm, Ancylostoma ceylanicum  
Koppinger, Kaitlin

1:50-2:10  Passive Transfer of Leishmania major Antibodies Leads to Disease Exacerbation Upon Exposure to Leishmania infantum  
Anderson, Heidi; Stryker, Gabrielle; Dondji, Blaise

2:10-2:30  Kinematic Analysis of Prey Capture in Coastal Giant Salamanders (Dicamptodon tenebrosus)  
Westervelt, Laura; Reavill, David; Richbourg, Sara; Fessler, Brandon

SESSION 30  Room 140
Session Chair:  Lisa Ely

1:10-1:30  Identifying Channel Morphology Changes in Response to the Removal of the Glines Canyon Dam on the Elwha River, Washington  
Free, Bryon; Baumgartner, Spencer; Lund, Craig

1:30-1:50  Sedimentological and Stratigraphic Evidence for Paleotsunami Events at Quidico, Chile  
Hong, Isabel

1:50-2:10  Controls on Fault Geometry During Early Stages of Extension in the Larkspur Hills, Northwest Basin and Range  
Strickley, Diana; Egger, Anne
### SESSION 31  Room 201
Session Chair: Ian Loverro

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:10-1:30</td>
<td>Learning at Home with Interactive Literacy Kits</td>
<td>Walker, Teri; Keller, Cassandra; Southern, Andrea</td>
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<tr>
<td>1:30-1:50</td>
<td>Oil Painting with First Graders</td>
<td>Donahoe, Susan</td>
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</table>

### SESSION 32  Room 202
Session Chair: Michael Whelan

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>1:10-1:30</td>
<td>Creating and Utilizing “Drain, Waste, and Vent Plumbing Trainers” to Enhance Student Learning in a Construction Management Program</td>
<td>Plugge, Warren; Carns, David</td>
</tr>
<tr>
<td>1:30-1:50</td>
<td>Lean Construction Games in the Classroom</td>
<td>Martin, David; Plugge, Warren</td>
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<tr>
<td>1:50-2:10</td>
<td>Don’t Leave Ergonomics Out of Your Construction Safety Program</td>
<td>Rajendran, Sathyaranarayanan</td>
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</tbody>
</table>

### SESSION 33  Room 271
Session Chair: Matthew Altman

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<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>1:10-1:30</td>
<td>Would Not Existing Put a Limitation on the Idea of Infinity?</td>
<td>Stankus, Melanie</td>
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<tr>
<td>1:30-1:50</td>
<td>Religion: Doctrines of Detriment</td>
<td>Ridgeway, Joe</td>
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<tr>
<td>1:50-2:10</td>
<td>The Student-Athlete Myth</td>
<td>Davis, Maxwell</td>
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<td>2:10-2:30</td>
<td>A Failure of Modern Leadership</td>
<td>Tollackson, Ryan</td>
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### SESSION 34  Room 301
Panel Chair: Anne Cubilie

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<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>1:10-2:30</td>
<td>Project Based Learning: An Examination of the South Sudan Crisis</td>
<td>Alling, Tyler; Vidmore, Jordan; Macinko, Jess</td>
</tr>
</tbody>
</table>

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SESSION 35  
Session Chair: Crystal Fullmer

1:10-1:30  
**Site Specific**  
*Sande, Elizabeth*

1:30-1:50  
**Site-Specific Choreography Project**  
*Pruitt, Calista*

SESSION 36  
Session Chair: Jerry Dougherty

1:10-1:30  
**Speak of the Devil and He Will Appear: Why Macbeth Deserved His Fate**  
*White, Cassandra*

1:30-1:50  
**Stage Management**  
*Scheopner, Gregory; Jones, Kathleen*

1:50-2:30  
**Puppetry Movement: What It Teaches Us**  
*Andrews, Sarah*

SESSION 37  
Session Chair: Christine Sutphin

2:40-3:00  
**The Androgynous Disguise: Marian Halcombe’s Hidden Misogyny**  
*Kent, Jessica; Chaddock, William; Thomas, James “Tyler”*

3:00-3:20  
**Alone in the Storm: The Dangers of Isolation and Weather in Rudyard Kipling’s “At the End of the Passage” and Bithia Mary Croker’s “To Let”**  
*Thomas, James*

3:20-3:40  
**A Mysterious Non-Mystery: Deconstructing Dicken’s “Hunted Down”**  
*Chaddock, William*

SESSION 38  
Panel Chair: Mark Auslander

2:40-4:00  
**Digital Audio Tour of Central Washington University Art and Architecture**  
*Auslander, Mark; Avitts, Ellen; Armbrust, Matt; Hyogung, Kim; Charles, Seth; Walton, Lauren; Kijak, Kevin; Mohamed, Saeed; Foster, Presten; Roberts, Chelsea; Crawford, Kailona; Kvietkus, Wolfgang; Garrison, Melissa*
SESSION 39  Room 137B
Session Chair:  Paul James

2:40-3:00  Analysis of Daily Activity Times for the American Pika (*Ochotona princeps*) in the Eastern Cascades of Washington  
Marquis, Amanda

3:00-3:20  Variations in Vocalization Frequency of Chachalacas in Chamela, Jalisco, Mexico  
VanDerslice, Julia; Reyer, Emily

3:20-3:40  An Evaluation of Fish Passage Through Small Urban Streams in Central Washington  
Martin, Kelsey; Green, Ethan; Herdmann, Jennifer

3:40-4:00  Evaluating the Effect of Population Density on Cutthroat Trout and Brook Trout Competitive Behavior and Energy Expenditure  
Green, Ethan

SESSION 40  Room 140
Session Chair:  Levente Fabry-Asztalos

2:40-3:00  Synthesis Towards Straight Chain Borinic Acids as Potential HIV-1 Protease Inhibitors  
Contreras, Erik

3:00-3:20  Towards the Synthesis of 1,3-Azaborines as Potential HIV-1 Protease Inhibitors  
Treich, Nicholas

3:20-3:40  Synthetic Versatility of Boron: Novel Potential Anthrax Lethal Factor Metalloenzyme Inhibitors and Boron Amino Acid Analogs  
Frank, Michael

3:40-4:00  Carbonaceous Nanoparticle Toxicity as a Function of Ferrous Iron Content  
Hinz, Daniel; Barnes, Jeff; Teng, Hsiang; Ting, Hoi; Shore, Cameron

SESSION 41  Room 201
Session Chair:  Maya Chachava

2:40-3:00  Convergence: Art and Chemistry  
Hall, Tarra

3:00-3:20  Gutenberg-Michelangelo-Bach: The Effect of Print Technology on Visual Art and Music, 1400-1800  
Armbrust, Matthew
SESSION 42  Room 202
Session Chair: Dorothy Chase
2:40-3:00  The Historical Background of American Beer and the Opinion Leaders of Breweries
Duff, Alison
3:00-3:20  GiddyUpPayUp: A Public Relations Campaign
Patterson, Mia; Homer, Alexandra; Monterrey, Samantha; Nelsen, Hailey; Reynolds, Ann
3:20-3:40  Flight Attendants: Stars of the Airline Industry
Tolbert, Shanice
3:40-4:00  Positive and Negative Impacts of Tourism
Beletskiy, Vladimir

SESSION 43  Room 271
Session Chair: Cynthia Coe
2:40-3:00  Intersexuality and the Ethics of Infant Genital Surgery
Dozier, Zachariah
3:00-3:20  Rethinking Black Masculinity and Sexuality
Millhouse, Camron
3:20-3:40  Beyond Camp: The Effect of Gender Identity on Drag Performance
Gardner, Kevan

SESSION 44  Room 301
Session Chair: Anne Cubilie
2:40-3:00  The Lyme Disease Controversies
DeVries, Tonia
3:00-3:20  An Analysis of Generational Cooperation in the Workplace
Wyatt, Barbara
3:20-3:40  Helping Up, Instead of Holding Down
Lecker, Derrick
3:40-4:00  The Education Bubble: Federal Tertiary Education Policy and the Myth of Accessibility
Hegstrom Oakey, Jesse
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<th>SESSION 45</th>
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<tr>
<td>Session Chair:</td>
<td>Jeffrey Snedeker</td>
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<tr>
<td>2:40-3:00</td>
<td>Building a Natural Trumpet</td>
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<td>Martinson, Sarah</td>
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<td>3:00-3:40</td>
<td>Music Advocacy in Ellensburg</td>
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<td></td>
<td>Snedeker, Jeffrey; Bisson, Rebecca; Bliley, Vanessa; Jordan, Julian; Kurtenbach, Clara; Munden, Mikhail; Simons, Connor; Stewart, David</td>
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<tr>
<th>SESSION 46</th>
<th>SURC Theatre</th>
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<tbody>
<tr>
<td>Session Chair:</td>
<td>Patrick Dizney</td>
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<tr>
<td>2:40-3:00</td>
<td>Feeding Time at the Human House by David Weiner</td>
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<td>Burch, Alicia; Tarabini, Nicholas; Brown, Jordyn; Oswald, Chad</td>
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<td>3:00-3:20</td>
<td>Selected Scene from Crossing by Reza De Wet</td>
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<td>Andrews, Sarah</td>
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<td>3:20-3:40</td>
<td>Hand to Hand Stage Combat</td>
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<td>Bugallo, Paul; Hernandez, John; Gibbs, Drew; Domena, Monica; Gahley, Skyer</td>
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<tr>
<th>SESSION 47</th>
<th>Room 135</th>
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<tr>
<td>Session Chair:</td>
<td>Liahna Armstrong</td>
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<tr>
<td>4:10-4:30</td>
<td>When a Man Bleeds: Fears of the Feminine and Reproduction in John Carpenter’s The Thing</td>
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<td>Tranchell, Thomas</td>
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<td>4:30-4:50</td>
<td>Narrating a Story</td>
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<td>Gremel, Shelby</td>
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<td>4:50-5:10</td>
<td>The Bookshop Quartet: An Original Screenplay</td>
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<td>Allison, Caleb</td>
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<tr>
<th>SESSION 48</th>
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<tbody>
<tr>
<td>Panel Chair:</td>
<td>Mark Auslander</td>
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<tr>
<td>4:10-5:30</td>
<td>Digital Audio Tour of Central Washington University Art and Architecture</td>
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<tr>
<td></td>
<td>Auslander, Mark; Avitts, Ellen; Armbrust, Matt; Hyogung, Kim; Charles, Seth; Walton, Lauren; Kijak, Kevin; Mohamed, Saeed; Foster, Presten; Roberts, Chelsea; Crawford, Kailona; Kvietkus, Wolfgang; Garrison, Melissa</td>
</tr>
</tbody>
</table>
SESSION 49  Room 137B
Session Chair: Lori Sheeran

4:10-4:30  Developmental Changes in Vocalizations of Tibetan Macaques
(Macaca thibetana)
Price, Erika; Sheeran, Lori; Li, Jin-Hua

4:30-4:50  Interactions Between Tourists and juvenile Tibetan Macaques
(Macaca thibetana) at Mount Huangshan, China
Staven, Asa

SESSION 50  Room 140
Session Chair: Yingbin Ge

4:10-4:30  A Combined Molecular Dynamics, Rigidity Analysis Approach for
Studying Protein Complexes
Orndorff, Brian

4:30-4:50  e-Titrator, a Web-Based Titration Calculator for Chemical Education
Ngo, Kevin

4:50-5:10  Using a Spreadsheet to Solve the Schrödinger Equations for H₂ in the Ground
and Excited States
Buchanan, Jacob

5:10-5:30  Polyelectrolyte/Surfactant Complexes as Reversible Transports to a Modified
Silica Surface
Siegenthaler, James

SESSION 51  Grupe Center
Session Co-Chair: John Hudelson and Barbara Masberg

4:10-4:30  The Very Old and the Very New: Important Grape Varietals in the Wine Regions
of Hungary
Clevenger, Jeanette; Hudelson, John

4:30-4:50  The Effectiveness of Vienna’s Heurigens as a Wine and Tourist Industry
Vamderpool, Kene; Dietrich, Brandon; Lindahl, Tamra

4:50-5:10  Hungary’s Post-Communism Wine Tourism
Alter, Kirsten; Johnson, Krystal

5:10-5:30  Wine Tourism Best Practices
Masberg, Barbara
SESSION 52  Ballroom A
Session Chair: Gayla Blaisdell

4:10-4:30  “The Lark Ascending” Arranged for Flute Choir
Hile, Elizabeth

4:30-4:50  Quartet from Act III of La Boheme by Puccini
Waywell, Brittany; Sacchi, Joe; Thornton, Joey; Gregor, Alyssa

4:50-5:10  L’Elisir d’Amore Scene
Sacchi, Joseph; Hemenway, Sarah

5:10-5:30  The World of A Cappella
Prigge, Nicole
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 13, 2:00-6:00 p.m. in the Higher Education Center, Bldg 29

1. The Sounds of Colors and Tastes: An Experimental Extension of the Bouba Kiki Effect
   Kawachi, Bridgett

2. Police Hiring and Marijuana Legalization
   Kohr, Devin

CWU-LYNNWOOD
Posters on display Wednesday, May 14, 5:00-8:00 p.m. in Snoqualmie Hall

1. Medical Device Supply Chain
   Berry, Alexandria; Anderson, Jennifer

2. Purchasing at Hyatt Regency Danang Resort
   Nguyen, Hiep; Nguyen, Tien; Nguyen, Mai

3. The Build-to-Order Supply Chain
   Parks, Adam; O'Keefe, Justin; Pasonok, Valeria

4. Financial Risk Evaluation of Suppliers
   Kravchun, Oxana; Flanagan, Trang; Kaur, Amanpreet

5. The Impact of Social Networks on Supply Chain
   Rogers, Laura; Sims, William; Vo, Ann; Xiong, Kabao

6. Information Systems and How They Effect Supply Chain
   Radish, Blake; Radchanka, Valiantsina; Purkey, Michele

7. Technology and Business Innovation in Tesla's Supply Chain
   Eberli, Craig; Cohrs, Andre; Bhambi, Archana
POSTER PRESENTATIONS, CREATIVE WORKS, AND CONSTRUCTED OBJECTS SCHEDULE: BALLROOM 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

PHYSICS

1. Initiating an Asteroid Observational Astronomy Program at Central Washington University
   Seel, Matt

2. Ion Trajectory in Saturn’s Magnetosphere near Titan
   Richardson, Jordache

3. Synchronization of Chaotic Circuits
   Choe, Kevin

4. Light Curve of SN2014J
   Berghoff, Hans

5. Growth of Laser-Induced Damage on Third Harmonic Generators
   DeShano, Brad

6. Discovery of Optically Pumped Far-Infrared Laser Emissions
   Johnson, Eric; McKnight, Mark; Penoyar, Patrick

7. Resonance Measurements of a Pre-Stressed Spherical Shell with Application to Non-Invasive Intracranial Pressure Monitoring
   Avila, Rafael; Kastner, Cameron

8. Computational Modeling of Focused Sonic Booms
   Pearce, Christopher; Grist, Richard

COMPUTER SCIENCE

9. Investigating Rigidity Properties of Protein Cavities
   Walling, Christian

10. A Java Implementation of a Novel Quantitative Genetic Framework for the Evolution of Developmental Interactions
    Brooks, Elizabeth
CHEMISTRY

11. Measuring Quantitative Literacy Through Electronic Data Collection  
   Beemer, Emily; Hall, Tarra

   McClure, Jen

13. Decrease in Acid Rain Over 24-Year Study at Paradise, Mount Rainier National Park  
   Beebe, Naomi

14. Bioavailable Iron in Equatorial Pacific Ocean Aerosol Samples  
   Teng, Hsiang; Ting, Hoi; Hinz, Dan; Shank, Lindsey

15. Concise Total Synthesis of Phidianidine A and B  
   Buchanan, Jacob

16. The Dibromination of Homogentisic Acid Lactone  
   Bouchey, Sydney; Calaway, Austin; Maverick, Rebecca; Chamberland, Stephen

17. Progress Toward the Total Synthesis of Credneramide A and B  
   O’Neal, Kathryn

18. Chromatographic Isolation and Characterization of Secondary Metabolites of Dalea ornata (Fabaceae)  
   Winterstein, Eric; Ray, Will; Koppinger, Kaitlin

BIOLOGY

19. Evaluation of the Toxicity to Mammalian Cells of Plant Extracts with Anthelminthic Activity  
   McCornack, Jocelyn

20. Comparative Study of Periwinkle Extract on MCF-7 Breast Cancer and C2C12 Myoblast Growth Rate and Morphology  
   Brizendine, Amanda; Heidinger, Brigitta; Tapia, Nancy; Williams, Carin

21. The Morning After: Oral Contraceptive Effects on MCF-7 Breast Cancer Growth Rate and Morphology  
   Marzano, Jami; Waters, Kaitlin; Heyano, Mindy; Clark, Jane; Johnson, Samantha

22. Effects of Excess Testosterone on NOD Mouse Adipocyte Cell Size  
   Simianer, Courtney

23. Is Ellensburg Water Safe for Recreation? An Analysis of Total Coliform Bacteria Levels in Wilson Creek  
   Elg, Clinton; Shrinzada, Sabahuddin; Neziri, Izak

24. Trypanosoma cruzi Recombinant Protein Expression in Escherichia coli  
   McDonald, Jay
25. Phylogenetic Analyses of the Litter Decomposing Fungi Clitocybe Found in the Cle Elum Ranger District
   Bennett, Douglas

26. Poster withdrawn

27. Identification of Genes Involved in Behavioral Changes Due to Chronic Serotonin Treatment in the Nematode *C. elegans*
   Baird, Tykah

28. The Effects of Light Environment and DNA Methylation on Phenotypic Plasticity in *Arabidopsis thaliana*
   Walters, Rachel; Marrese, Anthony

29. Artificial Selection on an Inducible, Stably Inherited Defensive Trait in Yellow Monkeyflower
   Neuffer, Sam

30. Assessing Occupancy of Amphibians Using Environmental DNA on Snoqualmie Pass
   Richbourg, Sara; Reavill, David; Fergus, Craig

   Rathburn, Elizabeth Anne

32. Salmonid Passage in Oak Creek Basin of Central Washington
   Olsen, John; Fox, Michael

33. Microhabitat Use and Thermal Ecology of Termites in a Tropical Dry Forest of Jalisco, Mexico
   Loughran, Caleb; Rayburn, Micah; Parker, Brad

34. Designing a Trap to Attract and Capture Kissing Bugs in Jalisco, Mexico.
   Wenger, Analiese; Fergus, Craig

35. Water Quality Fluctuations and Macro-invertebrate Diversity within Intertidal Rock Pools, Jalisco, Mexico
   Martin, Kelsey; Cross, Sidney; Brombach, Annalisa

36. The Mexican Beaded Lizard (*Heloderma horridum*) and Life in the Lithos
   Hueter, Joshua; Butterfield, Taggert; Saxby, Rachael; Olivan, Jesus; Holcomb, Kerry

GEOLOGICAL SCIENCES

37. Stream Characteristics of Arroyo Zarco
   Duffy, Jared; Rush, Philip; Terrile, Kenny

38. Change in Woody Debris Following the World’s Largest Dam Removal, Elwha River, Washington
   Baumgartner, Spencer; Free, Bryon
   Nenninger, Christopher

40. Stream Water and Soil Water Chemistry Following the Table Mountain Wildfire, Washington
   Roccanova, Vincent

41. Stratigraphy of Glacial Horse Lake, Wenatachee, Washington
   Querry, Brian

42. Timing and Source of Alkali-Enrichment at Mount Etna, Sicily, Using Clinopyroxene Geobarometry and in situ Sr Isotope Data
   Nelson, Kaitlyn; Viccaro, Marco; Bendaña, Sylvana; Wilson, Joshua

43. Analyzing Compositional Trends in Plagioclase Crystals Erupted from Mount Etna
   Wilson, Joshua

44. Geometry and Kinematics of Fault Slip Transfer from the Southern Walker Lane to the Mina Deflection
   Warren, Rachelle

45. Zircon Separation Using a Spiral Panning Table: Particle Size Analysis and Yield Efficiency
   Edwards, Ashley; Fagin, Brittany

46. Analyzing Topographic Profiles of the Surprise Valley Fault to Determine Age
   Sherrod, Joe

SCIENCE EDUCATION/SCIENCE TALENT EXPANSION PROGRAM (STEP)

47. Analyzing Student Essay Responses from the Geoscience Literacy Exam
   Olson, Thomas

48. The Science Talent Expansion Program (STEP) at Central Washington University: Improving Recruitment and Retention of College Students in STEM
   Nye, Jessica; Bohrson, Wendy; Ely, Lisa; Piasek, Andy; Braunstein, Michael; Kurtz, Martha; Diaz, Anthony; Carnell, Lucinda

ELLENSBURG HIGH SCHOOL

49. Heliocentric
   Sumner, Alexander

50. Legen-Dairy
   Jensvold, Hannah

51. Imagine Tomorrowville
   Wilson, Eric
52. Moo-ving Towards A Better Biofuel  
   Davis, Logan

53. Connecting Recycling to Our Hispanic Community  
   Baldovinos, Diana

54. Reecer Creek Sinuosity and Large Woody Debris  
   Streepy, Westley

55. Reecer Creek Cross Sections and Flow Regimes  
   Ernest-Beck, Abby

56. Reecer Creek Microorganisms and Macroinvertebrates  
   Smith, Abbigale

57. Reecer Creek Soils and Water Quality  
   Casey, Clare

58. Reecer Creek Photodocumentation  
   Davis, Kate

ACTUARIAL SCIENCE

59. Fitness Assessment Through Body Fat Prediction  
   Weber, Madelyne

NUTRITION, EXERCISE, & HEALTH SCIENCES

60. Probiotic Fortification is Acceptable in Chocolate No-Bake Cookies  
   Anderson, Margo; Estey, Caitlin; Johnson, Jennifer

61. Brownies Fortified with Milne MicroDried Blueberries and Carrots as a Method to Increase Fruit and Vegetable Consumption  
   Pequignot, Kate; Nikolaus, Cassandra; Jensen, AnneCherise

62. Acceptability of Adding Inulin to Fudge Brownies  
   Nitta, Cheryl; Hudson, Josh; Hahn, Erika
**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

**POLITICAL SCIENCE**

1. **The Vision for Liuzhou’s New Town: Motor City**  
   Xu, Hui; Chen, Rongrong; Zhang, Lijun

2. **Student Government in the United States and China: Events Planning**  
   Wang, Yuan

3. **Liuzhou City: Traditional Wisdom and New Economics**  
   Wen, Haocheng; Huang, Huadong; Qin, Jianfeng

4. **Scotland’s Independence Referendum: A Policy Path Analysis**  
   Baldwin, Matthew

5. **The Dream Act: What’s the Problem?**  
   Serrano, Jessica

6. **Migrant Labor in Washington State: Smuggling or Trafficking?**  
   Rosales, Erika

7. **Structural Reforms in Washington at Large Voting Systems and Minority Communities**  
   Shearer, Brendan

8. **The Quest for Political Power: Latinos in the City of Sunnyside, Washington**  
   Valencia, Jamie; Davidson, Austin; Galvan, Eric; James, Kyle; Rockseth, William; Vo, Binh

**ENVIRONMENTAL STUDIES**

9. **The Mining Law of 1872: How Outdated Mindsets are Hurting People and the Environment**  
   Bonner, Bradford

10. **Range Land Policy Impact on Riparian Habitat**  
    Nash, Christopher

11. **Industrial Farmers: 21st Century Point Source Polluters**  
    Puz, Abraham

12. **Impacts of Urban Growth and Energy Demand on Water**  
    Kajca, Spencer; Weigel, Landon
REGIONAL SCHOOL SCIENCE PROJECTS

13-21. Field Investigations by Students at Walter Strom Middle School
Walter Strom Middle School Students; Griswold, Trish

22-24. Investigations by Students at Selah Junior High School
Selah Junior High School Students; Murphy, Jennifer

22. CO$_2$ Production Using Yeast and Different Brands of Sugar
Murphy, Jennifer; Clark, Carissa; Roberts, Autumn

23. Charging an iPod Using Citrus Fruits
Murphy, Jennifer; Beksinski, Casey; Madrid, Dylan; Martinez, Mason

24. Which Produces More Starch: A Shade Plant or a Sun Plant?
Murphy, Jennifer; Moreno, Maria; Naverrete, Vanessa

ECONOMICS

25. US 97 Realignment Project
Fahsholtz, Sam

GEOGRAPHY AND RESOURCE MANAGEMENT

26. Thinking Outside the Box: Sustainable Water for the Future
Klewin-Arkell, Sunshine

27. The Snohomish River Estuary: Restoration, Conflict, and Compromise
Braun, Anthony

28. Land Use Change in Phoenix, Arizona 1990-2014
Skyllingstad, Reed

29. Perceptions of Wilderness: An Examination of Native American Utilization of Traditional Plant Resources and Public Lands Management
Shoaf, Kelli

30. How Big is that Hole? Using ArcGIS to Calculate the Volume of Sediment Needed to Mitigate Erosion of an Archaeological Site
Stcherbinine, Sean

31. Vegetation Classification and Fire Activity in the Blue Mountains of Oregon
Goodner, Christopher; Walsh, Megan

32. Variability in Charcoal Deposition into Lake Basins Within the Taylor Bridge Fire, Washington
Dykes, Devin; Walsh, Megan
ANTHROPOLOGY

33. Building a History: Historical Context of Central Washington University Campus Architecture
   Walton, Lauren

34. Pig Feet and More: Analysis of a Historic Faunal Sample from Ellensburg City Block 24
   Taylor, Allie

35. Faunal Analysis of Mesa Site 6
   Johnson, Matt

36. Genetic Analysis of Ancient Bison Mitochondrial DNA
   Smith, Samuel

37. Investigating the Anatomy of the Stylohyoid Bone of Hoofed Mammals for Archaeological Interpretation
   Hanson, Sydney; Wakeland, Eric; Hale, Thomas

38. Hereditary Colon Cancer Research
   Anderson, Brittany

39. Species Identification through a DNA Barcode Analysis of Salmon Bones of Central Washington Archaeological Sites
   Frederickson, Victoria

40. Biomolecular Chemistry and Archaeology: Preliminary Organic Residue Analysis from Ceramics, Barbados, West Indies
   Hendrix, Jillian; Seelye, Elizabeth

41. Geoarchaeology of House Features, Redbird Beach, Hells Canyon, Idaho
   Baumgart, Eryn; Cummings, Tiffany

42. Resources Intensification, Sedentism, Storage, and Ranking: A Visual Synopsis of Pacific Northwest History and Theory
   Brown, James; McCutcheon, Patrick

43. Comparative Analysis of Radiometric Dating Techniques: The Sunrise Borrow Pit Site
   Brown, James; Hackenberger, Steve; Chatters, James

44. Evidence for the Presence of an Archaic Ritual Mortuary Complex in Vermillion County, Indiana
   Davis, David

45. A Paradigmatic Lithic Analysis of an Upper Kittitas County Spring Site, Washington
   Chenvert, ErinMarie

46. Chemical Sourcing of Obsidian Lithic Fragments from the Grissom Site (45KT301) to Study Intra- and Inter-site Source Variability
   Parfitt, Anne; McCutcheon, Patrick
47. The Archaeology of Obsidian Occurrence Across Stone Tool Manufacture and Use Along the Mid-Columbia River, Washington
Kassa, Sonja; McCutcheon, Patrick

48. Archaeological Investigations at the Sunrise Ridge Borrow Pit Site (45PI408) in Mount Rainier National Park
Sheldon, David; Limberg, Caitlin; Lewis, Patrick; Rennaker, Patrick; Kassa, Sonja

CREATIVE WORKS

APPAREL, TEXTILES AND MERCHANDISING

49. Haunting Darkness
Eklund, Andrea

50. Rebel
Wentworth, Brittany

51. Walking the Line
Durfee, Ryanne

52. Genevieve
Knutz, Krissy

53. Moonlight
Bywater, Brittany

54. Golden Glam
Wright, Andrea

55. Hyde Park
Davey, Erin

56. Seaside Bombshell
Kirckof, Joanne

THEATRE

57. The Nightingale: A Steampunk Fairytale
Kirckof, Joanne

58-59. Draping Nanawatai
Eschels, Sariina

60. Dionysus Makeup Design
Gilmond, Shelbi

61. Sherlock Holmes: A Radio Drama with Foley
Martinez, Avril
MUSIC

62. **Music Arranging and Performance for Geriatric Audiences**
   Shelton, Katie

ART

63. **Solitude**
   Gromala, Kyle
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

1. Electric Vehicle Seating System
   Huber, Ryan

2. Insulated Battery Box
   Harbine, Kyle

3. CatMobile Steering Spindles
   Newman, Landon

4. Parachute Mount for Mitsubishi Evolution
   Wilkinson, Kyle

5. Programmable Logic Controller Automated System
   Waytuck, Michael

6. Truck Tie Down Anchor
   Israeli, Jonathan

7. Tracking the Sun for Solar Energy
   Coudriet, Blake

8. KCWU FM: Broadcast Engineering
   Smith, Stephanie

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

10. Central Washington University Fuel Cell
    Congdon, Brian

11. Three-Phase Motor Controller Design
    Johnson, Aaron

12. Pelton Wheel Housing
    Townsend, Garrett

13. Student Workplace Safety
    Lancaster, Ryan

14. Marine Rope Winder
    Holt, Samuel

15. Wheelchair Curb Stepper
    Yoder, Joshua
16. Carbon Fiber External Hiking Pack Frame  
   Woodman, Robert

17. Solar Tracking Device  
   Bui, Tam

18. Electrathon Vehicle Floor  
   Hein, Jason

19. Downhill Ski with an Integrated and Removable Binding Plate  
   Bergstrom, Trevor

20. Door Knob Lever Attachment  
   Golchin, Kayvon

21. Center Stand Redesign  
   Guerrero, Eliseo

22. Lighter than Air UAV  
   Kinney, Patrick

23. Lighter Than Air UAV  
   Sedy, Joe

24. Biomass Gasification  
   Harrington, Crissy

25. Residential Cooling System  
   Alredaihi, Bandar

26. Residential Cooling System: Manufacture Tank and Connecting the Fan  
   Alshammari, Salman

POSTER PRESENTATIONS

EDUCATIONAL FOUNDATIONS & CURRICULUM; LANGUAGE, LITERACY, & SPECIAL EDUCATION

27. Learning Strategies that Demonstrate Positive Academic Growth for a Student with Asperger’s Syndrome: A Family’s Journey  
   Gilbert, Jamie; Gilbert, Meghan; Gilbert, Dylan

28. Duration of Days without Washing Dishes  
   Spadoni, Amanda

29. Decreasing the Amount of Cigarettes Smoked Using an ABAB Design  
   Harting, Daniel

30. Behavior Study: Decreasing Chewing with Mouth Open  
   Corley, Louisa
31. Decreasing Smoking Frequency
   Lynch, Andee

32. Alcohol Intervention
   Bailiff, Jake

FAMILY STUDIES

33. Corporal Punishment and Its Relationship to Adjustment and Educational Attainment
   Herendeen, Deborah; Carlson, Amanda; Maupin, Nicole; Page, Melissa

34. Cyberbullying and Behavioral Outcomes
   Simpson, Clara

35. Perceived Parental Support and Academic Outcomes in College Students
   Mailhot, Brittney

36. The Effects of Relationship Initiation on Relationship Satisfaction
   Montgomery, Lindsay; Logan, Gabriela

37. Parent-Teen Communication and Sexual Behavior in Emerging Adulthood
   Xagoraris, Ashley

38. Social Settings, Substance Use, and Sexual Behaviors
   Reddaway, Amanda

39. Knowledge About the Female Anatomy and Its Effects on Sexual Behavior
   Schiller, Hailey

40. Is Hooking Up Emotional?
   Fischer, Kristina; Tackett, Tiffany

41. Where College Age Students Go to Find Hook-Ups
   Laidler, Ariel

PSYCHOLOGY

42. Effects of Lying on Memory for Positive and Negative Events
   Polage, Danielle

43. Are You an Extrovert or an Introvert: What Does the Face Say?
   Radeke, Mary; Stahelski, Anthony; Hanson, Max; Garriott, Joseph; Jennings, Naomi

44. Identification of the Big Five Personality Traits by Psychology Majors and Non-Psychology Majors Using Still Photographs
   Jennings, Naomi; Simonis, Lindsey; Radeke, Mary

45. Behavioral Relaxation Training: A Stress Management Tool for Graduate Students
   Juhlin, Natalie; Warrington, Savannah
46. Anxiety in Social Situations  
   Kenworthy, Jennifer

   Tiffany, Shayla; Melton, Stephanie; Little, Suzanne; Marrs, Heath; Bogue, Heidi

48. Electronic Device Usage and Distraction In Lectures and Driving  
   Lacour, Suzanne; Larrabee, Elena

49. Reaction Time Differences in Video Game and Non-Video Game Players  
   Richardson, Benjamin

50. The Impact of Video Games on Working Memory  
   Ellis, Derek; Richardson, Ben; Celori, Anthony; Meador, Camille; Cherry, Jessica

51. Anxiolytic Effects of Chronic Intraperitoneal Administration of GABA in Mice  
   Celori, Anthony; Kilburn, Zachariah; Freeze, Samantha; Garritott, Joseph; Wulf, Lyndsay

52. Implicit Racism Measures’ Continuity with Real World Behavior  
   Williams, Kyle; Johnson, Nicholas; Mitchell, Renard; Periman, Douglas; Wulf, Lyndsay

**SOCIOLOGY**

53. The New Jim Crow: The War on Drugs and Mass Incarceration  
   Caldwell, Kayla; Davis, Caless

**COMMUNICATIONS**

54. Comparison of the United States and Morocco Using Hofstede’s Cultural Dimensions  
   Leshley, Lauren; Jacobson, Staci

**ECONOMICS**

55. Determining the Factors Leading to Graduation Rates  
   Wyler, Robert

56. Pay It Forward  
   Elshoff, Colby

**LANGUAGE, LITERACY, & SPECIAL EDUCATION**

57. Ellensburg Book-Mobile  
   Robertson, Jaclyn; Bean, Amanda

58. Compass 2 Campus: Community Mapping and the Role of Mentoring  
   Sanchez, Felisa; Fuss, Rebekah
WORLD LANGUAGES

59. Analysis of Slang Translation
    Harris, Kiah

60. “Je te RT et tu me follow back”: The Influence of the Oral Code on French-Speaking Online Social Media
    O’Connor, Joseph

PRIMATE BEHAVIOR & ECOLOGY

61. Picture Naming in Signing Chimpanzees
    Putzier, Amanda; Bettini, Anna; Keenan, Susan Ann; Jensvold, Mary Lee

62. Contextual Use of the Sign ‘BLACK’ in a Signing Chimpanzee
    Keenan, Susan Ann; Jensvold, Mary Lee
ABSTRACTS

Arranged by Last Name of First Author

El Salvador
Abuhudra, Lana; Gregson, Ryan; Welch, Alyssa; Vidaurri, Elizabeth; Arevalo, Esme
Faculty Mentor(s): Joanne Perez, Center for Leadership and Community Engagement

Oral Presentation, Session #4
9:10-9:30 a.m. in Room 201

The purpose of this project is to take the five Cross Cultural Competencies from the Globe Study and relate it to the Salvadoran culture in order to understand the relationship between culture and leadership in that specific culture. The Cross Cultural Competencies are: 1) Understand business, political, and cultural environments worldwide; 2) Learn the perspectives, tastes, trends, and technologies of many other cultures; 3) Learn to work simultaneously with people from many cultures; 4) Adapt to living and communicating to other cultures; and 5) Learn to relate to people from other cultures position of equality rather than cultural superiority. Each of these competencies will be used to interpret our experience in El Salvador. The specific evaluation of these competencies will be analyzed through our pre-departure and return thoughts and the change in perspective that took place between these evaluations.

Keywords: Cross Cultural Competencies

Influence of Saltwater Intrusion, Climate, and Population Changes on the Ground Water Supply of San Juan Island
Adolphson, Scott
Faculty Mentor(s): Anthony Gabriel, Geography

Oral Presentation, Session #3
9:10-9:30 a.m. in Room 137B

Freshwater availability is a serious resource concern, due to the increasing needs of a rising population. This issue is especially critical in coastal regions both due to supplying the increasing number of people migrating to these areas, and the higher potential for saltwater intrusion into groundwater supplies as water demands increase. This study assesses the degree of saltwater intrusion on San Juan Island, Washington, including its extent, contributing factors, and the implication for the water resource availability. The analysis projects water resource issues on the island based on the extent of saltwater intrusion, population fluctuations due to tourism, projected island population changes, and the potential impact these will have on groundwater resources and freshwater supply. The level of intrusion is increasing and will affect future water availability on the island.

Keywords: Saltwater Intrusion, Groundwater, Water Budget
Manastash Showcase
Allen, Brittany; Allmand, Chloe; Dougherty, Steven; Epperson, Megan; Fisher, Daniel; Gould, Shaylynn; Landoe, Kathryn; Zalischi, Natalia
Faculty Mentor(s): Joseph Johnson, English

Creative Expression Presentation, Session #9
9:40-11:00 a.m. in Room 135

The English Department Writing Specialization is proud to showcase CWU’s student-edited, student-produced literary arts annual magazine, Manastash. We present a series of short readings of student work features in the new 2014 issue of Manastash. Faculty Instructor Joe Johnson will introduce the presentation with a few words about the magazine and the readers.

Project Based Learning: An Examination of the South Sudan Crisis
Alling, Tyler; Vidmore, Jordan; Macinko, Jess
Faculty Mentor(s): Anne Cubillie, Douglas Honors College

Panel Presentation, Session #34
1:10-2:30 p.m. in Room 301

This panel examines both positive and negative aspects of a project-based learning (PBL) approach in an honors environment. The papers will address the PBL approach as used to study the structure of the United Nations and its humanitarian, peacekeeping, development, and human rights efforts in the current conflict in South Sudan.

Keywords: Project Based Learning, Sudan, Crisis

The Bookshop Quartet: An Original Screenplay
Allison, Caleb
Faculty Mentor(s): Melissa Johnson, Film and Video Studies

Oral Presentation, Session #47
4:50-5:10 p.m. in Room 135

My script explores the lives of four eccentric, elderly men who co-own a hole-in-the-wall Tacoma bookstore. Their lives are altered when a young woman begins working for them, forcing a cathartic examination of demons long buried, inspiring hope in the future, and forging a unique bond between the five characters. I first began developing this story three years ago in community college, but it wasn’t until I went through Screenwriting Fundamentals with Melissa Johnson that I received the instruction and direction necessary to make my visions a reality. In this presentation I will explore the processes of theme and character development, the evolution of the script as I met with my mentor (Ms. Johnson), and the obstacles I have faced throughout the creation journey as well as how I have overcome them. I will pitch the script informally as a whole, additionally presenting a scene out of the first act with a cast of volunteer actors. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)

Keywords: Ambition, Catharsis, Comedy-Drama
Residential Cooling System
Alredaihi, Bandar
Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction

Poster Presentation Session #3, Constructed Object #25
2:30-5:00 p.m. in Ballroom C/D

How can the water temperature be reduced inside a tank in hot weather (52°C), while reducing the water temp from 45°C to 25°C within approximately 30 minutes using green energy? I tested a simple solution to the problem of cooling the water using a fan that blows air along the top of the water surface. We arrived at a solution by testing two different fans. We first tested a small fan with reasonable amount of air flow; and conducted an experiment with this fan. Based on different times and temperatures, the small fan was able to reduce the temperature of the water faster than the time we set before. We performed the same experiment but used a bigger fan; the results were different and not expected. The smaller fan had a faster cooling time compared with the bigger fan. The speculations on these findings: that the smaller fan has more laminar flow than the bigger one. Finally, the smaller fan was the right one to use since it has better results. Also, building an air duct to connect the fan to the tank was good idea. The main source of energy is solar panels. These findings could help people in the future to create green cooling systems.

Residential Cooling System: Manufacture Tank and Connecting the Fan
Alshammari, Salman
Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction

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

This project will help humans and the environment. One of the greatest problems that the world is facing today is environmental pollution, increasing every passing year and causing grave and irreparable damage to the earth. All countries in the Arabian Gulf have mostly sunny days, and in hot weather temperatures are 48°C to 50°C except in the winter. The main object of this project will be to reduce the water temperature inside the water tank when the temperature reaches a certain high temperature such as 30°C to 48°C. Solar panels will be used to charge four batteries for the fan. The project has five important parts such as a fan, a tank, a box or air duct, the solar panels system, and batteries. However, this project has three methods. The first and second methods would be measuring the time and the temperature of the water inside the tank. The third is to measure the power and time from solar panels. In results, this project will work very well because it will reduce the water temperature and will get more power from solar panels.

Keywords: Temperature, Fan, Solar Panels
Hungary’s Post-Communism Wine Tourism

Alter, Kirsten; Johnson, Krystal

Faculty Mentor(s): John Hudelson, Global Wine Studies

Oral Presentation, Session #51
4:50-5:10 p.m. in Room 202

Hungary’s wine tourism is growing but at a slow rate. Through a personal visit to, and survey of, five major wine regions in Hungary the researchers observed that the winemakers’ love and passion of the process trumped the monetary desires associated with the previous communist era of Hungarian winemaking. The researchers believe that there is an abundant potential for enotourism (wine tourism) which is sure to hit its peak growth within the next few decades if the wineries keep up their hard work and originality.

Keywords: Enotourism, Hungary, Wine Regions

Hereditary Colon Cancer Research

Anderson, Brittany

Faculty Mentor(s): Joseph Lorenz, Anthropology and Museum Studies

Poster Presentation Session #2, Poster #38
11:30-2:00 p.m. in Ballroom C/D

My project reflects how heredity can be used in anthropology as a way to trace human variation. I researched the genetic basis of heredity colon cancer known as Lynch syndrome. Lynch syndrome had been traced back to Finnish and Dutch descent. First, I began reading case studies and concluding the differences in multiple ways in which Lynch syndrome can develop, which can be across multiple genes. Then narrowing my focus to a specific gene known as MLH1, mutations in this gene have a direct effect in the mismatch repair gene that is used to fix errors during the reproductive process known as meiosis, meaning that when a mutation occurs it may lead to a higher frequency of mutations. Second, I began attempting to conduct electrophoresis on PCR products to compare human MLH1 genes to non-human primates. However, there were errors in the primer process that lead to me being unable to run my samples. In the meantime, my professor and I compared the MLH1 gene from our own DNA that we had sequenced through the website 23andme.com along with sequences available on the National Center for Biotechnology Online Information. In high school, I found out that I have Lynch syndrome, a result of my study was that my DNA from 23andme.com had an abnormal amount of mutations that resulted in amino acid changes; I believe this is due to the mismatch repair gene being compromised. In the future, I wish to review my study and finish the lab work.

Keywords: Lynch Syndrome, Heredity, Genes
Passive Transfer of *Leishmania major* Antibodies Leads to Disease Exacerbation upon Exposure to *Leishmania infantum*

**Anderson, Heidi; Stryker, Gabrielle; Dondji, Blaise**

*Faculty Mentor(s): Gabrielle Stryker, Biological Sciences; Blaise Dondji, Biological Sciences*

**Oral Presentation, Session #29**

1:50-2:10 p.m. in Room 137B

Leishmaniasis is a global disease found anywhere the temperature is warm enough for the sandfly vector to survive and anywhere that lacks rigorous vector control programs. Twelve million people are infected annually with this parasitic disease. Symptoms range from a minor cutaneous lesion at the bite site caused by dermotropic species such as *L. major*, to a life-threatening disease with multiple organ involvement, caused by viscerotropic species such as *L. infantum*. Both species of *Leishmania* co-occur in multiple countries, leading to the risk of co-infection. Previous research has shown that BALB/c mice first infected with the cutaneous form of leishmaniasis, followed by later infection with the visceral form of the disease, show increased disease severity. My research has focused on exploring how antibodies can be used to measure this disease exacerbation. Studies have shown that there is a strong association between *L. major* specific antibodies and increased disease upon secondary infection with *L. infantum*. Control animals inoculated with serum from uninfected mice did not have any disease enhancement. Overall, mice exposed previously to either *L. major* induced antibodies or *L. major* infection followed by exposure to *L. infantum* have increased parasitemia in visceral organs relative to control mice. Antibody enhancement due to interspecies infection has not previously been described in *Leishmania* infections. This research could have real world consequences on the practice of leishmanization that many parents practice to prevent disfiguring scars on their children.

*Keywords: Leishmaniasis, Antibody Enhancement, Tropical Disease*

Probiotic Fortification Is Acceptable in Chocolate No-Bake Cookies

**Anderson, Margo; Estey, Caitlin; Johnson, Jennifer**

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

**Poster Presentation Session #1, Poster #60**

8:30-11:00 a.m. in Ballroom C/D

The human gastrointestinal (GI) tract is naturally host to trillions of bacteria that, when depleted, may contribute to a variety of diseases and disorders. Supplementing the diet with probiotics in order to recolonize the GI tract is known to have proven health benefits that may reduce disease and/or promote good health. This study examined the acceptability of chocolate no-bake cookies fortified with a daily dose of probiotics (as recommended by the manufacturer, Neutra-aceutical Corporation, Park City, Utah). Central Washington University Dining Service’s chocolate no-bake cookie recipe was used as the control and the test cookie was fortified with 45g of probiotic powder. Therefore, according to the manufacturer’s recommendations, consuming a single serving of cookies would result in a daily dose of probiotics. Statistical analysis of data from an extended duo-trio test for sensory attributes, obtained from a panel of 30 untrained judges, revealed that no significant difference could be detected between the two cookies. Preference ratings based on overall look, feel, aroma, and taste on a 9-point hedonic scale showed both cookies were well liked. Objective tests revealed no significant difference in penetration force, withdrawal force, and shear force when both modified and control cookies were measured using a TA.XT2 Texture Analyzer. This study demonstrates that fortification of a chocolate no-bake cookie with a daily dose of probiotics does not alter the acceptability of the cookie and produces a well-liked product undistinguishable from an unmodified version.

*Keywords: Probiotics, Fortification, Health*
Puppetry Movement: What It Teaches Us
Andrews, Sarah
Faculty Mentor(s): Patrick Dizney, Theatre

Oral Presentation, Session #36
1:50-2:30 p.m. in the SURC Theatre

Puppetry is a valuable skill for any theatre artist who is serious about his/her craft. It teaches actors to pay close attention to their surroundings and the way they move on stage. In addition, it educates designers to work on a much smaller scale and generate creatively in a way which pulls the focus directly onto the objects on stage. At the Kennedy Center Theatre Festival in Boise, Idaho, a workshop gave students a hands-on opportunity to work with American Bunraku puppets. They were able to gain a greater understanding of how puppets are constructed and actuated on stage. This type of movement has been invaluable to directors and actors in understanding their own movements and choreography on stage. This workshop will be given again at Central Washington University in the hopes of enlightening an audience on the benefits of puppetry as an art form. The audience will have the opportunity to play with and discuss what makes puppetry a valuable art form.

Keywords: Movement, Art, Puppets

Selected Scene from Crossing by Reza De Wet
Andrews, Sarah
Faculty Mentor(s): Patrick Dizney, Theatre

Creative Expression Presentation, Session #46
3:00-3:20 p.m. in the SURC Theatre

Crossing is a ghost story written by award winning Afrikaans playwright Reza De Wet. Wet’s play Crossing portrays violent, thought provoking themes such as sexual abuse, rape, servitude, death, life after death, and imprisonment, all through a lens of human sexuality. I have chosen to direct Crossing because it presents a challenge to both myself and other students involved on the project. Part of my approach to directing this play is encouraging my actors to break their personal boundaries by building intimacy through games and activities related to the script. The space we are presenting in is very small, so every movement and gesture will be seen; the more detailed the character the more believable they will be. For my crew, I’m encouraging them to think simplistically and to only emphasize the important elements of the set. Learning how to work with sensitive themes such as the ones presented in Crossing, will make myself, my cast, and my crew more seasoned theatre artists. This experience will later benefit us in the future when we look for jobs and graduate programs. Furthermore, because of the nature of college theatre, students rarely have the opportunity to work on small-cast, contemporary pieces like Crossing. All around, Crossing is a great student project because it presents the students with an opportunity to work on a challenging piece that will benefit them in the future.

Keywords: Contemporary, Intimate, Art
Gutenberg-Michelangelo-Bach: The Effect of Print Technology on Visual Art and Music, 1400-1800

Armbrust, Matthew

Faculty Mentor(s): Ellen Avitts, Art

Oral Presentation, Session #41
3:00-3:20 p.m. in Room 201

In his landmark 1962 publication, The Gutenberg Galaxy, Marshall McLuhan argues that the Gutenberg press created a visual bias with regard to information distribution. That is, information dissemination became dominated by written transmission rather than aural transmission. He further posits that this changed Western culture’s approach to the visual arts. This paper identifies a concrete pattern to this approach specific to the production of visual art and music in the period between 1400 and 1800. Specific case studies will show how the nature of form and content change congruously in visual art and music. This paper will consider the Sistine Chapel ceiling as an example of a synthesis of a visual approach and an aural approach within one work; one that displays hallmarks of earlier church narrative while increasing the use of depiction of common individuals, similar to Martin Luther’s introduction of drinking-song tunes to the hymnal. This paper will also examine music to clarify how the visual bias of print culture effected compositional practice. By considering the work of Josquin De Prez, H.I.F. Biber, and J.S. Bach, my study makes clear that performance becomes less sympathetic to audience as visual bias becomes stronger. This paper concludes that print culture increases the importance of individual authorship and this not only desacralizes expression, it creates the need for spectacle in art and music to trap the attention of an audience that had previously been participants in, not spectators of, the theaters of visual art and music.

Keywords: Print, Art, Spectacle

Cultural Capital in Our Schools

Athan, Stavroula; Duval, Brittney

Faculty Mentor(s): Nelson Pichardo, Sociology

Oral Presentation, Session #4
8:30-8:50 a.m. in Room 201

There are many explanations offered to understand the differential academic outcomes of students from different racial and socioeconomic backgrounds. One of the more intriguing is the notion of Cultural Capital. Cultural Capital argues that the academic outcomes of students are not a reflection of their innate intelligence or study habits, but rather of the social class basis of their knowledge. The notion of Cultural Capital argues that children from lower socioeconomic backgrounds are at a severe disadvantage in our public schools, as we conjecture that these school favor upper class forms of knowledge. Our presentation seeks to understand that social barriers that prevent these children from succeeding, as well as ways the public school system can break through Cultural Capital learning barriers. We focus on preschoolers and kindergarteners because we feel that this age group has not been studied in terms of Cultural Capital. We seek to investigate whether Cultural Capital accounts for the differential academic outcomes of students in the same learning environment. Cultural Capital refers to the social norms and forms of knowledge that are not necessarily taught in schools; this knowledge base would be more learned from home and the surrounding environment, whether that be affluent or struggling. Our primary question was: “Are schools treating all children from all socioeconomic backgrounds equally? If not, is Cultural Capital the factor that could lead to the failing student’s success?”

Keywords: Cultural Capital, Pre-K Education, Social Learning
Digital Audio Tour of CWU Art and Architecture

*Auslander, Mark; Avitts, Ellen; Armbrust, Matt; Hyogung, Kim; Charles, Seth; Walton, Lauren; Kijak, Kevin; Mohamed, Saeed; Foster, Presten; Roberts, Chelsea; Crawford, Kailona; Kvietkus, Wolfgang; Garrison, Melissa*

*Faculty Mentor(s): Mark Auslander, Anthropology and Museum Studies; Ellen Avitts, Art*

Panel Presentation, Sessions #38 and #48
2:40-4:00 p.m. and 4:10-5:30 p.m. in Room 137A

Students in Mark Auslander’s Museum Exhibition Design and Exhibiting Nature classes and Ellen Avitts American Art and Architecture have created a digital audio tour, accessible via mobile phone, of important work of art and architecture on the CWU-Ellensburg campus. Their collaborative mission has been to create audio segments that are accessible and engaging for young people. Students have worked to create an audio tour (edited on Garage Band or Audacity) that is informed by art history and museum theory, but which is distinct from most conventional museum audio tours, which tend to emphasize the expertise and connoisseurship of the speakers. These audio segments often deploy humor and repartee among speakers, to encourage auditors to reflect upon the works of art and see them in new ways, even if listeners are initially resistant to thinking about art critically. The project emerged in close consultation with the university’s Art Selection and Permanent Committee and with faculty in the Art Department and in the Museum of Culture and Environment. When possible artists and staff members involved in the initial selection and placing of the art were carefully consulted. At the SOURCE presentation, each collaborative student team will present their audio segment and reflect on their presentational tactics. There will also be a discussion with participants and audience members about effective new strategies for using this new technology to deepen student and community engagements with art and the built environment.

*Keywords: Art, Museums, Audio*

Resonance Measurements of a Pre-Stressed Spherical Shell with Application to Non-Invasive Intracranial Pressure Monitoring

*Avila, Rafael; Kastner, Cameron*

*Faculty Mentor(s): Andrew Piacsek, Physics*

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

Recent experiments and numerical modeling by faculty and students at CWU have shown that resonance frequencies of a spherical aluminum shell (radius 3.0 in, thickness 1/8 inch) exhibit small shifts when different pressures are applied to the fluid inside. Further investigation is needed to determine whether this phenomenon can be exploited as part of a noninvasive method for monitoring intracranial pressure. The goal of the present study is to modify the experimental apparatus and procedure to more closely resemble clinical conditions and to acquire reliable resonance measurements. In previous experiments, the shell was suspended from elastic cords and the pressure was varied from 0 to 120 psig in steps of 10 psi. In the modified apparatus, we let the sphere rest on a support system, such as a ring stand, and the target pressure range is 0 to .5 psig in steps of 0.05 psi. Both modifications presented significant challenges: supporting the shell necessarily interferes with the vibrational response, and small pressure changes produce very small resonance frequency shifts that are difficult to detect. We present results comparing the efficacy of different support systems and preliminary results for detecting small frequency shifts.

*Keywords: Resonance Frequency, Pressure, Frequency Shifts*
Alcohol Intervention

Bailiff, Jake

Faculty Mentor(s): Shu-Fei Tsai, Language, Literacy, and Special Education

Poster Presentation Session #3, Poster #32
2:30-5:00 p.m. in Ballroom C/D

This study attempted to decrease the behavior of how often the subject went to the bar. The participant in this study was a college student who was a twenty-one-year-old male. The intervention used was to take away the participant’s car keys. The participant was willing to do the study. To collect data, event recording was used over the ten-week period of the study. The outcome showed that the subject’s behavior improved after the intervention was implemented. To ensure confidentiality of study, the subject’s name will not be used. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)

Keywords: Behavioral, Case Study

Identification of Genes Involved in Behavioral Changes due to Chronic Serotonin Treatment in the Nematode, C. elegans

Baird, Tykayah

Faculty Mentor(s): Lucinda Carnell, Biological Sciences; Eric Foss, Biological Sciences

Poster Presentation Session #1, Poster #27
8:30-11:00 a.m. in Ballroom C/D

Caenorhabditis elegans (C. elegans) is a free-living soil roundworm with only 302 neurons, making them a model organism for studying the function of neural pathways that regulate behavior. Serotonin (5-HT) is a neurotransmitter that modulates behavior in many organisms. In wild-type worms, this exposure causes an acute slowing in locomotion, which can be quantified by measuring the speed of the worms using an automated tracking system. When treated with elevated levels of 5-HT exposure for 30 minutes, C. elegans speed will decrease, but when treated overnight (12-16 hours) the worms will return locomotory speed to levels close to untreated animals; a behavior termed behavioral adaptation. Another behavior associated with long-term 5-HT treatment occurs when worms are removed from 5-HT; which results in increased speeds above levels of untreated animals. This behavior is referred to as withdrawal. To identify the cell mechanisms for this behavior we examined known mutants with genes involved in 5-HT-mediated behaviors. GOA-1 is a G-protein that binds to a 5-HT receptor, SER-4. MOD-5 is a serotonin reuptake transporter (SERT) that is involved in the reuptake of serotonin into the presynaptic neurons. goa-1 mutants when treated overnight with 5-HT fail to adapt or withdrawal. mod-5 mutants upon overnight 5-HT treatment were able to withdraw but failed to adapt. These results suggest a role for these proteins in controlling behavioral changes associated with chronic 5-HT treatment.

Keywords: C. elegans, Serotonin, Behavior
Connecting Recycling to Our Hispanic Community  
*Baldovinos, Diana*  
*Faculty Mentor(s): Jeff Hashimoto, Ellensburg High School*

Poster Presentation Session #1, Poster #53  
8:30-11:00 a.m. in Ballroom C/D

We are going to gather 12 different households and weigh their initial solid garbage, to see how much garbage they are throwing away. We will teach each family about the three Rs which are Reduce, Reuse, and Recycle. After teaching them about the three Rs we are going to give them two weeks to put in practice what they have learned. Whatever family reduces the weight of their garbage the most, will be receiving a prize. After those two weeks and after giving the prize, we will return to see if they have gotten in the habit of reducing their garbage.

*Keywords*: Sustainability, Recycling

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Scotland’s Independence Referendum: A Policy Path Analysis  
*Baldwin, Matthew*  
*Faculty Mentor(s): Joshua Zender, Political Science*

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

The purpose of this study is to explore the motivation, likelihood, and consequences associated with Scotland’s upcoming independence referendum on September 18, 2014. Specific emphasis is placed on what the relationship of a possibly independent Scotland would look like with the European Union and international community at large. Established precedents of secession, separation, and dissolution are explored in light of the current referendum’s objectives. Scotland’s relationship with the European Union is vital for economic, societal, and global security reasons. However, an independent Scotland could jeopardize the region’s status with the European Union, as well as undermine existing economic and security agreements with the United Kingdom. The study aims to identify the potential consequences of Scotland’s withdrawal from the European Union by examining previous outcomes of regional European secession efforts.

*Keywords*: Scotland, International Relations, European Union

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Geoarchaeology of House Features, Redbird Beach, Hells Canyon, Idaho  
*Baumgart, Eryn; Cummings, Tiffany*  
*Faculty Mentor(s): Steve Hackenberger, Anthropology and Museum Studies*

Poster Presentation Session #2, Poster #41  
11:30-2:00 p.m. in Ballroom C/D

The Redbird Beach site contains extensive vertical exposures of archaeological materials inter-bedded with Snake River flood sediments. Stratigraphic analyses reveals 30 or more flood events (1000-2500 B.P.). Previous studies by students from Washington State University and CWU have documented several hearths, ovens, and possible house floors (200-2000 B.P.) exposed in upper portions of bank profiles. Suites of subsurface surveys by University of Arkansas suggest intact features remain buried in the upper terrace. This undergraduate research project reexamines stratigraphic evidence for possible house floors. We outline criteria and results for distinguishing house floors from flood channels or stream troughs.

*Keywords*: Housepit, Geology, Archaeology
Change in Woody Debris Following the World’s Largest Dam Removal, Elwha River, Washington

Baumgartner, Spencer; Free, Bryon
Faculty Mentor(s): Lisa Ely, Geological Sciences

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

This research documents the fluctuation of logs and other woody debris in the Elwha River, Washington, in the year following the initiation of the sediment release from the removal of the Glines Canyon Dam. Fluctuations in the amount and position of large woody debris were documented over a one-year period at four sites that had been previously selected for separate studies of sediment and channel changes. Branches, logs, and trees, known as woody debris, that have accumulated in the reservoir for 85 years were released during the removal of the dam. We hypothesized that this influx of new woody debris into the river would influence the course of the Elwha River channel over time. Log jams and large woody debris in the river channel from 1.4 to 8 kilometers downstream of the dam were mapped using ArcGIS 10.2 along with orthographic photos, provided by the National Parks Service. All visible individual logs on a 1:1000 scale were mapped and measured. A group of four or more logs in close proximity to one another was mapped as a log jam. Logs within a jam that had clear termini and line of sight were also measured for length. The results show small alterations to the Elwha River channel path, an increase in woody debris quantity for the first ten months, and an increase in the average length of woody debris over the study period. The sites exhibiting the greatest changes were located 1.4 and 4 kilometers downstream of the dam.

Keywords: Dam Removal, Fluvial Geomorphology, Woody Debris

Decrease in Acid Rain over a 24-Year Study at Paradise, Mt. Rainier National Park

Beebe, Naomi
Faculty Mentor(s): Anne Johansen, Chemistry

Poster Presentation Session #1, Poster #13
8:30-11:00 a.m. in Ballroom C/D

Weekly wet precipitation samples from Paradise in Mt. Rainier National Park, Washington, were analyzed for major anions and cations, conductivity and pH. Volume weighted 3-month averages were tested for significant trends throughout the 23-year monitoring period starting in 1988 and compared with analogous data collected at established National Atmospheric Deposition Program sites throughout the state. Proton concentrations decreased by a significant amount of 59 percent resulting in a pH increase of wet precipitation from 5.1 to 5.5 (P=0.001). Similar trends were observed for the acidic sulfate and nitrate species. These results indicate that air pollution standards contribute significantly to the decrease in acid rain deposition to this pristine and vulnerable high elevation location, and that trans-Pacific transport of pollution is not detected in the form of acid rain and associated anions.

Keywords: Acid, Rain, Environment,
Measuring Quantitative Literacy through Electronic Data Collection

*Beemer, Emily; Hall, Tarra*

*Faculty Mentor(s): Timothy Sorey, Chemistry*

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

The purpose of this study was to determine if the implementation of Electronic Data Collection Devices (EDCD) into our lab activity would clearly cause an increase in a students’ comprehension of a concept and the ability to quantitatively support a scientific argument. Current research students in the Sorey Group assessed CHEM 180 series students with pre/post lab quizzes, teaching assistant observation of students, and student generated lab reports. To analyze the data collected, a “Theory of Affordance” and “Quantitative Literacy” was applied to assess inquiry-based laboratories that integrate electronic data collection devices (EDCD). This technology was assessed in five broad areas that may directly affect the quality of educational experiments at Central Washington University; (1) graphical display of data, (2) time, (3) error, (4) ease of use and (5) other physical affordances during data acquisition. Instructors will use the results from this study to inform teaching practice and increase teaching effectiveness.

*Keywords: Quantitative Literacy, Chemical Education, Computer-Based Technology*

Positive and Negative Impacts of Tourism

*Beletskiy, Vladimir*

*Faculty Mentor(s): Dorothy Chase, Recreation and Tourism*

Oral Presentation, Session #42
3:40-4:00 p.m. in Room 202

When we think of the tourism industry today, what comes to mind? Do we think about the positive effects of tourism, such as the creation of millions of jobs, and the generation of billions of dollars, or do we see its potential negative side as well? This presentation demonstrates some of the impacts tourism has on the environment, economics, society, and culture. There are things that many don’t realize about the tourism industry today. Most important of these are how you and I can impact the industry in a way that will benefit many. Are we going to stay with the old or can we, tourism professionals, learn how to evolve and change the tourism industry. You be the judge of that, but change will come when we act.

*Keywords: Tourism, Society, Environment*
Phylogenetic Analyses of the Litter Decomposing Fungi Clitocybe Found in the Cle Elum Ranger District

Bennett, Douglas
Faculty Mentor(s): James Johnson, Biological Sciences

Poster Presentation Session #1, Poster #25
8:30-11:00 a.m. in Ballroom C/D

Fungi are some of the most diverse and understudied organisms on the planet. In this experiment we studied a genus of litter decomposing fungi, *Clitocybe*, which are found in the Cle Elum Ranger District of the Wenatchee National Forest of Kittitas County using phylogenetic techniques. *Clitocybe* are part of a diverse and ecologically important guild of fungi that influence nutrient cycling and soil fertility in the forest. A phylogenetic analysis was done using DNA barcoding, a technique which uses short universal sequences (~640-680 base pairs) to establish species identifications which is possible through polymerase chain reaction (PCR). Due to the biochemical nature of these fungi, PCR is greatly inhibited and, as a result, the PCR solution was adjusted to optimize the effectiveness of the PCR. Each sample was then quantified using a 16 well DNA plate reader, and each sample was adjusted to 10 ng/mL; additionally, a copy of each primer for each sample set at 3mM and sent to High Throughput Sequencing at the University of Washington. The sequence data was then screened for quality and, using a blast search, species identification was assigned based upon sequence similarities with known species. A phylogenetic tree was then constructed using PAUP and MrBayes software, to show the evolutionary relationships of the specimens.

Keywords: Phylogenetic, Fungi, Sequencing

Light Curve of SN2014J

Berghoff, Hans
Faculty Mentor(s): Michael Braunstein, Physics

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

On January 21, 2014, during an undergraduate teaching lesson, observers at the University of London discovered a supernova in Messier 82 approximately 11 million light years away. This supernova, identified as SN2014J, is classified as a type Ia supernova which occurs when a white dwarf accretes sufficient mass from its companion star to undergo fusion in its carbon-oxygen core. This sudden onset of fusion releases more energy than our Sun will in its entire lifetime in a time frame of months, and destroys the white dwarf. Furthermore, type Ia supernovae play the crucial role of a standard candle that is used to define and measure the cosmic distance scale. Photometric data collection for SN2014J with the Central Washington University Observatory 0.3m telescope started on January 31, 2014 when the supernova had reached its peak brightness and will continue until SN2014J is too dim to distinguish from its host galaxy. Data was collected with Kron-Cousins visible band (V) and infrared band (I) filters. After reducing the raw images and performing differential photometry measurements, a light curve was constructed that shows SN2014J decreasing in brightness as time progresses. When combined with data obtained by other observers, the resulting light curves can contribute to understanding how type Ia supernovae evolve and change as a function of time.

Keywords: SN2014J, Light Curve, Type Ia Supernova
Let Them Eat Grass: The Media and the Sioux Uprising of 1862

Bergstrom, Jordan
Faculty Mentor(s): Daniel Herman, History

Oral Presentation, Session #6
8:10-8:30 a.m. in Room 271

The Sioux Nations of Minnesota and the Dakotas were pushed to the brink of collapse. Having been forced onto a small tract of land in southern Minnesota, the Sioux had been promised $1.4 million for their lands, as well as food and supplies. The Federal government, a year into the Civil War, did not live up to the promises it had made to the Sioux. By 1862 the tribes were near death from starvation. When Andrew J. Myrick, a trader in the area, was asked for food he said, “So far as I am concerned, let them eat grass, or their own dung.” (His body was later found with grass stuffed down his throat and filling his mouth.) The Sioux uprising, led by Little Crow, began shortly after. I argue here that the Sioux uprising was not treated as a war in the media, but rather as acts of terror and barbarity. In part because the media clouded the line between warrior and terrorist, the government and the courts created a new category for the Sioux rebels, treating them not as soldiers per se but as “enemy combatants” (to use a modern term). This blurring led to the miscarriage of justice, when the government executed 38 Dakota warriors in a single day (the single largest mass-execution in American history) and helped set a precedent for more recent treatment of soldiers as enemy combatants. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)

Keywords: Sioux, Uprising, War

Downhill Ski with an Integrated and Removable Binding Plate

Bergstrom, Trevor
Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction

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

A traditional wood core downhill ski can only be mounted three times before the cores become compromised by holes in them. Binding plates can be used but require the user to ski high above the ski and can decrease performance by making them harder to maneuver. One way this could be solved is by a removable integrated binding plate in the ski so that it provides lateral support with the core of the ski, but doesn’t require the user to ski above the top of the ski. The basic system derives from the idea of the binding plate. Screws can be interchangeable in tapped metal but not in wood because the screw will tear the wood and deform the threads more than in metal. A traditional ski has a wood core in which the binding screws are installed with wood glue. Removal of these screws compromises the wood core and makes those holes unusable. Testing will be done spring quarter should show if the ski designed can behave like a traditional ski, hold the same pullout strength on the binding screws, yet be mounted more than three times. In this project, the ski will be totally redesigned, and will require meticulous calculations for user safety.

Keywords: Design, Engineering, Optimization
Medical Device Supply Chain
Berry, Alexandrea; Anderson, Jennifer
Faculty Mentor(s): Kun Liao, Finance and Supply Chain Management

Lynnwood Center - Poster Presentation, Poster #1

The goal of the project is to develop a medical device supply chain, from raw materials to manufacturing, working with the Center for Advanced Manufacturing Puget Sound (CAMPS). We will be breaking down the bill of materials for two medical devices, a prosthetic ankle and an ultrasound machine, into components, sub-components, and raw materials. We will then find suppliers and original equipment manufacturers (OEMs) located within the Puget Sound, Washington State, neighboring states, and globally. The OEMs and suppliers will be evaluated and rated on several criteria, including: risk, quality, reputation, and location. Cost for raw materials and components will also be evaluated. Using the ratings and evaluations, we will analyze and develop two supply chains, one for each medical device, with several alternatives. The information is collected through interviewing suppliers and OEMs, scheduling visits, and working with CAMPS.

Keywords: Supply Chain, Medical Device, Supply Chain Management

Canvas Training Program
Betz, Amber; Guinotte, Sarah
Faculty Mentor(s): Laura Portolese Dias, Information Technology and Administrative Management

Oral Presentation, Session #12
9:40-10:00 a.m. in Room 140

In ADMG373, Training and Development for Administrative and IT support, we developed a tentative training plan for the Canvas Learning Management System (LMS). This consisted of several steps: conducting a needs assessment; developing a training strategy; and discussing the learning objectives, outcomes, and metrics. The methodologies we used, on which the needs assessment was based, included interviewing Bob Lupton, the chair of the Information Technology and Administrative Management department, and Delayna Breckon, the LMS Administrator. The training program is designed to introduce and educate faculty, staff, and students at Central Washington University (CWU) on how to operate the basic functions of Canvas. We initially designed the program because we saw that the LMS was new to CWU and it would be beneficial if there were additional resources available to faculty, staff, and students to access. The resources will offer support if users need help with a particular part of the LMS. Currently, the training program is in the early stages of development and has the potential to be implemented by CWU. The program is intended to be an orientation for faculty, staff, and students that includes a step by step walkthrough to accelerate their understanding of the Canvas LMS. If CWU were to implement the training program for Canvas, it can be used for any department on campus.

Keywords: Canvas, Training, Development
Stages

Bir, Taylor

Faculty Mentor(s): Crystal Fullmer, Physical Education, School and Public Health, Dance Program

Creative Expression Presentation, Session #25
12:40-1:00 p.m. in Ballroom A

This will be a live presentation of a dance trio that was created in PED 301 Choreography. As a requirement for the project, a poem and a piece of art were selected to inspire the movement that would develop a dance. This process opened my eyes to different ways of creating a dance work. Throughout the class, we learned different tools for creating our movements; the ones that resonated most with me were speed and repetition. These inspired me because I felt those methods would really connect with the audience. I chose the poem, “Do Not Stand At My Grave and Weep” by Mary Elizabeth Frye, because when I read it I felt a special connection to the words. Once I found the poem, I chose Cornfield with Crows by Vincent van Gogh. I was intrigued by the colors, the paint strokes, and the three pathways presented. Combining all of these components I started to create my movement. Using three dancers, I began playing with the theme of grief and the different ways individuals cope with loss. The poem and artwork served as a map for my movement. As the dancers move, some travel at faster speeds representing letting go and moving forward, while one dancer remains at a slow repetitious pace representing the crippling pain of loss. In the end, all the dancers learn to accept their loss and see their time with the loved one as a blessing.

Keywords: Dance, Integrated Arts, Grief

Directed Graph Cryptosystems

Boberg, Kurt

Faculty Mentor(s): Dominic Klyve, Mathematics

Oral Presentation, Session #5
9:10-9:30 a.m. in Room 202

Cryptography is a necessary tool for secrecy in our increasingly connected and data-driven world. As advances are made in both mathematics and computer hardware design, existing cryptosystems must be improved or replaced to maintain privacy of sensitive data. In this paper, we propose a novel cryptosystem based upon an algorithmic traversal of a directed graph (digraph). The system is resistant to the most common attacks on stream-type ciphers that do not use known-plaintext attacks. However, given a length n, the minimum number of vertices a digraph must contain to guarantee a cycle of at least n length is unknown, making the system unsuitable for practical use without further research.

Keywords: Cryptography, Graph Theory, Computer Science
The Mining Law of 1872: How Outdated Mindsets are Hurting People and the Environment

Bonner, Bradford

Faculty Mentor(s): Rex Wirth, Political Science

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

This project demonstrates how late 19th century mindsets lead to the creation of the Mining Law of 1872, and how those outdated mindsets are creating multiple problems in the world today. At its time, the Mining Law of 1872 did exactly what it was supposed, and that was to promote westward expansion across the United States to settle and claim vast new amounts of land and resources. To achieve this, the law is purposely written to allow anyone easy and cheap access to minerals to improve both the country’s and individual’s wealth. However, as America pushed forward into the 20th and 21st centuries, it saw changes on a scale never seen before. Populations reached record levels and cities along the California and Washington coasts ensured the West was being settled and developed. New technologies and strategies allowed miners to extract minerals at rates never fathomed in 1872, quickly altering local natural environments. Finally, the country saw a change in its mindset on the environment. Events like the Environmental Movement during the 1960s proved Americans were becoming more aware about the environment and no longer saw nature as something for man to control or conquer. Despite these changes, one law that remained untouched was the Mining Law of 1872, which still handles the country’s mining operations today; all in 1872 prices and mindsets. Because of the rapid change the West saw, these outdated policies can no longer keep up with modern mining practices and are only hurting the people and environments they touch.

Keywords: Mining, Westward Expansion, Environment

The Dibromination of Homogentisic Acid Lactone

Bouchey, Sydney; Calaway, Austin; Maverick, Rebecca; Chamberland, Stephen

Faculty Mentor(s): Stephen Chamberland, Chemistry

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

The recently described total synthetic pathway to clavatadine A, beneficial for its properties as an anticoagulant, is hindered by a step involving the dibromination of homogentisic acid lactone. This step produces moderate yields and mixed products preventing the discovered pathway from being practical in industrial production. Consequently, the efficiency of the dibromination step will be improved so that it results in at least an 80 percent yield and in a single product. In developing this alternative route many variables have been manipulated including the bromine source, base type, and reaction conditions. This work has revealed that the brominating agent N-bromosuccinimide, the bases pyridine, lithium acetate, potassium acetate, imidazole, and N,N-diisopropylethylamine, along with the solvents acetonitrile and tetrahydrofuran, do not improve the reaction. Other manipulations to the dibromination reaction are still being examined including the brominating agents hydantoin, N-bromophthalimide, and tribromoisocyanuric acid, along with the base 1,4-diazabicyclo[2.2.2]octane, and adjustments to the reaction temperature and duration. The new dibromination route that this work will produce will provide the scientific community with a novel dibromination pathway and will significantly improve the synthetic route to clavatadine A.

Keywords: Natural Synthesis, Bromination, Optimization
Analyzing the Seahawks’ Offensive Play-Calling
Brand, Adam
Faculty Mentor(s): Yvonne Chueh, Actuarial Science

Oral Presentation, Session #14
10:20-10:40 a.m. in Room 202

Analytics has become a valuable tool in sports. Movies like *Moneyball* have even popularized the mathematical methods that sports teams are now using to try to gain an advantage over their opponents. Sports analysts are also using analytics to attempt to predict outcomes in sports. Since offensive plays in football offer clearly-defined, short term events (plays), offensive play-calling in football is the perfect opportunity to analyze how a team calls plays and how those plays affect performance. My project will attempt to analyze all of the Seahawks’ 2013 regular season offensive plays by fitting specific play events to probability distributions in order to predict the probability of certain plays being called in certain situations, and finding the strongest correlations between game situation and play-call to predict the performance of those plays/drives. I am personally responsible for all aspects of the project, including data collection. I have watched every Seahawks game play by play and collected more than 25 fields of data for every offensive play. By defining the specific data fields and collecting the data myself I will analyze the plays from my unique perspective with the hope that my findings will be unique to sports analysis. This project is an original idea that to my knowledge has not been attempted before (at least not like this). My hope is that I am able to offer a new perspective from which to analyze offensive play-calling in pro football and provide valuable, unique information to my hometown Seahawks on how they called plays in 2013 and how those plays affected their performance in 2013. Go Hawks!!!

Keywords: Football, Probability, Statistics

The Snohomish River Estuary: Restoration, Conflict, and Compromise
Braun, Anthony
Faculty Mentor(s): Jennifer Lipton, Geography

Poster Presentation Session #2, Poster #27
11:30-2:00 p.m. in Ballroom C/D

The Snohomish River is a commercially and historically important river in central Snohomish County, Washington. In the early 20th century, the islands of the river’s estuary were diked to prevent tidal flooding and provide land for the agricultural needs of the county. Modification of tidal flow has changed the estuary by removing salmon rearing habitat, damaging native wetlands, and preventing natural tidal movements. Snohomish County, and the City of Everett, moved to reestablish the wetlands and marshes that made up the estuary in order to revive important habitat. In the late 20th century, restoration efforts began, and levees were breached to allow for a more natural tidal movement. However, political lines are being drawn between those in favor of continued restoration efforts and those that advocate for future growth and development. Republican groups have fought against restoration to preserve farmland and the growth of industry in the estuary. Meanwhile, the majority Democratic Snohomish County pushed strongly for restoration. This case study seeks to examine multiple factors, including land ownership, land use, and hydrology to make recommendations in order to create a compromise that will preserve farmland and industry while allowing for restoration of the Snohomish River estuary. Geoprocessing of aerial imagery and digital vectorization of map features will be conducted to examine infrastructure risks if proposed restoration projects take place. Along with raster registering and vectorization, hydrological modeling of tidal flow will be used to digitally alter tide levels to examine how water level rise will effect the landscape.

Keywords: Restoration, Hydrology, Salmon
Comparative Study of Periwinkle Extract on MCF-7 Breast Cancer and C2C12 Myoblast Growth Rate and Morphology

Brizendine, Amanda; Heidinger, Brigitta; Tapia, Nancy; Williams, Carin
Faculty Mentor(s): Ian Quitadamo, Biological Sciences

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

Nutritional supplements, or neutraceuticals, are touted by many for their purported ability to maintain wellness and treat disease. Neutraceutical treatment of human diseases is gaining popularity; however comparatively few scientific studies support their routine use. This study compares the effects of periwinkle extract as a neutraceutical treatment to determine if it has a differential impact on cancerous and normal cell lines. Periwinkle, a flower currently used to help treat leukemia and lymphoma, is a prime candidate for study. An exploratory study was conducted to investigate periwinkle’s effect on growth rate and morphology for MCF-7 human breast cancer and C2C12 mouse myoblast cell lines. Initial studies showed a dose-dependent decrease of MCF-7 viability as well as dramatic changes in cancer cell morphology; however periwinkle’s effects on normal cells is unknown. Ideally, periwinkle would differentially affect breast cancer but not normal cells. This ongoing study is investigating that question. Based on preliminary results, we anticipate that: a) MCF-7 human breast cancer cell growth rate will decrease as periwinkle concentration increases; b) MCF-7 morphology will change as periwinkle concentration changes; C2C12 muscle cell viability be unaffected at normal but will decrease at high periwinkle concentrations; and C2C12 muscle cell morphology remain unchanged as periwinkle concentration changes. Forthcoming study results will support or refute our hypotheses.

Keywords: Breast Cancer, Periwinkle, Neutraceutical

Wildcat Cafe & Brewpub
Brookhart, Ryan
Faculty Mentor(s): Dwayne Douglas, Information Technology and Administrative Management

Oral Presentation, Session #7
9:30-10:00 a.m. in Room 301

Wildcat Cafe & Brewpub is unlike any other restaurant in the Ellensburg area. It is a place for students to meet, learn, and grow. By partnering with Central Washington University, students are offered a place in which to apply what they are learning to a real business. Students will gain work experience and earn credits simultaneously. The restaurant would be located on campus and would be available to students and faculty. Having a brewery on campus enables programs, such as the craft beer certificate program to have a building in which they can brew and learn how a brewery operates. Food made in other areas on campus would provide low cost, locally made, fresh alternatives. Vegetables grown by the horticulture department, bread and other baked goods from the culinary arts would supply basic ingredients for the restaurant. Wildcat Cafe & Brewpub will be open through four periods each day: breakfast, lunch, dinner, and late-night. During late-night hours live entertainment will be the main focus, offering events ranging from an open-mic, karaoke, comedy or music. As part of a monthly contest, students will have the opportunity to have their menu item, beer, or art put on display. The winner will receive special discounts. Students who have a hand in how the business operates will have a greater sense of pride and accomplishment. My goal is to provide an exciting environment for peers to display their creative talents and passions and have fun while doing it.
A Java Implementation of a Novel Quantitative Genetic Framework for the Evolution of Developmental Interactions

Brooks, Elizabeth
Faculty Mentor(s): Alison Scoville, Biological Sciences; Filip Jagodzinski, Computer Science

Poster Presentation Session #1, Poster #10
8:30-11:00 a.m. in Ballroom C/D

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. Such interactions can produce large and rapid changes to trait (co)variances. Because of this, traditional models may not accurately predict evolutionary dynamics. The goal of this project is to determine the extent to which the developmental architecture of traits affects the evolutionary response of a given species. This may be achieved through the use of an updated mathematical framework that explicitly incorporates nonlinear interactions between developmental factors underlying one or more traits. As a first step, with the Java programming language we have developed a traditional model and a second, more advanced, model that allows a user to test hypotheses about how the developmental interactions among two traits affect their (co)variances and subsequent evolutionary trajectories. Additionally, our code and model framework are easily amenable to generating plots and graphs of trait relationships. With this software, users will be able to assess the accuracy of the updated model in comparison to the traditional framework. Future versions of our software will be available online as a user-friendly web tool, which will provide options to custom supply model parameters and equations of trait relationships.

Keywords: Software, Evolution, Quantitative Genetics

Radiocarbon Dating of Calcined Bone: Pacific Northwest

Brown, James
Faculty Mentor(s): Steve Hackenberger, Anthropology and Museum Studies; James Chatters, Applied Paleoscience

Oral Presentation, Session #11
10:00-10:20 a.m. in Room 137B

Calcined bone, highly burned bone, survives well in archaeological sites with acidic soils (pH 4.5 to 5.5). These acidic soils are present in archaeological sites along the Northwest coast due to the presence of coniferous forests. Calcined bone has shown to provide accurate radiocarbon ages, if intact apatite can be extracted, processed, and assayed. My CWU Science Honors Research project involves collaborations with DirectAMS Laboratory, creating a protocol for test comparison of calcined bone and radiocarbon dates from seven sites. Petrographic microscope analysis of calcined bone shows there is little to no calcite contamination (from humic acids). Analysis also reveals intact apatite structure, which contains the only obvious carbon in my samples of calcined bone. Accelerated mass spectrometry (AMS) dating of calcined bone samples compare accurately with corresponding dates of charcoal and other bone from all seven sites in my sample. Dating calcined bone from large cooking features will be highly significant for researchers investigating resource intensification along the Northwest coast and within the Columbia Plateau. In these areas, mass food processing and storage were well established by 2500 RCYBP, especially where marine resources and/or tuberous plants were abundant. Radiocarbon dating of calcined bone from three of my sites with large cooking features demonstrates that improved accuracy and efficiency in radiocarbon dating will yield supporting evidence for resource intensification. This evidence will aid in improving our understanding of the ecological and economic factors that drive the development of the Pacific Northwest village pattern.

Keywords: Archaeology, Anthropology, Radiocarbon Dating
Resources Intensification, Sedentism, Storage, and Ranking: A Visual Synopsis of Pacific Northwest History and Theory

Brown, James; McCutcheon, Patrick

Faculty Mentor(s): Steve Hackenberger, Anthropology and Museum Studies

Poster Presentation Session #2, Poster #42
11:30-2:00 p.m. in Ballroom C/D

Resource intensification is a theoretical concept that is used routinely to explain past human subsistence and settlement systems by identifying evidence of sedentism, storage, ranking, and hierarchy among early horticulturists and complex hunter-gatherers. Evidence for these developments in the archaeological record include: large houses, and cooking and storage features. Resource intensification, as defined, can include technology for mass capture and processing, resource extension through scheduling, logistical organization of labor, or expanding habitat use. Within the Pacific Northwest, theoretical explanations of these developments grew within three schools: evolutionary-ecology, political economy, and social agency. Our strategy is to (1) diagram the intellectual history of Northwest coast and Columbia plateau theory, and (2) trace relationships and interactions between synthetic works and archaeological studies. Given that almost all treatments of resource intensification focus on the development of households (plank houses and house pits) and larger house settlements, our review provides a critical synopsis of major directions in the archaeology of the Pacific Northwest. As possible each source we cite is assessed in our visual synopsis. We code each source according to three scientific performance criteria: dynamic sufficiency, empirical sufficiency, and tolerance limits. By evaluating each work using these performance criteria, we can begin to interpret anthropological explanations for cultural ecology and evolution, and political economy or social agency within the Pacific Northwest.

Keywords: Archaeology, Anthropology, History, Theory, Resource Intensification

Comparative Analysis of Radiometric Dating Techniques: The Sunrise Borrow Pit Site

Brown, James; Hackenberger, Steve; Chatters, James

Faculty Mentor(s): Patrick McCutcheon, Anthropology and Museum Studies

Poster Presentation Session #2, Poster #43
11:30-2:00 p.m. in Ballroom C/D

In the summer of 2013, I excavated an archaeological feature at the Sunrise Borrow Pit site (45PI408) on the slopes of Mt. Rainier. Features are studied by archaeologists for evidence of resource intensification or an increased rate of resource extraction. The feature I excavated contained fire-modified rock, remains of stone tools, and burned bone. This research describes the thermoluminescence dating of the fire-modified rock to ascertain the last time the feature was heated to 500°C. The feature was located next to a stratigraphically older feature that could be the oldest yet known feature of its kind. I have analyzed thermoluminescence dates of other fire-modified rock features as well as radiocarbon dates of burned bone from the same features to determine if they are contemporaneous or of different ages. This research will help provide a more resolved chronology of upland land-use patterns for the southern Washington Cascades. In conjunction with this research, an analysis of the feature contents have been recorded which when analyzed in accordance with their corresponding thermoluminescence and radiocarbon ages will provide documentation for the earliest evidence of prehistoric resource intensification if the two adjacent features differ in age. However, if the thermoluminescence and radiocarbon ages are similar then it can be ascertained that the features can be considered as one of the most complex features recorded in upland settings in the southern Washington Cascade Mountains.

Keywords: Archaeology, Thermoluminescence, Anthropology
Using a Spreadsheet to Solve the Schrödinger Equations for H\textsubscript{2} in the Ground and Excited States

Buchanan, Jacob

Faculty Mentor(s): Yingbin Ge, Chemistry

Oral Presentation, Session #50
4:50-5:10 p.m. in Room 140

We have designed an exercise suitable for a lab or project in an undergraduate physical chemistry course that creates a Microsoft Excel spreadsheet to calculate the energy of the S\textsubscript{0} ground electronic state and the S\textsubscript{1} and T\textsubscript{1} excited states of H\textsubscript{2}. The spreadsheet calculations circumvent the construction and diagonalization of the Fock matrix and thus can be accomplished by any undergraduate chemistry student with basic calculus skills. The wave functions of the S\textsubscript{0}, S\textsubscript{1}, and T\textsubscript{1} states of H\textsubscript{2} are constructed from the symmetry-adapted bonding and antibonding molecular orbitals (MO). All quantum mechanical integrals are estimated using the Monte Carlo integration method. Due to the stochastic nature of the spreadsheet calculations, 25 runs were carried out to obtain the mean energy of the S\textsubscript{0}, S\textsubscript{1}, and T\textsubscript{1} electronic states of H\textsubscript{2}. The accuracy of the spreadsheet calculations is comparable to that of the HF/STO-3G calculations. The atomic and molecular orbitals and the energy components can be easily calculated and plotted for better visualization and understanding of essential quantum chemical concepts. This spreadsheet can also be adapted to tackle a wider range of quantum chemistry problems with different levels of complexity.

Keywords: Chemical Education, Spreadsheet Calculation, Molecular Orbital

Concise Total Synthesis of Phidianidine A and B

Buchanan, Jacob

Faculty Mentor(s): Stephen Chamberland, Chemistry

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

Phidianidine A and B aroused our interest because they were the first chemicals found in nature that contain a cyclic arrangement of one oxygen atom, two nitrogen atoms, and two carbon atoms called an oxadiazole. Several medicinal chemicals made by humans also contain this cyclic motif. In addition, because phidianidine A and B kill cervical, brain, and spinal cancer cells, we and others have sought to prepare these chemicals in the laboratory and develop them into new chemotherapy drugs. Yield for the key step in each known laboratory preparation of phidianidine A and B varies widely (from 15 to 75 percent). Our four-step laboratory preparation of phidianidine A and B is the shortest preparation to date, and we hope to increase our yield of the key step. Optimizing the key step would not only bolster the utility of our phidianidine preparation, but would expand the efficiency of this transformation to prepare other medicinal compounds.

Keywords: Medicinal Chemistry, Organic Chemistry, Total Synthesis
Hand to Hand Stage Combat
Bugallo, Paul; Hernandez, John; Gibbs, Drew; Domena, Monica; Gahley, Skye
Faculty Mentor(s): Patrick Dizney, Theatre

Creative Expression Presentation, Session #46
3:20-3:40 p.m. in the SURC Theatre

At the American College Theatre Festival, our combat troupe presented a workshop to 35 college students from around the region. We taught a workshop on medieval quarterstaff combat. We learned these techniques through our fight troupe class, which we have been taking all year. During our presentation today, we will be demonstrating some basic stage combat techniques. We will focus on safety above all else, but at the same time try to make it as realistic as possible. We will not be using weapons during our presentation as this will be some basic level stage combat.

Keywords: Stage Combat, Hand-to-Hand

Solar Tracking Device
Bui, Tam
Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction

Poster Presentation Session #3, Constructed Object #17
2:30-5:00 p.m. in Ballroom C/D

Renewable energy is one of the most talked about issues of the modern world. Solar energy is the most popular; it is everywhere, and there is an unlimited supply. Solar panels were invented to collect this unlimited energy. There are many devices that help these panels work better, but most of them are not used at their 100-percent efficiency since at the amount of sunrays are depend on the complexities of locations, times, directions, and price. Therefore, this project is about building a simple device that not only can track the sun from east to west, but also different angles that make the panels perpendicular to the sun at three main different times of the year. The device is made from standard Aluminum 6061-T6, which is lightweight, and not expensive. L-Brackets, bolts and screw threads connect all parts of the device. The stepper motor will turn the panels’ frame from east to west. The torque needed for the device is calculated carefully, and it has the safety factor of 2. The device is tested by using electronic multimeter to measure the produced voltage and current. Then it will be compare with a fixed solar device. This project’s result is expected to be more efficient than the benchmark devices by about 15 to 20 percent, and also a benchmark for other future projects that are in the same category.

Keywords: Track the Sun from East to West, Light Weight, Efficiency
**Feeding Time at the Human House by David Weiner**  
**Burch, Alicia; Tarabini, Nicholas; Brown, Jordyn; Oswald, Chad**  
*Faculty Mentor(s): Patrick Dizney, Theatre*

Creative Expression Presentation, Session #46  
2:40-3:00 p.m. in the SURC Theatre

While competing in the Irene Ryan Acting Competition, we were required to choose, rehearse, and perform two scenes, all while utilizing the skills that we have acquired and have been studying throughout the duration of our time within our respective theatre bachelor of fine arts programs. In order to progress within the competition, we had to make sure that we had done the work required outside of class. This meant that we had to not only memorize the lines within the scene, but work on specific points of view, physicality, and connection to our partners, to help make these scenes as truthful for the auditors as possible. This required research on the subjects that pertained to the characters and the world in which they lived, but also required insight and understanding of the message that the playwright was trying to convey through this work. As well, it required hours upon hours of outside rehearsal to create and solidify movement within each of the pieces, while still keeping in mind the basic principles of staging and directing, so as to not distract the audience and make sure that the movement moved the story along.

**Keywords:** Connection, Rehearsal, Point-of-View.

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**Moonlight**  
**Bywater, Brittany**  
*Faculty Mentor(s): Andrea Eklund, Apparel, Textiles and Merchandising*

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

Purpose: The purpose for this garment was to create an evening dress, inspired by Italian cityscapes at night, that could be worn in the evening while on a trip touring Italy. I designed it with the intentions of creating a classy and feminine romantic piece that shows both the colors, textures and nostalgia of the blinking lights of a coastal Italian city against the night sky. Process: I began by sketching renderings of ideas for the piece. During this process, I did image research on Italy and gathered images from multiple Italy destinations. From these, I established the looks and colors that I wanted to use. After a trip to Fabric Depot in Oregon to get fabric and many draping, patterning and fitting sessions later, I stitched each piece together to fit my model. Technique: I used the draping method to create *Moonlight*. Bed sheets were my primary material for draping the garment on a mannequin. After getting the draped piece to look the way I desired it, I moved to creating the paper pattern. I used bedsheets again to sew a sample of the garment to establish correct fit on my model and solidify the look of the design. When the sample fit correctly, I started on the fashion fabric. Carefully, I stitched the pieces together being conscious of every detail. When the base of the garment was completed, I added the final embellishments including trims and buttons. Materials: 100-percent polyester satin, silver chain, imitation pearls, polyester lining fabric, 100-percent cotton thread, invisible zipper, shank buttons.

**Keywords:** Draping, Evening Gown, Apparel Design
The New Jim Crow: The War on Drugs and Mass Incarceration

Caldwell, Kayla; Davis, Caless

Faculty Mentor(s): Nelson Pichardo, Sociology

Poster Presentation Session #3, Poster #53
2:30-5:00 p.m. in Ballroom C/D

The presentation relates the social, economic, and political consequences of the War on Drugs. The thesis presented is that the War on Drugs has led to the mass incarceration of largely African American male youth and that constitutes a new form of racial oppression. Since the War on Drugs began the prison incarceration rate for nonviolent drug offenses has risen from 300,000 to 1.3 million. Of those arrested for drug offenses, three-quarters have been black and Latino despite equal rates of drug use between blacks and whites. The consequences include voter disenfranchisement, employment discrimination, housing discrimination, and ineligibility for college student loans. It is our thesis that this mass incarceration in a modern day is a reflection of the Jim Crow of the antebellum South.

Keywords: Jim Crow, Mass Incarceration, War on Drugs

On Cyclic Decompositions of \( K_{n-1,n-1+I} \) into a 2-Regular Bipartite Graph with at Most Two Components

Carmona Herrera, Maira

Faculty Mentor(s): Ian Buvit, McNair Scholars Program

Oral Presentation, Session #14
10:00-10:20 a.m. in Room 202

Here, I represents a factor added to an already complete bipartite graph \( K_{n-1,n-1} \). A bigraph is a way to represent relationships between two independent sets of objects called vertices. Each vertex of one set connects to one or more vertices in the other set by what is called an edge. For example, the two sets could be NFL football conferences, the vertices are the various teams, and the edges connect teams of the two conferences that have played each other. To carry this example further, edges connect the Seattle Seahawks (vertex) of the NFC West (set) to the Washington Redskins, Dallas Cowboys, and New York Giants, the NFC East teams the Seahawks played in 2011. Cycles are sequences of vertices. Cyclic decomposition is the partitioning of the vertices into subsets based on edge patterns. In complete bigraphs, every vertex of one set is connected to every vertex of the second set. In a regular graph, each vertex has the same number of neighbors. In summer 2013, I participated in a Research Experience for Undergraduates at Illinois State University with Professor Saad El-Zanati, who investigates combinatorics and graph theory. Professor El-Zanati asked our team to expand the previous results by adding another factor in \( K_{n-1,n-1+I} \) to the complete bigraphs. We found patterns based on vertex labelings of G that allowed us to obtain cyclic G-decompositions of \( K_{n-1,n-1+I} \).

Keywords: Cyclic Graph Decompositions, 2-Regular Graphs, I-Factor
Reecer Creek Soils and Water Quality

Casey, Clare

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

Poster Presentation Session #1, Poster #57
8:30-11:00 a.m. in Ballroom C/D

We measures organic matter in soils and water quality in the Reecer Creek Floodplain Restoration Project. Increases in soil organic matter show development since the project was completed in 2011. We compared water quality to the local river and ponds and previous water quality measurements.

Keywords: Soils, Water Quality

Effects of Sleep Quality on Depression and Anxiety Symptomology

Celori, Anthony

Faculty Mentor(s): Kara Gabriel, Psychology

Oral Presentation, Session #23
11:40-12:00 p.m. in Room 202

Poor sleep quality has been found to be a common concern for individuals with depression and anxiety; however, the directional aspect of this relationship is unclear. While depression and anxiety may contribute to poor sleep quality, poor sleep quality may also exacerbate symptoms of psychological disorders. Importantly, both sleep quality and stress levels can negatively impact college students, and poor sleep quality may be further influenced by high levels of caffeine and alcohol consumption in students. The current study examined possible correlations between sleep quality, depression and anxiety symptoms, and caffeine and alcohol use in university students. A counterbalanced series of self-administered surveys were administered online. Those surveys included the Pittsburgh Sleep Quality Scale, the Personal History Questionnaire, the Generalized Anxiety Disorder-7 questionnaire, the Alcohol Use Disorders Identification Test and a caffeine survey adapted by the investigators. While data collection is ongoing, it is anticipated that worsening sleep quality will correlate with increasing severity of symptoms related to both anxiety and depression after accounting for alcohol and caffeine use. We also expect that increased use of alcohol and caffeine will modulate the effects of poor sleep quality, leading to increasingly severe symptoms. These results would be important in a clinical setting as both a tool for diagnosis and therapy efficacy, as the extent of poor sleep quality could help identify the severity of a patient’s depression or anxiety while tracking symptomology during therapy.

Keywords: Sleep, Depression, Anxiety
Previous research in humans and non-human animals clearly demonstrates that GABA plays a role in anxiety and anxiety-like behaviors. With rodent models, GABA agonists produce anxiolytic effects under multiple paradigms but the effects of directly administering GABA remain unclear. The current study investigated the effects of chronic peripheral GABA administration on behavior using a common measure of anxiety-like behavior in rodents, the elevated zero maze. Eight-week-old male and female Swiss Webster mice were quad-housed and exposed to either cat urine or plain litter as part of a secondary hypothesis regarding the development of a murine model of PTSD. Starting 20 minutes after predator scent exposure, each mouse was given an intraperitoneal injection of either GABA (10 mg/kg) or saline once a day for seven days. On the eighth day, each mouse was placed on an elevated zero-maze for recorded observation without an injection. Unfortunately, analysis of initial latency to new arm entrance (sec), exploratory behavior in the open arms (i.e., dipping behavior), and duration in the open arms (sec) found only small sex differences, and did not reveal any effect of GABA or predator scent exposure on anxiety-like behavior. The current findings suggest that the sexes behave differently under stress, as male and female mice displayed differences in their behavioral profiles across the testing sessions. These findings suggest that future studies may be more successful in developing a murine model of PTSD and, subsequently, assessing peripheral GABA administration as a possible treatment by examining male and female mice separately.

Keywords: Anxiety, GABA, PTSD

What is a mystery? A mystery is a veiled truth that demands to be revealed. What is veiled is not truly hidden, and a mystery story creates the desire for the discovery of truth by presenting an event which demands explanation but which affords none, at least not yet . . . A non-mystery would be the opposite. There is no initial event, but there is already an unveiling of truth in anticipation of it. Charles Dicken’s short story “Hunted Down” begins by announcing that the story will prove the assertion that first impressions are invariably the correct ones. It then unveils the story’s culprit, Julius Slinkton, whom the narrator, Mr. Sampson, quickly identifies as no good and up to no good. Subsequent events show the narrator is right on both counts. Hence it appears to fail entirely as a mystery story, and seems to be trying to prove there is no such thing as a true mystery, that things are always what they seem and become mysterious only if you let them. However, this initial impression is wrong. “Hunted Down” is a non-mystery that is still nonetheless mysterious. Rather than conceal the culprit, it disguises the identity of the detective. The story accomplishes this by effectively disguising the detective, Mr. Meltham, giving the reader a false first impression. Ostensibly seeking to prove that there is no such thing as a mystery, “Hunted Down” succeeds as a story of that genre by turning its logic on its head and refusing its reassuring confines.

Keywords: Charles Dickens, Detective and Mystery Stories, Deconstruction.
A Paradigmatic Lithic Analysis of an Upper Kittitas County Spring Site, Washington

Chenvert, ErinMarie

Faculty Mentor(s): Patrick McCutcheon, Anthropology and Museum Studies

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

The Upper Kittitas County Spring Site (UKCSS) artifact assemblage comes from a landowner that picked them up from the surface of a plowed field near a spring. This artifact collection contains 758 stone tools: 520 pieces of debitage, 67 ground stone tools, 56 projectile points, and 115 broken biface/miscellaneous stone artifacts. This site has a unique set of artifacts. For instance, large collections of ground stone tools, while common at spring sites, rarely occur in such frequencies or with such a range of chipped stone artifacts. The goal of my research project was to analyze the assemblage so that it could be compared to other archaeological sites in the Yakima and Columbia River Valleys. Ground stone, projectile points, and broken biface artifacts were analyzed using a lithic paradigmatic classification and it was found that all stages of manufacture were represented. The ground stone tools from this site show contrasts to local and regional sites’ ground stone artifacts. For instance, the ground stone tools from UKCSS show a higher variability in shape, wear, and a higher frequency of complete artifacts. Another way this site is different is that when the debitage from UKCSS is compared to the Newton and Bishop Springs sites, there are noticeable differences; in some cases, the UKCSS collection is unique because it is very similar to both spring and village site types.

Keywords: Archaeology, Stone Tools, Kittitas

Synchronization of Chaotic Circuits

Choe, Kevin

Faculty Mentor(s): Michael Braunstein, Physics

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

This research project investigates synchronization of two identical simple chaotic circuits. There has been interest in synchronized chaotic circuits as a possible means of signal encryption. We selected a chaotic differential equation from the paper “Simple chaotic systems and circuits,” by J.C. Sprott, published in the American Journal of Physics in 2000. Then, we designed and assembled a circuit that realizes the differential equation. Our implementation contained three 741 operational amplifiers, one AD734 chip, four 100kΩ resistors, one 10kΩ resistor, one variable resistor, and several power supplies. We qualitatively investigated the circuit using an oscilloscope and determined that it behaved chaotically. We then assembled another approximately identical chaotic circuit to investigate the synchronization of chaotic signals. We tried several different coupling schemes and observed phase space behaviors of the coupled circuits using an oscilloscope. Initial results for this system indicate that an extremely simple but not particularly useful coupling scheme permits synchronization of the two chaotic signals.

Keywords: Synchronization, Chaotic, Circuit
**AWC<sup>ON</sup> Mediates Navigation to Preferred Range of Field Strength in a DC Electric Field**

*Chrisman, Steven; Waite, Christopher; Foss, Eric*

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

Oral Presentation, Session #20
11:40-12:00 p.m. in Room 137B

*C. elegans* will orient and travel in a straight uninterrupted path directly towards the negative pole of a DC electric field, a behavior referred to as electrotaxis. Additionally, animals widen their approach angles proportionally to increasing field strength. To elucidate the neural basis for this behavior we utilized an approximately uniform field that is fixed in direction and magnitude. We determined that *C. elegans* navigate to a specific gradient of field strength by altering approach trajectories towards the negative pole. *eat-4* mutants are severely electrotaxis defective and addition of the wild-type *eat-4* gene in AWC neurons recovers the behavior. The pair of AWC neurons are functionally asymmetric in regard to chemotaxis and have been shown to express different genes; in particular, the AWC<sup>ON</sup> neuron expresses the STR-2 receptor. To test the role of the AWC neurons in electrotaxis behavior we examined: *ceh-36* mutant animals, which are defective in the terminal differentiation of the AWC neurons, *inx-19* mutants, which express both neurons as AWC<sup>OFF/0FF</sup>, and *nsy-1* mutants, which express both neurons as AWC<sup>ON</sup>. We found that only *nsy-1* mutant animals are able to sense field gradient, suggesting AWC<sup>ON</sup> is required for electrotaxis behavior. Here, we demonstrated that AWC<sup>ON</sup> functions as an electro-sensory neuron allowing animals to sense and adjust approach trajectories angles to match the preferred field strength.

*Keywords: Electrotaxis, C.elegans, Neurons*

**The Very Old and the Very New: Important Grape Varietals in the Wine Regions of Hungary**

*Clevenger, Jeanette; Hudelson, John*

*Faculty Mentor(s): John Hudelson, Global Wine Studies*

Oral Presentation, Session #51
4:10-4:30 p.m. in Room 202

There are 22 different wine regions recognized in Hungary today, although only three or four are known internationally. The researchers recently had the opportunity to visit seven of these regions and evaluate their wines and wine industry. Of importance to the topic were the new varieties developed at the research center of University of Pannonia Georgikon. These, along with a resurgence in the planting of several native Hungarian *Vitis vinifera*, have adapted well to the soils and climates of specific regions. They may serve to spur the future popularity of Hungarian wine.

*Keywords: Grape Varieties, Vitis vinifera, Hungary*
Central Washington University Fuel Cell
**Congdon, Brian**

*Faculty Mentor(s): Lad Holden, Engineering Technologies, Safety, and Construction*

Poster Presentation Session #3, Constructed Object #10
2:30-5:00 p.m. in Ballroom C/D

The goal of the Central Washington University Fuel Cell project is to promote fuel cell technology and utilization of hydrogen as an alternative and viable fuel source. Because of the inherent limit of hydrocarbon based fuels, there is a growing desire for cleaner, more abundant fuel sources. The Proton Exchange Membrane Fuel Cell utilizes hydrogen and oxygen to create electricity, yielding only \( H_2O \) and occasionally liquid \( H_2 \). The use of hydrogen as an alternative fuel is embodied in the term “hydrogen economy” which the US Department of Energy has planned to be in place by 2040-2050. For this project, Central Washington University was provided a ReliOn T-2000 fuel cell power system. This presentation represents the culmination of the first three stages of the project. First, the assembly and christening of the fuel cell itself; second, the integration of fuel, current, and voltage sensors to allow for data acquisition; and third, the recording and storage of data for future study.

*Keywords: Hydrogen, Renewable, Energy*

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Synthesis toward Straight Chain Borinic Acids as Potential HIV-1 Protease Inhibitors
**Contreras, Erik**

*Faculty Mentor(s): Levente Fabry-Azstalos, Chemistry*

Oral Presentation, Session #40
2:40-3:00 p.m. in Room 140

Approximately 34 million people are currently infected with HIV. The only treatment available involves slowing the development of HIV into AIDS, which is done with a cocktail of antiretroviral drugs such as protease inhibitors. This approach is necessary as the virus continually mutates and develops resistance. Further issues arise from the drugs’ low bioavailability, and high toxicity. To circumvent these obstacles, the goal of this research is to develop a synthesis for a potential HIV-1 protease inhibitor. This inhibitor mimics the transition state of the natural substrate, and it interferes with the viral life cycle. Several linear boron modified peptides will be synthesized in the hopes that the analogs will demonstrate a greater inhibitory activity than their non-boronated counterparts.

*Keywords: Protease-Inhibitors, Borinic Acids, Antiretroviral drugs*

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Behavior Study: Decreasing Chewing with Mouth Open
**Corley, Louisa**

*Faculty Mentor(s): Shu-Fei Tsai, Language, Literacy, and Special Education*

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

This study was conducted to investigate the use of a reversal ABAB design to decrease the occurrence of a problem behavior of an adult woman. The woman was identified chewing her food with her mouth open at least ten times during the duration of dinner. Therefore, an inter-
vention was implemented that included the use of both auditory and visual prompts to eliminate the problem behavior. The results demonstrated that this intervention effectively decreased the occurrence of the problem behavior.

Keywords: Applied Behavior Analysis, Special Education

Speak in Rounds
Coté, Jeffrey
Faculty Mentor(s): Maria Sanders, Film and Video Studies

Video Presentation, Session #26
11:40-12:00 p.m. in the SURC Theatre

While the world flows at its fast pace outside the comfort of his bedroom, a young man remains inside alone. He suffers from the inability to make a connection or even identify with the gay community and has become conditioned to getting involved in random one-night sexual encounters with men he does not know. While his sexual rendezvous begin as a desperate attempt to connect with others and fulfill his closeted sexual urges, they develop into an unhealthy compulsion which only further distances him from a healthy and fulfilling life. The only other characters of the narrative are the faceless men the protagonist has sexual encounters with, representative of the brutal and violent nature of the main character’s oppression. Speak in Rounds is a film that provides audiences with insight into the psychologically daunting and emotionally vulnerable life of a young gay man living in a small town—a story all too familiar and haunting for many queer Americans. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)

Keywords: Queer Issues, Sexual Compulsion, Mental Illness

Tracking the Sun for Solar Energy
Coudriet, Blake
Faculty Mentor(s): Lad Holden, Engineering Technologies, Safety, and Construction

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

This project represents the development process of a project. Using a dated tilting and panning camera mount, there was very little documentation regarding operation. Therefore, we had to use a variety of methods to make the mount operate. Once operation was achieved, we mounted a solar panel on the turret mount with the intention of tracking the sun. Using an Arduino processor, a code was written in C language to track the sun throughout the day and stay in the most efficient position for producing power. Data were collected from different positions in relation to the sun and the highest value was used to determine where the sun was in the sky. Running in a loop, the code causes the turret mount to periodically check where the sun to ensure that the panel is always exposed to solar energy. Built on a larger scale, this process can be used to make solar power generation on the residential level more efficient.

Keywords: Solar, Arduino, Power
Yeah Buddy Brewpub and Theater
Dahlin, Alex
Faculty Mentor(s): Dwayne Douglas, Information Technology and Administrative Management

Oral Presentation, Session #7
10:00-10:30 a.m. in Room 301

Yeah Buddy Brewpub and Theater is coming to Ellensburg! I will be opening a three screen theater with an attached pub close to campus for those students and young adults looking for something to do in the evening. Ellensburg has a median age of just 23-years-old. This provides a huge opportunity for businesses focused on this age group. When you sit down to watch the newest movie, a server will come by and ask you if you would like anything to drink or eat. After you order, your meal and drinks will be brought out to you. They will then be picked up when you are finished, along with your payment. The option to have drinks and food make this theater a unique opportunity which will keep people coming in. These types of business have been very successful in other markets around the United States. With the central location, students will be able to walk from campus to the theater, without the risk of having to drive. The best part of all of this is the business will generate a large, consistent flow of money and give the community of Ellensburg a place to gather. I am positive that given the opportunity in Ellensburg this business would generate lots of revenue and continue to do so for many years.

Hyde Park
Davey, Erin
Faculty Mentor(s): Andrea Eklund, Apparel, Textiles and Merchandising

Poster Presentation Session #2, Creative Work #55
11:30-2:00 p.m. in Ballroom C/D

Purpose: The purpose of this design is to create a garment that can easily transition from a conservative work ensemble to a classic fashion forward dress that can be worn out for drinks or to a sophisticated cocktail party. Inspired by a weekend in London exploring the romantic atmosphere of Hyde Park, the theme for this garment came to me. Looking at traditional English gardens, a romantic image took form and this dress was created using the soft colors and a simple silhouette. Process: To incorporate these elements into the garment, I first designed a silhouette that could be worn by any woman with a layering suit jacket to the office keeping in mind what is traditionally considered appropriate office wear. I then designed the back of the garment as a way to transition the garment into a sophisticated cocktail dress. I chose the color based on the many hues of purple that can be commonly seen in English gardens. Techniques: This garment was created using the draping technique. From the draping a pattern is created and from the pattern a sample is made. The sample is fit on my model and alterations are made on the pattern. From there, the final garment is constructed out of the fashion fabric. The edges of all pieces were serged prior to assembling of the garment which allowed for the garment to be put together without fraying. Then, the bodice of the dress was assembled so the front yoke and back yoke panels could be attached. After, the outer shell of the garment was assembled, the invisible zipper was attached, and the lining was assembled. The lining was attached to the exterior fabric at the neckline, armholes and back key hole leaving the shoulder seams open to be hand-stitched closed. Understitching the front neckline and the bottom of the key hole allowed for the lining to sit flat in the garment minimizing any bulk that may occur. Finally, the shoulder seams were hand-sewn closed, hook-and-eye attached to the top of the zipper and the hook closure at the center back was sewn.

Keywords: Fashion, Fashion Show, Design
Evidence for the Presence of an Archaic Ritual Mortuary Complex in Vermillion County, Indiana

Davis, David
Faculty Mentor(s): Patrick McCutcheon, Anthropology and Museum Studies

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

In 1975, the author discovered nineteen lithic artifacts, ranging from scrapers to projectile points, protruding from a weathered circular mound in Vermillion County, Indiana. Subsequent investigations since 2011 using Google Earth have revealed the probable presence of multiple mounds, two of which appear to be serpent effigy mounds, as well as a possible stone circle. Scholars believe that effigy mounds were primarily for religious purposes, although some also fulfill a burial mound function. The artifacts, which have been identified by type and assigned date ranges based on comparative analysis, evidence a date range which covers the greater part of the Archaic Period, and the entire Woodland Period. Preliminary research shows evidence of some artifactual similarity to the Terminal Archaic Riverton culture (1500-700 BC) of the Lower Wabash Valley. This cultural manifestation, primarily represented in southwestern Indiana, was part of the Interior Valley Archaic encompassing the Ohio, Cumberland, Tennessee, Green, and Wabash rivers, and their tributaries. Interior Valley Archaic cultures are characterized by a micro-tool industry, shell middens, living on mounds in the floodplains, mounds used for burials, and the beginnings of plant domestication. This project represents the beginning of an effort, geared toward site protection and potential future archaeological research.

Keywords: Lithics, Mounds, Projectile Points

Reecer Creek Photodocumentation

Davis, Kate
Faculty Mentor(s): Jeff Hashimoto, Ellensburg High School

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

We created the next chapter in the photodocumentation of the Reecer Creek Floodplain Restoration Project. We took a series of photographs from fixed locations to match photographs taken since the Restoration was completed in 2011. The photographs show changes in riparian vegetation, upland vegetation, and channel morphology and flow.

Keywords: Reecer Creek
The Student-Athlete Myth
Davis, Maxwell
Faculty Mentor(s): Michael Goerger, Philosophy and Religious Studies

Oral Presentation, Session #33
1:50-2:10 p.m. in Room 271

College athletes are not being treated with dignity in the current student-athlete format. Nineteenth-century philosopher Immanuel Kant introduces the idea of dignity in the Groundworks of the Metaphysics of Morality. I discuss Kant’s views and apply them to the issue of college athletics. I argue that the term student-athlete is no longer appropriate, and that the amateurism myth denies college athletes dignity. I discuss health risks, devaluation of academics, and reduction of athlete’s goals and ends, and explain why these hazards are detrimental to the college athlete, and to the institution of college athletics as a whole.

Keywords: Ethics, Athletes, Dignity

Moo-ving Towards A Better Biofuel
Davis, Logan
Faculty Mentor(s): Jeff Hashimoto, Ellensburg High School

Poster Presentation Session #1, Poster #52
8:30-11:00 a.m. in Ballroom C/D

In the United States, ethanol fuel is mostly produced using corn, which is problematic because it competes with humans for food, and requires substantial amounts of fossil fuels for production. Cellulose is a vast potential source of energy. The applicability of cellulose fuel is hindered by the ability to competitively break cellulose into glucose. Our group looked into using naturally occurring bacteria and fungi found in a bovine stomach to perform this process. We took rumen fluid from a cow, and then applied several concentrations of the diluted fluid to cellulosic culture medias. This allowed us to isolate cellulose degrading microorganisms which we identified and cultured. We then tested the cultures for their efficiency in breaking down cellulose.

Keywords: Sustainability, Energy, Biofuels
A Faunal Sample from Pre-Mazama Levels of the Bernard Creek Rockshelter,
Hells Canyon, Idaho

Day, Lianne  
Faculty Mentor(s): Patrick Lubinski, Anthropology and Museum Studies

Oral Presentation, Session #11  
9:40-10:00 a.m. in Room 137B

The Bernard Creek Rockshelter (10IH483) is located in Hell’s Canyon, Idaho, and lies just above the Snake River. The rockshelter was excavated in 1976 by the University of Idaho and four meters of cultural deposits spanning over 7,000 years were discovered. A preliminary analysis was performed on the faunal remains in 1976, but no in-depth taphonomic information was originally recorded. My analysis examined 573 mammal and bird specimens underlying Mazama tephra (ash fall from Mt. Mazama about 7,000 years ago) from 310-370 cm below surface. Preservation was excellent, with 99 percent of specimens exhibiting Stage 0-1 bone weathering. Remains were dominated by large mammals (>70 percent deer size or larger) and included bighorn sheep and deer. Other identified taxa included woodrat, ground squirrel, marmot, canid, porcupine, bear, and rattlesnake. A significant number exhibited modification by humans (including cut-marks, impact damage, and use-wear) with few signs of non-human modification (like gnawing or digestion), which indicates the assemblage is almost entirely accumulated by people.

Keywords: Taphonomy, Zooarchaeology, Pre-Mazama

Using Guide Emissions to Assess Far-Infrared Laser Wavelengths
DeShano, Brad; Olivier, Kerry; Cain, Breeanna
Faculty Mentor(s): Mike Jackson, Physics; Michael Braunstein, Physics

Oral Presentation, Session #21  
12:20-12:40 p.m. in Room 140

For the past three years, several teams of undergraduates at Central Washington University have used an optically pumped molecular laser system with a transverse pumping geometry to discover 135 far-infrared laser emissions. Beginning with the investigation into the lasing properties of formic acid and its isotopic forms, a curious pattern emerged while analyzing the data from these studies. When laser emissions with output powers exceeding 0.1 mW were generated, they were often accompanied by a secondary laser emission. These secondary laser emissions were typically at least a factor of ten weaker in power. Additionally, and most importantly, their wavelengths were uniformly larger by a factor of approximately 1.047. In this presentation, an overview of the experimental data will be presented along with several possible hypotheses that will hopefully explain the creation of these secondary laser emissions.

Keywords: Optically, Pumped, Laser
**Growth of Laser-Induced Damage on Third Harmonic Generators**

**DeShano, Brad**  
*Faculty Mentor(s): Wren Carr, Lawrence Livermore National Laboratory’s National Ignition Facility (NIF)*

Poster Presentation Session #1, Poster #5  
8:30-11:00 a.m. in Ballroom C/D

Obtaining quantitative knowledge of the evolution of third harmonic generator damage from multiple shots of ultraviolet photons allows the National Ignition Facility (NIF) laser system to operate more efficiently. Damage sites on test crystals were generated and grown by various laser pulses shot offline in order to predict and model the behavior of the optic under conditions found within the NIF laser.

*Keywords: Laser, Induced, Damage*

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**The Lyme Disease Controversies**

**DeVries, Tonia**  
*Faculty Mentor(s): Matt Altman, Philosophy and Religious Studies*

Oral Presentation, Session #44  
2:40-3:00 p.m. in Room 301

The Lyme disease controversies have sequestered conflicting audiences throughout the medical, political, scientific, financial, and environmental communities for more than two decades. This presentation speaks to the moral obligations owed society in the face of scientific uncertainty concerning our current state of health. It asks the reader to consider whether national health trumps other causes or whether priority be given to big business and big pharma. Should the boundaries of scientific evidence in present-day medicine be reevaluated? Is there a disconnect between national policies when several government agencies are involved? This paper asks if long-term antibiotics are inherently dangerous for human consumption or if they are only hazardous in light of factory farming. Should medical consultants be allowed to create guidelines which are perceived to insure financial success from products and services? All of these controversies have culminated into a perfect storm in connection to chronic Lyme disease and its patients. Additionally, in the midst of these battles, research has essentially halted. This presentation will argue for immediate and exponentially intensified financial underwriting by the government for the necessary research to answer these moral dilemmas.

*Keywords: Philosophy, Ethics, Lyme Disease.*
**SolarDraft Solar Air Heater**

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

*Faculty Mentor(s): Roger Beardsley, Engineering Technologies, Safety, and Construction*

Poster Presentation Session #3, Constructed Object #9  
2:30-5:00 p.m. in Ballroom C/D

The overarching goal of SolarDraft is to reduce dependency on fossil fuels and improve indoor air quality by providing a clean method of heating residential dwellings. Almost three billion people worldwide continue to depend on some form of solid fuels for their heating needs. We recognize that, for most people, the system that is currently installed in their home is the one they have to live with. Additionally, the most complex component of reducing dependency on non-renewable resources is not developing a radical new technology, but implementing existing techniques in a fashion that is cost effective and that the public would actually embrace. We have created an inexpensive solution to the inefficient and health hazardous heating methods currently in use around the world. SolarDraft can augment an existing HVAC system by providing space heating where it is needed, and reduce dangerous sources of indoor air pollution by using a clean, renewable source of energy. Our solution is a self-contained solar heater that requires no external source of power and provides enough heat at maximum capacity to keep three 10x10 rooms at a constant 85 degrees. With this solution, we are able to help offset the expense and dependency on non-renewable resources used in residential heating while also providing a means of improving indoor air quality for millions of people across the world.

*Keywords: Solar, Environment, Sustainability*

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**Oil Painting with First Graders**

*Donahoe, Susan*

*Faculty Mentor(s): Susan Donahoe, Language, Literacy, & Special Education*

Oral Presentation, Session #31  
1:30-1:50 p.m. in Room 201

Designated times for arts activities have been reduced in the public schools, but standards for them remain. Both teachers and students like to do some special art projects to explore creativity and to augment the ideas for writing production. The regular curriculum was in place. However, recently, I was able to work with first-grade students at Rock Creek Elementary School and CWU’s former teacher candidate in the Elementary Education Programs who are now full-time teachers in Maple Valley. Stephanie Ailment, Alynne Durkan, and Emilee Castillo documented the art painting workshops with photographs. Classic, professional-looking oil and acrylic painting productions were made with a little guidance and a lot of creativity and inspiration from the students. Everyone was so joyful. Parents were so happy to get such unique quality work as Christmas presents. The works and smiling faces in the photos tell all, but the process will be explained.

*Keywords: Art, Education, K-12 Curriculum*
Intersexuality and the Ethics of Infant Genital Surgery  
*Dozier, Zachariah*  
Faculty Mentor(s): Cynthia Coe, Philosophy and Religious Studies, Women’s and Gender Studies

Oral Presentation, Session #43  
2:40-3:00 p.m. in Room 271

It is the primary focus of this paper to argue that the surgical response to intersexuality in infants and children, outside of evident threats to the child’s health and without regard to the child’s own agency, ought to be criminalized under the same justification as the Criminalization of Female Genital Mutilation Act of 1996. Through a philosophical examination of the surgical response to intersexuality and the reasons that this practice has become prominent, it is revealed that this treatment is based solely on the incorrect cultural assumption of sex as strictly binary. Furthermore, many of the negative physical side effects of genital-normalizing surgeries performed on intersexed children are parallel to the effects of female genital mutilation. Included in this paper will be an explanation intersexuality and intersexed conditions; a discussion on the history of the medical treatment of intersexuality; an analysis of the goals of surgical intervention weighed with common or unavoidable side effects of such procedures; a discussion of each person’s fundamental rights to autonomy, bodily integrity, and reproduction; as well as the implications of the 1996 Act protecting female children and an explanation as to why those protections should extend to all infants and children, regardless of anatomy. (*Editor’s Note: This presentation may contain adult themes, content, or imagery.*)

**Keywords:** Ethics, Surgery, Intersex

The Historical Background of American Beer and the Opinion Leaders of Breweries  
*Duff, Alison*  
Faculty Mentor(s): Phil Backlund, Communication; Nadene Vevea, Communication

Oral Presentation, Session #42  
2:40-3:00 p.m. in Room 202

This paper analyzes American’s attitude toward alcohol, past and present. History has shown that public attitude toward alcohol shifts from positive to negative every 80 years. There are other factors that influence the diffusion of breweries into America culture. These factors include: opinion leaders, opinion leaders and their entrance into the S curve, technology, and political influence. The public attitude toward alcohol, today, is positive. It is important for modern micro-breweries to understand the variance in public attitude that can occur over the years. It is vital for small breweries, which focus their brewing method on traditional methods, to be aware of the possibility of a decline in positive public attitude.

**Keywords:** Diffusion of Innovations, Public Attitude toward Alcohol, Microbrewery
Stream Characteristics of Arroyo Zarco  
**Duffy, Jared; Rush, Philip; Terrile, Kenny**  
*Faculty Mentor(s): Lisa Ely, Geological Sciences; Daniel Beck, Biological Sciences*

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

We investigated the influence of external factors on sediment size and stream gradient in an ephemeral stream channel, the Arroyo Zarco at Chamela, Jalisco, Mexico (19°30N, 105°3W). The external factors that we examined were tributary streams, woody debris, and debris flows. We hypothesized that these factors would cause a reduction in the stream gradient, and an increase in sediment size. We surveyed the longitudinal gradient of a 600-m reach of the Arroyo Zarco, surveyed channel cross-sections at noticeable transitions between sediment sizes, and measured average sediment size at each cross section. We calculated the average surface sediment size at each cross-sectional area using a step-randomization method. To determine change in stream gradient, we measured the change in elevation every 10 meters along the channel using a surveyor’s tape measure and leveling scope. Qualitative observations of sediment size, presence/absence of the listed external factors, and presence of bedrock were noted every 10 meters along the stream channel. The locations of all sites were documented with a Geographic Positional System (GPS) instrument for subsequent mapping of the channel changes. The sediment size was larger downstream of debris flows and tributary streams, as we predicted. In contrast, sediment size was smaller downstream of accumulations of large woody debris. A change in gradient was correlated with tributaries, debris flows, and woody debris, but not all change in gradient was due to these external influences. The results, therefore, partially support our hypothesis.

*Keywords: Gradient, Debris Flows, Sediment*

Walking the Line  
**Durfee, Ryanne**  
*Faculty Mentor(s): Andrea Eklund, Apparel, Textiles and Merchandising*

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

Purpose: The purpose of my piece is to illuminate the wonders and beauties of each individual woman. It’s telling a story about a woman’s journey into finding herself between a young woman and a sophisticated adult. This relates to me immensely because I am also taking this journey where I am finding myself in this world. The woman to wear this garment is fearless and confident but has grace and elegance. She never lets anything get her down and is always looking at the positive aspects of life. Process: During the design development of this project, photos of Paris were reviewed and the common theme of elegance from the images was used as a major source of visual inspiration. It gave a sense of independence and beauty that so many women strive for. I then looked and researched more photos and I fell in love with photos that are classy and elegant from the front of the garment but when the wearer turns around the back is subtly sexy. This inspired me to my dress with an open back and elegant front. Techniques: This dress was created through the draping technique. From the draping a pattern was made and a sample from the pattern was fitted on my model. Adjustments were made to the pattern and the final product was constructed. The garment is fully lined and features an invisible zipper and a hand stitched hem. Materials: 100-percent black polyester exterior fabric, black polyester lining, invisible zipper and thread.

*Keywords: Apparel Textiles and Merchandising, Student Design, Fashion Design*
As a result of climate change and more than a hundred years of fire suppression, the risk of catastrophic wildfires in the western United States has increased dramatically. This is especially true in the dry ponderosa pine forests of the eastern Cascades. The Taylor Bridge fire, which occurred in such an environment, burned during the summer of 2012. By the time of its containment it had burned approximately 23,000 acres east of the town of Cle Elum, Washington, and consumed 61 homes. This created the ideal situation in which to study charcoal accumulation into lake sediments following fire. Two small lakes, Cabin Lake and Little Lake, lie within the fire perimeter and were targeted for this study. In fall 2013, lake sediment cores were extracted from both sites using a Bolivia short coring device lowered from a raft. Two 35-cm long cores were taken from the center of Cabin Lake, and three 15-cm long cores were obtained from a transect across Little Lake. The cores were analyzed using macroscopic charcoal and loss-on-ignition analysis at 1-cm intervals. These methods illustrate how charcoal accumulation, organic content, and carbonate content changes with depth in the cores, and also varies between the two sites. The results of this analysis show that charcoal deposition varies in both space and time, most likely as a result of topography, fuel availability, and fire severity within different areas of the burn. This information is important for interpreting charcoal records when reconstructing long-term fire history.

Keywords: Fire History, Paleoecology, Charcoal

I will show before and after clips of a web series I have been editing. The clips will demonstrate how poor framing can be fixed in programs such as Final Cut Pro X. I will also demonstrate my own personal preferences for maintaining an aesthetic while cutting a scene.

Keywords: Film, Editing, Aesthetics
Technology and Business Innovation in Tesla’s Supply Chain  
*Eberli, Craig; Cohrs, Andre; Bhambi, Archana*  
*Faculty Mentor(s): Kun Liao, Finance and Supply Chain Management*

Lynnwood Center - Poster Presentation, Poster #7

Our aim is to demonstrate how Tesla revolutionized the traditional supply chain and set up a potential model for current or future electric car manufacturers to implement. The purpose of this presentation is to highlight the importance of continuous improvement (kaizen) and innovation within the supply chain, while comparing new methods to traditional ones. Information on the topic is readily available and will be gathered through various means including: internet webpages, scholarly articles, statistical data, and textbooks. Our tentative conclusion will show that the methodology and processes used by Tesla will and should be applied to other electric car manufacturers in an effort to decrease costs associated with transportation while helping to eliminate unnecessary waste and purchasing costs.

*Keywords: Supply Chain, Tesla, Innovation*

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Zircon Separation Using a Spiral Panning Table: Particle Size Analysis and Yield Efficiency  
*Edwards, Ashley; Fagin, Brittany*  
*Faculty Mentor(s): Chris Mattinson, Geological Sciences*

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

Mineral separations concentrate the mineral zircon necessary to date rocks; current methods are expensive, time-consuming, toxic, with unknown yield-efficiencies. Samples of the Mt. Stuart Batholith (near Leavenworth, WA), were separated with a spiral-panning table to concentrate denser minerals before magnetic, and heavy-liquid separations. Particle size analysis of panner-lights compared to unprocessed and control samples determined sizes lost during processing. Panner#1 (fast feed-rate, 58g/min, slow rotation, 9rpm), recovered 0.0037g zircon from 5.21g of panner-heavies; Panner-lights lost 5.3 percent of grains <180μm. Panner#2 (slow feed-rate, 12g/min, slow rotation) recovered 0.0061g zircon from 34.4g of heavies; lights lost 8.4 percent of grains <180μm. Panner#4 (slow feed-rate, 9g/min, slow rotation) used a surfactant to cut surface tension, recovered 0.0069g zircon from 17.5g of heavies; lights lost 13 percent of grains <180μm. Panner#5 (fast rotation, 25rpm, fast feed-rate, 36g/min), and recovered the most zircon (0.0132g) from 41.2g of heavies. Faster rotation increased zircon yield by concentrating more heavies. Panner#6 (fast rotation, 25rpm, fast feed-rate), changed nozzle position to avoid directly spraying the panner’s center. This trial recovered 132.7g of heavies (zircons not yet recovered); lights lost 4.03 percent of the grains <80μm, no loss of grains from 80-230μm. Panner trials recovering more heavies yielded more zircon. However, a control sample hand washed without the panner recovered much more zircon, (0.067g, considered the maximum amount of recoverable zircons). In thin section, ~30 percent of zircons were <20μm, mostly lost during panning, explaining the higher yield for the control.

*Keywords: Mineral Separation, Zircon, Yield Efficiency*
**Haunting Darkness**  
**Eklund, Andrea**  
*Faculty Mentor(s): Andrea Eklund, Apparel, Textiles and Merchandising*

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

**Purpose:** The purpose of this design was to integrate techniques learned at workshops at the International Textiles and Apparel Association’s annual conferences. I wanted to combine the couture hand sewing technique that was used by Madame Gres in the 1930s and new leather sewing techniques. This design was also to further challenge and develop my design and construction skills.  

**Process:** Inspiration for the design came from walking through the historic cemeteries in New Orleans. The beauty of the graves and the darkness of death was combined to create the overall look of the garment. Mimicking the alligator skin using the Madame Gres pleating technique was also critical to executing the design.  

**Techniques:** creating the front bodice shapes to mimic the alligator skin was a long and technical process. The size, placement, and angle of the pleated pieces was a tedious process. Each pleated piece was applied to a base garment. Once the pleated appliques were sewn on the base fabric it was carefully attached to the back leather bodice. The pleated skirt was attached to the bodice at the waistline and features a waist stay to support the weight of the skirt.  

**Materials:** 100-percent polyester jersey knit, alligator leather, twill tape, hook & eyes, thread.  

**Keywords:** Madame Gres, Draping, Pleating, Couture

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**Is Ellensburg Water Safe for Recreation? An Analysis of Total Coliform Bacteria Levels in Wilson Creek**  
**Elg, Clinton; Shrinzada, Sabahuddin; Neziri, Izak**  
*Faculty Mentor(s): Gabrielle Stryker, Biological Sciences*

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

The City of Ellensburg is steeped in agriculture and livestock grazing and the concern for potentially harmful microbial growth from animal and urban runoff represents an important local issue that sits at the crossroads of science, community health, politics and the rural lifestyle. This presentation is a subset of data concerning the fecal coliform levels in a creek that is a harbinger for local water health: Wilson Creek, which runs from rural farms north of the township, through town, and out into the Yakima River south of Ellensburg. High total coliform bacteria levels are associated with harmful pathogens that cause hepatitis, cholera, and gastrointestinal illnesses.  

Our central question was whether the fecal coliform levels of Ellensburg surface water are safe for recreational use (less than 10 colony forming unit per 1 ml). An upper, middle, and lower site on Wilson Creek were sampled over the course of six weeks including the closing of local irrigation canals and seasonal hay cutting. The null hypothesis stated there was no difference between TCB concentrations at the various sample sites while the alternative hypothesis stated that TCB levels will be present in higher concentrations as Wilson Creek exits Ellensburg. The results show fecal coliform levels in town over three times higher than water entering and exiting town along with in-town levels dangerously close to unsafe recreational levels. The research represents the beginning of a research partnership between undergraduates in BIOL 323 (Microbiology) and the City of Ellensburg.  

**Keywords:** Coliform, Wilson Creek
The Impact of Video Games on Working Memory
Ellis, Derek; Richardson, Ben; Celori, Anthony; Meador, Camille; Cherry, Jessica
Faculty Mentor(s): Ralf Greenwald, Psychology

Poster Presentation Session #3, Poster #50
2:30-5:00 p.m. in Ballroom C/D

The Entertainment Software Rating Board (ESRB) estimates that the average US household owns at least one video game console, and of those that do, 49 percent own an average of two consoles. In addition, the ESRB also notes that 66 percent of parents believe video games offer mental stimulation or education. To date, few studies have analyzed the impact of video game play on cognition. The purpose of the current study was to investigate the impact of video games on both behavioral and neurophysiological measures (event-related potentials) of working memory. Stimuli used during the neurophysiological portion of the study were based on the visual odd-ball paradigm in which participants had to respond to standard and rare occurring visual targets, while working memory was evaluated using the TOMAL-2 (Test of Memory and Learning 2nd edition). Results revealed no significant differences between gamers and non-gamers on the TOMAL-2 and reaction time. However, analysis of the event-related potentials data revealed differences in the two groups, with gamers having a larger brain response than non-gamers.

Keywords: Memory, EEG/ERP, Video Games

Pay It Forward
Elshoff, Colby
Faculty Mentor(s): Charles Wassell, Jr., Economics

Poster Presentation Session #3, Poster #56
2:30-5:00 p.m. in Ballroom C/D

An initiative called Pay It Forward has been introduced in various states by the Economic Opportunity Institute (EOI). The idea behind the initiative is to change the way students pay for public college and ultimately make public college more accessible for students. The initiative takes a different approach to paying for college than traditional loans. Students pay no tuition or fees upfront, instead after graduation, students pay a certain percentage of their Annual Gross Income (AGI) for a specified amount of time. Currently, the payback period is being discussed as 20 or 25 years, and the equity stock or percentage of student’s income that they are required to pay is being discussed as 0.75 to 1 percent per year of college. A cohort study is used to assess the initiative Pay It Forward from the student and state’s perspective in Washington state. Factors such as median time to graduate college with a four-year degree, average cost of tuition and fees, tuition inflation, Washington State’s borrowing rate, starting or entry level salary for a 2014 graduate, annual salary increases, salary inflation, and population growth are used in assessing the initiative. The ultimate question is whether it is cost effective for states to move forward and bear the burden of college tuition and fees. If not, then what variables or factors need to change to make it feasible such as higher starting salaries for grads, larger percentages of income for repayment, or longer payback periods are a few examples.

Keywords: Tuition, Loans, College
The Effects of Native American Folklore on Contemporary Nonfiction Literature

**Epperson, Megan**

*Faculty Mentor(s): Raymond Hall, Anthropology and Museum Studies; Toni Culjak, English*

Oral Presentation, Session #18  
11:40-12:00 p.m. in Room 135

There are a number of contemporary Native American writers, such as Leslie Marmon Silko, Winona LaDuke, and N. Scott Momaday, who draw upon their own traditional culture, incorporating tribal stories and oral traditions into the structure and content of their work. This integration of traditional folklore into modern fiction has become a recognized form in the postcolonial literary tradition. However, the use of Native American traditional stories within the genre of nonfiction, particularly in the construction of the autobiographical narrative merits further analysis. How are contemporary Native American authors informed by their cultural heritage and associated tribal stories and texts? What are the responsibilities and critiques of dominant society that emerge from these orally transmitted values? Using narrative analysis, this paper proposes that tribal stories and cultural heritage have an impact on contemporary Native American nonfiction. Specifically, I will address the development of autobiographical identity and writings.

*Keywords: Traditions, Literature, Nonfiction Analysis, Cultural Stories, Folklore, Identity Narrative*

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Reecer Creek Cross Sections and Flow Regimes

**Ernest-Beck, Abby**

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

Poster Presentation Session #1, Poster #55  
8:30-11:00 a.m. in Ballroom C/D

Cross sections in the Reecer Creek Floodplain Restoration Project were measured in October 2013 in three locations and compared to previous surveys. A map of flow regimes was created in October 2013. These measures of streamflow and morphology show changes in erosion and deposition over the life of the restoration project and are critically important for aquatic habitat.

*Keywords: Geomorphology, Streams*

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Draping Nanawatai

**Eschels, Sarina**

*Faculty Mentor(s): Jessica Pribble, Theatre*

Poster Presentation Session #2, Creative Work #58-59  
11:30-2:00 p.m. in Ballroom C/D

This presentation focuses on the creation of seven unique dresses based on one vintage dress for Central Theatre Ensemble’s production of *Nanawatai* using scrap fabric from the costume shop to minimize cost and promote repurposing. My presentation shows my step-by-step process and discovery of the process while draping, patterning, and building these dresses.

*Keywords: Theatre, Draping, Nanawatai*
US 97 Realignment Project
Fahsholtz, Sam
Faculty Mentor(s): Charles Wassell, Jr., Economics

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

The Washington State Department of Transportation is in need of replacing two culverts along US Highway 97 north of Ellensburg: the Iron Creek culvert and a Swauk Creek culvert, almost two miles to the northeast. In its current alignment, US-97 is separating Swauk Creek from its natural floodplain, leading to several environmental and maintenance problems, including adverse effects on anadromous fish. Several options for floodplain reintroduction in conjunction with the culvert replacements are being considered. The most expensive, but potentially most beneficial alternative, involves realigning a two-mile stretch of US-97 around the majority of the isolated floodplain. I used IMPLAN Pro input-output software to estimate the total economic impacts of this realignment alternative. When considered in conjunction with quantified environmental benefits from this proposed project, an informed decision can be made as to whether this alternative project warrants further consideration.

Keywords: Realignment, Salmon, IMPLAN

A Diachronic and Synchronic Comparison of Sites 45PI0429, 45PI0438, 45PI0406, and 45PI0408, at Mount Rainier, WA
Ferry, Joy; McCutcheon, Patrick
Faculty Mentor(s): Patrick McCutcheon, Anthropology and Museum Studies

Oral Presentation, Session #11
10:20-10:40 a.m. in Room 137B

Synchronic comparisons across archaeological components are only possible when artifact classifications are comparable. The 45PI0429 stone tool assemblage from Mount Rainier was analyzed using a similar paradigmatic classification scheme as previously analyzed assemblages (45PI0438, 45PI0406, and 45PI0408). A tephra marker bed (Mt. Saint Helens Yn tephra, ca. 3500-2900 RCYBP) that occurs across most of Mount Rainier’s slopes is used as a consistent stratigraphic marker to define archaeological components for comparisons between the four sites and through time. The MSH-Yn component includes stone tool artifacts excavated from above the MSH-Yn tephra marker bed and below the overlying pre MSH-W paleosol. Later and earlier components consist of stone tool artifacts excavated from below and above the MSH-Yn component. The analytical dimensions compared consisted of fragment type, raw material, reduction trajectory, and thermal alteration. Results indicated significant variability in the distribution of reduction and thermal alteration dimensions through time within the 45PI0429 assemblage, and synchronically between sites. The dimensions fragment type and raw material showed lesser degrees of variability between sites synchronically. These frequencies are consequences of the selective conditions of the environment, and so are representative of variation within stone tool manufacture and use, and representative of adaptation through time and adaptedness to the local environmental conditions. The diachronic and synchronic variation seen in this research may be representative of human responses to the selective conditions of the particular environmental settings.

Keywords: Archaeology, Mountains, Artifacts.
Is Hooking Up Emotional?
Fischer, Kristina; Tackett, Tiffany
Faculty Mentor(s): Duane Dowd, Family Studies

Poster Presentation Session #3, Poster #40
2:30-5:00 p.m. in Ballroom C/D

A sample of 186 college students completed an anonymous online survey on hooking up behavior and its consequences. The survey included 23 questions that assessed demographic characteristics, frequency of sexual behaviors, definitions of hooking up, and expectations of emotional attachment. It was hypothesized that first-year college students would have behaviors and attitudes distinct from senior level college students. Some evidence supporting the hypothesis was discovered, however group differences were not statistically significant due to a small sample of first-year students. In addition, an interesting finding emerged that first-year students in this sample reported more sexual partners than seniors. Results suggest further research is necessary with careful attention to sampling technique. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)

Keywords: College, Emotion, Sex

Reducing the Amount of Swearing by Using a Token System
FitzGerald, Kristen
Faculty Mentor(s): Shu-Fei Tsai, Language, Literacy, and Special Education

Oral Presentation, Session #22
11:40-12:00 p.m. in Room 201

The purpose of this research is to determine if implementing a token system will decrease the amount of time the participant in the study uses profanity (the f-word). The participant in this study volunteered herself for the study and is a twenty-one year old college student. The participant was recruited voluntarily to participate in this study and only one participant was studied for the purpose of this research. The participant was observed over a three-hour time period, five days a week for a total of four weeks. The participant received positive reinforcement using a sticker token system every time she used the f-word one or fewer times in a three-hour time period. An ABAB design was used for this study to determine if the intervention was successful. Confidentiality was maintained throughout this research study and the participant will not be mentioned by name. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)

Keywords: Reducing, F-Word, Token System
Synthetic Versatility of Boron: Novel Potential Anthrax Lethal Factor Metalloenzyme Inhibitors and Boron Amino Acid Analogs

Frank, Michael

Faculty Mentor(s): Levente Fabry-Asztalos, Chemistry

Oral Presentation, Session #40
3:20-3:40 p.m. in Room 140

The bacterium Bacillus anthracis is responsible for the anthrax infection and secretes a toxin composed of three proteins: lethal factor (LF), edema factor (EM), and protective antigen (PA). These toxins persist even if treatment of the bacterial infection takes place and presents a limited window of opportunity for current toxin inhibitors to be administered before widespread necrosis of tissue occurs. Therefore, there is a need for new immediate acting toxin inhibitors. This research is centered on organoboron chemistry for expansion of potential new treatments against acute infection from the biological warfare agent anthrax. This research also illustrates the potential of boron compounds for other medicinal uses and outlines the synthetic versatility of organoboron chemistry. Three novel potential anthrax LF inhibitors will be synthesized. The proposed target compounds will potentially serve as a more effective treatment to toxin damage caused by Bacillus anthracis infection.

Keywords: Pharmaceutical, Anthrax, Chemistry

Species Identification through a DNA Barcode Analysis of Salmon Bones of Central Washington Archaeological Sites

Frederickson, Victoria

Faculty Mentor(s): Joseph Lorenz, Anthropology and Museum Studies

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

Salmon bones found at archaeological sites have historically been very difficult to identify, by osteometric identification. While research has been conducted that uses DNA comparison to validate osteometric information of salmon species, research on the subject of species identification that uses DNA as the primary source of identification of salmon bones from archaeological sites has yet to be fully studied. I am using the DNA sequence of the mitochondrial DNA cytochrome B (cytB) locus in an effort to identify the species of salmon bones found at archaeological sites in Washington State. Using PCR to amplify cytB, I have been able to identify the species of salmon from modern specimens and I am currently attempting to amplify the cyt locus from ancient salmon remains. This technique when applied to archaeological faunal specimens could be used to determine species identification of specimens that have been historically problematic to identify by other methods.

Keywords: Archaeology, Molecular, DNA
Identifying Channel Morphology Changes in Response to the Removal of the Glines Canyon Dam on the Elwha River, Washington

Free, Bryon; Baumgartner, Spencer; Lund, Craig

Faculty Mentor(s): Lisa Ely, Geological Sciences

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

The ongoing removal of the Glines Canyon and Elwha Dams on the Elwha River, Washington, is the largest dam-removal project in history. Our research quantified sediment deposition, erosion and channel changes to the Elwha River following the removal of the Glines Canyon Dam. Documenting river channel response to this exceptional sediment pulse could improve models of the impacts of future dam removals on similar gravel-bed rivers. We measured changes in channel morphology and sediment-size distribution at four field sites located 2 to 6 km downstream of Glines Canyon Dam. In the first two months following the initial sediment release in October 2012, the mean sediment size on the surface of the channel bars abruptly decreased from approximately 18 cm to <1 mm due to rapid burial by new sediment. Large woody debris transported downstream from the former reservoir has contributed to the formation of new sand and gravel bars along the channel margin at two of our study sites, as well as the longitudinal growth of several bars throughout the study area. The gravel bars at three study sites have increased in volume by ≥5 percent during the dam removal process. By spring 2013, channel features that were present before the dam removal began to re-emerge due to reduced sediment flux through the system. We anticipate that the gravel bar formations in this reach will continue to evolve as the dam removal continues to add new sediment and as seasonal discharges remobilize the existing sediment.

Keywords: Geomorphology, River, Sediment, Restoration

Beyond Camp: The Effect of Gender Identity on Drag Performance

Gardner, Kevan

Faculty Mentor(s): Pamela McMullin-Messier, Sociology; Cynthia Coe, Women’s and Gender Studies

Oral Presentation, Session #43
3:20-3:40 p.m. in Room 271

In the last half century, there has been a fair amount of research on drag queens, although most of it has focused on analyzing the performance itself and/or the effects it has on the audience and even the greater community. Less research has been done on the motivation of the performers in choosing drag as a medium. Since the 1970s there has been speculation that men choosing to perform in feminine drag do so out of resentment or hatred of the female sex. I contend that many drag queens may perform in drag because their gender identities fall somewhere between male and female and that drag offers an acceptable and rewarding opportunity to express said identities. Inspired by Judith Butler’s comments on gender identity in Gender Trouble (1990), I examined existing research on drag performance for indications of individual performers’ motivations for performing in drag. I combed through research starting with Esther Newton’s 1972 seminal work on drag queens, Mother Camp, culminating with the work of more recent researchers such as Steven Schacht and Verta Taylor and Leila Rupp. What I discovered challenges the notions that drag queens are motivated by misogyny and indicates there is much exploratory research to be undertaken if we are to truly understand the motivation to perform in drag. Given the increased attention given to gender studies in the social sciences, such research would undoubtedly inform us regarding the many facets of gender identity. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)

Keywords: Gender Identity, Drag
Muscular Activity in Collegiate Football Linemen with and without a Prefabricated Functional Knee Brace

Gembol, Shea

Faculty Mentor(s): Karen Roemer, Nutrition, Exercise, and Health Science

Oral Presentation, Session #23
12:20-12:40 p.m. in Room 202

Functional knee braces are commonly used in the athletic realm in an attempt to prevent initial and reoccurring injuries. The purpose of this study is to evaluate muscular activity in collegiate football linemen during sport specific skills (three point stance, lateral cutting maneuver, and drop jump). Ground Reaction force (GRF) and muscular activity of the quadriceps and hamstrings was analyzed to determine the impact of wearing a knee brace. Results showed no differences in the GRF or muscular activity of the quadriceps during any of the skills. The hamstring showed increased activity drop jump only. In conclusion, functional knee braces do not negatively impact muscular activity during football specific drills.

Keywords: Functional Knee Brace, Muscular Activity, Football

Effective Learning Strategies for College Students with Asperger’s Syndrome

Gilbert, Jamie

Faculty Mentor(s): Shu-Fei Tsai, Language, Literacy, and Special Education

Oral Presentation, Session #22
12:20-12:40 p.m. in Room 201

More and more students with Asperger’s syndrome are being accepted into college without having the proper foundation in place to successfully graduate with a bachelor’s degree. Those students need support systems to properly prepare them to face challenges of college. The purpose of this project is to discuss the current research in regards to effective learning strategies that lead to success (graduating from college) for college students with Asperger’s syndrome and further discuss how to implement these learning strategies in higher education institutions. This year, a single-case study will be conducted which will involve a college student with Asperger’s syndrome. The study will identify what learning strategies are the most effective for him or her, and what barriers could be standing in the way of his or her success.

Keywords: Asperger’s Syndrome, Learning Strategies
Learning Strategies that Demonstrate Positive Academic Growth for a Student with Asperger’s Syndrome: A Family’s Journey

Gilbert, Jamie; Gilbert, Meghan; Gilbert, Dylan
Faculty Mentor(s): Shu-Fei Tsai, Language, Literacy, and Special Education

Poster Presentation Session #3, Poster #27
2:30-5:00 p.m. in Ballroom C/D

Navigating the public school system can be detrimental to the mental health of a student with Asperger’s syndrome (AS). Support from other students, teachers, and administrators is limited for these students with AS, which escalates the AS student’s stress and behaviors, creating a huge need for the use of coping skills and learning strategies. The end result is the student with AS feeling a need to continuously switch schools or even give up and withdraw. Parents tend to blame the school in general, and hope that a new school will have the empathy and understanding the student with AS needs. The researchers will demonstrate how the family chose to change from a traditional academic high school in exchange for a non-traditional online high school, and how they further implemented learning strategies based on current research methodology and external support systems to positively affect the student’s academic growth and development. The learning strategies that the family applied will be illustrated from the point of view of the high school student with AS, his sister, who tutors and supports him, and also from his mom, who is his main support system and high school learning coach.

Keywords: Asperger’s Syndrome, Learning Strategies

Supporting a Student with Asperger’s Syndrome: Perspectives from the Student, Sibling, and Non-Familial Tutor

Gilbert, Meghan; Carlson, Amanda; Gilbert, Dylan
Faculty Mentor(s): Shu-Fei Tsai, Language, Literacy, and Special Education

Oral Presentation, Session #22
12:40-1:00 p.m. in Room 201

When working with a student with Asperger’s syndrome, tutoring strategies can vary depending on the person implementing them. The purpose of the presentation is to discuss current research in regards to successful tutoring strategies for students with Asperger’s syndrome, and which of these strategies have been successful in the high school student with Asperger’s syndrome’s academic endeavors. Dr. Shu-Fei Tsai, a faculty member of CWU, provided training on the use of self-management skills. Both the sibling and the tutor have been assisting the student with Asperger’s syndrome to implement self-management skills to track his academic work. The outcomes demonstrated that the student improved his assignment completion and academic performance through using self-management skills. The sibling and the tutor will discuss their experience of helping the student with Asperger’s syndrome. Furthermore, the student will share his voice of using these self-management abilities.

Keywords: Asperger’s Syndrome, Learning Strategies
**Gilman, Michael**  
*Faculty Mentor(s): Toni Sipic, Economics*

Oral Presentation, Session #28  
1:30-1:50 p.m. in Room 137A

The Convention on Nuclear Safety (CNS) proposed safety standards for land based nuclear power plants in response to widespread demand for standardized rules in the wake of the Chernobyl accident. This paper aims to analyze the determinants of countries' ratification delay for the CNS using non-parametric estimates of the survival function. The current body of literature addresses either determinants of ratification of a multilateral environmental treaty, or an examination of the effectiveness of the CNS itself. However, there is little research done on the ratification delay of multilateral environmental treaties. This presentation will present these findings along with possible policy implications of the findings.

*Keywords: Environmental Economics, Nuclear Power, Public Policy*

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Dionysus Makeup Design  
**Gilmond, Shelbi**  
*Faculty Mentor(s): Mary Catherine McMillen, Theatre*

Poster Presentation Session #2, Creative Work #60  
11:30-2:00 p.m. in Ballroom C/D

This project was meant as an emotional interpretation of Dionysus from *Polaroid Stories* by Naomi Iizuka. I chose to do this project to further examine the characters in *Polaroid Stories*. Last quarter, I was given the opportunity to design makeup and costumes for *Polaroid Stories* and that is what lead to the design of Dionysus’s makeup based off of an emotional response. *Polaroid Stories* is a very visceral show. It specifically focuses on emotionally driven choices. The play narrates the transformation of characters due to their emotional driving factors. Being based off of Ovid’s *Metamorphosis*, the change of identity over time is reflected in each character in the show. The makeup design for Dionysus was a step within the transformation process, between man and snake. My first thought was that Dionysus hides his true self beneath the enticements he promised. I took that idea and decided that I wanted to create a makeup with a underlying deformity, but with a sheen, or shine masking the deformity. I, then, decided to add in the snake-like skin as a realization of his deformity. The process I used to achieve the makeup was via prosthetic design. To achieve the prosthetics, I first had to sculpt out of clay the scales and where they would live on the face. I, then, made a cast out of plaster, creating a negative of the clay designs. After the plaster dried, I removed the clay and poured in the liquid latex. After that was dried, I removed it from the mold and painted it.

*Keywords: Transformation, Response, Mythology*
Confucian Role Ethics for Women: A Response to Roger Ames  
Godwin, Ashlee  
Faculty Mentor(s): Jeffrey Dippmann, Philosophy and Religious Studies  

Oral Presentation, Session #24  
12:20-12:40 p.m. in Room 271  

In his book, *Confucian Role Ethics: A Vocabulary*, Roger T. Ames defined the dynamics of Confucian virtues and their portrayal of societal roles people must hold. In this book, Ames provided a description of Confucian ethics without gendering the elements of Confucian philosophy. Simultaneously, he used the male-dominant passages of the *Analects* to define the virtues and characteristics within the tradition. This use of non-gendered terms, paired with male-dominant examples, ignored women and the place they held in Confucianism as subjects to male power within the defined roles. *Confucian Role Ethics* does not contain gender-biased wording, however it lacks the female perspective in Confucian concepts and, by exclusion, silences their experience and discounts their specific ethical duties. Just as the *Analects* had done with exclusion and belittling comparison, so too has *Confucian Role Ethics* promoted a female subordinate role.  

*Keywords: Feminism, Confucianism, Eastern Philosophy*  

Door Knob Lever Attachment  
Golchin, Kayvon  
Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction  

Poster Presentation Session #3, Constructed Object #20  
2:30-5:00 p.m. in Ballroom C/D  

This project helps people who need an affordable, safe, and simple way to open a door. Millions of people today suffer from arthritis/dexterity issues and have trouble turning a standard doorknob. This project set out to design an attachment that could snap onto an existing doorknob. This assists individuals with arthritis/dexterity issues without having to replace existing door hardware. The device was built in a simplified manner for individuals who suffer from these issues, allowing it to be used without the assistance of any tool. Due to the audience for whom this device is intended, it was designed to be small and lightweight for ease of handling. The cost of manufacturing the device was required to be under $15 to ensure it was cheaper than just replacing the knob with a new handle. Results will be addressed in the presentation and report.  

*Keywords: Attachment, Optimization, Door Knob*
Vegetation Classification and Fire Activity in the Blue Mountains of Oregon
Goodner, Christopher; Walsh, Megan
Faculty Mentor(s): Megan Walsh, Geography

Poster Presentation Session #2, Poster #31
11:30-2:00 p.m. in Ballroom C/D

In order to help select study sites in the Blue Mountains of Oregon to be used for post-glacial paleofire reconstructions, we used ERDAS Imagine to map the current vegetation cover types of the region. Additionally, ESRI ArcGIS was used to show how the current vegetation distribution is related to 20th century fire activity. Phase one was to classify vegetation cover types of the Blue Mountains based on Landsat 8 imagery captured July 14, 2013. For our purposes, we used this to show the degree to which vegetation cover varies in both composition and structure between high and low elevation sites. The Forest Inventory and Analysis from the USDA Forest Service (USFS) was used for ground truthing the classification. Phase two involved mapping known fire locations from 1910–2012 from the USFS GIS Data Library. This process involved overlaying historic fire polygons on the classified cover types to assess the spatial distribution of recent fires in the Blue Mountains and their possible impact on the current vegetation mosaic. The final product of phase two is a map that displays the vegetation cover classification and fire history. The results of this analysis will be used to determine appropriate study sites for collecting lake sediment cores and completing macroscopic charcoal analysis to determine the Holocene (last ~12,000 years) fire history of the region. We expect the results of the paleofire analysis to show how the influence of fire suppression activities have varied between high versus low elevation sites in the Blue Mountains.

Keywords: Fire History, Paleoecology, Forest Management

Beautiful and Bound
Graham, Catherine; Hautamaki, Lauren; Macdonald, Crystal; Glasman, Elizabeth
Faculty Mentor(s): Chong Eun Ahn, History

Oral Presentation, Session #15
10:40-11:00 a.m. in Room 271

People know the practice of footbinding in Chinese history through the lens of the anti-footbinding discourse that began in the late 19th century. Since modern elites in China and western missionaries problematized the practice for weakening women’s bodies and the Chinese national body, footbinding lost its history and became a representation of oppressive and exotic antiquity. This presentation attempts to introduce the overshadowed history of footbinding, by looking at its various methods and analyzing the meanings of individual practices. It will argue that footbinding, despite its notoriety, actually served to empower women within Chinese society.

Keywords: Empowerment, Women, Patriarchy
Evaluating the Effect of Population Density on Cutthroat Trout and Brook Trout Competitive Behavior and Energy Expenditure

Green, Ethan
Faculty Mentor(s): Paul James, Biological Sciences

Oral Presentation, Session #39
3:40-4:00 p.m. in Room 137B

In western North America, invasive brook trout (Salvelinus fontinalis) displace native cutthroat trout (Oncorhynchus clarki) throughout their range. One factor that may play a role in why cutthroat trout are being so widely displaced is the population density at which brook trout occur. To assess the effects of population density, juvenile cutthroat and brook trout were held in a simulated stream aquarium and observed at three population densities. The fish were monitored with a closed-circuit camera array. Antagonistic behaviors were measured via focal animal sampling of each individual. Individual energy expenditure was assessed using Tracker software that tracked fishes' movements in recorded video and estimated hourly energy expenditure using a velocity-based metabolic model. Antagonistic behaviors observed included lateral threats, frontal threats, charges, chases, and nips. These data will determine the relationship between population density and the behavioral or bioenergetic competitive advantages of brook trout and cutthroat trout.

Keywords: Cutthroat, Fish, Competition

Narrating a Story
Gremel, Shelby
Faculty Mentor(s): Melissa Johnson, Film and Video Studies

Oral Presentation, Session #47
4:30-4:50 p.m. in Room 135

Using the narrative elements of film, I analyzed the movie Back to the Future, looking at the different narrative elements as compared to Toy Story, The Princess Bride, and Breakfast at Tiffany's. All four movies, although different stylistically, function in a similar way narratively. Through the use of scope, setting, event order, and diegetic/non-diegetic elements, Back to the Future gives the audience a story that is easy to follow, yet still suspenseful and surprising.

Keywords: Narrative Elements, Films, Comparison
Territorial Identity: How Newspapers Covered the Civil War in Washington Territory 1861-1865
Griffith, Adam
Faculty Mentor(s): Daniel Herman, History

Oral Presentation, Session #6
8:30-8:50 a.m. in Room 271

As the Civil War raged across the South and the Trans Mississippi region, Washington Territory newspapers found themselves having to walk a political tight rope. While most of the population supported the North, politicians and civic leaders had to always remember that many of the early settlers had come from the upper South. While these people did not approve of slavery, neither did they did they appear to glory in the destruction of their home states. For this reason, newspapers at the time watched developments over slavery and the war, but wanted to emphasize uniting ideas of internal improvements like the establishment of a territorial capital, construction of a university, and the transcontinental railroad over the bloody details of the war. This presentation will examine several press reports printed in Washington Territory during the war, where they were placed in the paper and what information they contained. In this way I will theorize that while newspaper editors hesitated to display news of the war on the front pages, it was because they viewed the conflict as the sadly divided present and wanted to focus instead on an identity of a united future in Washington Territory.

Keywords: Press, War, Identity

Solitude
Gromala, Kyle
Faculty Mentor(s): Allyson Klutenkamper, Art

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

For as long as I can remember, the winter seasons have been the hardest time of the year for me, and 2014 has been no different. After being diagnosed with depression, it was no surprise that I would face many more struggles during the season, creating a constant battle with myself. It has effected who I am and is inspiring the development of my work. Through this quarter, I have taken the challenge of converting these emotions into my photography. Since I have dumped so much emotion into these images, my ultimate goal would be to evoke these emotions onto my viewers, if that is achieved, then I consider my purpose for this collection complete. My photographic process relates to isolating objects that people normally wouldn’t consider to be able to emit emotion or aren’t symbols with a deeper meaning. The development of this collection is not a representation of the ordinary, but rather a depiction of personal adversity.

Keywords: Photography, Collection, Emotion
Center Stand Redesign
Guerrero, Eliseo
Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction

Poster Presentation Session #3, Constructed Object #21
2:30-5:00 p.m. in Ballroom C/D

A conversation with a co-worker about his Honda Express scooter that he had just purchased, led to my senior project. The scooter had a center stand that had failed along a weld which prevented the part from functioning properly. Using engineering, a new center stand that was able to support the weight of the scooter and rider as well as to be a direct bolt-on replacement was needed. In order to create a new device a material had to be selected that would replace the steel and be strong as well as lightweight. The dimensions of the device were calculated after several assumptions and comparisons to the benchmark were made. Methods learned in Statics, Strength of Materials, and Machine Design courses were used. After the dimensions were finalized, the drawings for manufacturing were completed. Using the skills learned in basic machining and the use of the machine shop ensured the device was completed. Testing of the device against the design requirements has not commenced at the moment. Once testing is completed, the project will be deemed successful or not.

Keywords: Engineering, Statics, Mechanical Design

Women, Role Ethics, and Phenomenology: A Critique and Expansion
Gustafson, Megan
Faculty Mentor(s): Jeffery Dippmann, Philosophy and Religious Studies

Oral Presentation, Session #24
12:00-12:20 p.m. in Room 271

My presentation is an examination of Confucian Role Ethics through the lens of phenomenology. I will explore the idea that phenomenology implies a set of ethics when studying the humanities (or anything for that matter), but I will focus primarily on religion. I will discuss how dogmatic views on gender can be perpetuated by certain systems of role ethics. I will be using Roger Ames’ work as a jumping off point and will be discussing his omission of the female role in his book, Confucian Role Ethics, as it relates to phenomenology. Primarily, I will focus on this omission as un-phenomenological and strive to support that argument and how such hermeneutical errors both ignore and perpetuate the problem of patriarchy. I will discuss my recent experience presenting at the UAA conference “Living Ethically in a Global World”. I will discuss the unique challenges and rewards of critiquing a well-known scholar in my field.

Keywords: Confucianism, Role Ethics, Gender
Convergence: Art and Chemistry
Hall, Tarra
Faculty Mentor(s): Maya Chachava, Art

Oral Presentation, Session #41
2:40-3:00 p.m. in Room 201

Convergence: A meeting place of similar or very different people, ideals, or concepts. My interest in fine art and chemistry inspired this series of paintings and drawings artistically illustrating chemical concepts and theories. The pieces utilize a combination of observations, photography, color theory, symbolism, realism, and abstraction to communicate often-complex concepts within chemistry into stylized environments. Some of the chemical theories portrayed include the pH scale, supersaturated solutions, triple point of water, and iron oxide. Each theory depicted in the series involves carefully developed abstract compositions incorporating realistically rendered elements, symbols, or other reference points relating to the concept. The series built on a desire to combine art and chemistry in a way that incorporated knowledge from both fields. The series carried the challenge of communicating complex theories in a way that viewers with little to no background in science could still relate to the series on a personal or artistic level. During the process of combining these two seemingly different fields, the artwork began bringing together people from both ends of the art and science spectrum. Art and chemistry are more integrated and reliant on each other than many people initially assume. These two fields also face similar prejudices that may not be easily noticed to someone outside the disciplines. In creating a point were art and chemistry meet, perhaps it will help open views in one field to a person in the other field. Materials: oil paint, charcoal, graphite, prismacolor pencils, image transfer, and collage.

Keywords: Analogy, Concept, Communication

Investigating the Anatomy of the Stylohyoid Bone of Hoofed Mammals for Archaeological Interpretation
Hanson, Sydney; Wakeland, Eric; Hale, Thomas
Faculty Mentor(s): Patrick Lubinski, Anthropology and Museum Studies

Poster Presentation Session #2, Poster #37
11:30-2:00 p.m. in Ballroom C/D

Hyoid bones are part of a complex of small bones in the throat region of mammals, including hoofed mammals (artiodactyls). Many archaeological sites with faunal remains lack hyoid bones; however, hyoid bones do occur in sites with large numbers of artiodactyl remains. Hyoid bones have been recovered with butchery marks and used as ornaments in archaeological sites across the Plains and Eastern United States. Hyoid bones are poorly known to many zooarchaeologists, and simple questions, such as how to side these bones, have not been well resolved. This project involved extracting hyoid bones in place from multiple artiodactyls to ensure an adequate sample for determining side, as well as adding to a sample for identifying artiodactyl species. This poster will provide examples of stylohyoid bones from archaeological sites, as well as information for determining side, which is important for the interpretation of cut marks on these bones.

Keywords: Archaeology, Zooarchaeology, Anthropology
**Insulated Battery Box**  
*Harbine, Kyle*  
*Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction*

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

The purpose of this device is to increase the capacity in batteries for an electric vehicle (EV) which also increases the distance the vehicle will travel. The need for this device is driven by the Electrathon America which is a competition for EVs to travel the furthest distance in an hour. The conditions for the batteries require the temperature to maintain above 80°F but not to reach 125°F. To accomplish the device was made with dimensions and material thermal resistance to offset the heat transfer conditions the at the EV competition. For the size of the device needed and raceway conditions, a R-value of 1 was calculated. The second part of this device was the structure holding the 70 pounds of batteries. The structure would need to withstand the largest dynamic load from stopping. With the existing frame material a cantilevered beam would hold this load and have a safety factor close to 2. In evaluating this device, the temperature range must maintained by the thermal resistance to increase battery capacity by 20 percent.

*Keywords: Newton’s Law of Cooling, Heat Transfer, Goodman Method*

**Biomass Gasification**  
*Harrington, Crissy*  
*Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction*

Poster Presentation Session #3, Constructed Object #24  
2:30-5:00 p.m. in Ballroom C/D

During times of electricity black outs, for families in remote areas, wood stoves are lifesaving sources of heat and allow hot meal preparation. A wood stove is needed that has a significant potential of energy generation while maintaining a low environmental impact. Biomass gasification allows for both heat production and potential promise of energy generation. A radiation shield installed into a gasifier has promise to significantly increase syngas production from biomass. This optimizes the biomass gasifier for low environmental impact. Tests will prove a percentage increase of biomass to syngas and emission analysis will determine environmental impact. The radiation shield optimization will allow individuals and families the comfort of both heat and electricity generation in one unit.

*Keywords: Biomass, Energy, Generator*
Analysis of Slang Translation
Harris, Kiah
Faculty Mentor(s): Penglin Wang, Anthropology and Museum Studies

Poster Presentation Session #3, Poster #59
2:30-5:00 p.m. in Ballroom C/D

Perfect equivalency between languages is more of a questionable phenomenon than something of tangible existence. Slang is known for being nearly impossible to translate; an issue that is brought on mostly due to cultural and societal separation but also due to the constraint between free and direct translation, as one method seems to always betray the other. This project is an attempt to analyze, define, and translate one hundred and five American English slang terms and expressions into the Spanish language using the both literal and free translation methods. To enact this research, various slang dictionaries, machine translation tools, and my own personal knowledge will be used. The process will consist of three translations of the same list of terms. The project will focus deeply in the differences between literal and stylistic translation to better understand the difficulties and strangeness of slang translation.

Keywords: Slang, Language, Translation

HopeSource Weatherization and Conservation Services: An Analysis of Program Effectiveness
Harris, Stephanie
Faculty Mentor(s): Elvin Delgado, Geography; Robert Trumpy, Information Technology and Administrative Management

Oral Presentation, Session #3
8:10-8:30 a.m. in Room 137B

Is affecting climate change hopeless? Global warming, climate change, green-house emissions – these phrases have produced alarm, disdain, or denial in much of the US population. The United States creates 25 percent of the world’s CO₂ emissions, with only 4.5 percent of the world’s population. Scientific literature strongly suggests that reducing our carbon emissions is vitally important for our future, and yet levels keep increasing at alarming rates. HopeSource, a regional non profit providing human services to all Kittitas County residents, offers conservation services in the form of In-home energy assessments, conservation education workshops, and a weatherization program for qualified individuals. These programs provide clients a resource to decrease their energy consumption resulting in reduced carbon emissions and a lowering of their annual energy expenditures. This study applies t-test statistical analysis to 19 case studies at the household level in Kittitas County provided by HopeSource, to evaluate household energy consumption before and after weatherization modifications were completed. For this project, HopeSource specifically requested an agency, user-friendly tool to calculate energy usage and savings comparisons. Staff will utilize this resource in a number of ways including: discovering which weatherization modifications are most effective; the average household energy consumption decrease after weatherization; as well as, for use in presentations and collaborations with peer and partner organizations. The tool will enable HopeSource to readily communicate these benefits with all stakeholders. Reduced energy consumption provides direct relief for those who participate in these weatherization and conservation programs, and takes a small step toward reducing our collective carbon footprint.

Keywords: Energy Conservation, Weatherization Results, Reduce Carbon Emissions
Decreasing the Amount of Cigarettes Smoked Using an ABAB Design

Harting, Daniel

Faculty Mentor(s): Shu Fei Tsai, Language, Literacy, and Special Education

Poster Presentation Session #3, Poster #29
2:30-5:00 p.m. in Ballroom C/D

This study was an effort to examine the cause/effect of goal setting and positive praise to decrease the amount of cigarettes a college student smoked per day. She was known to smoke cigarettes after completing daily activities such as eating, while driving, or during homework breaks. The researcher conducted an ABAB design in order to reduce and/or eliminate the number of cigarettes smoked in one day. The study results showed, in fact, that goal setting and positive praise did decrease the amount of cigarettes per day. The participant involved in this research study asked that her identity remain anonymous and it is my duty as a researcher and a CWU student to respect her wishes. Her identity will remain confidential.

Keywords: ABAB, Goal Setting, Positive Praise

Army of Liberation, Army of Terror: Rape as a Weapon of War

Hedgers, Kellie

Faculty Mentor(s): Daniel Herman, History

Oral Presentation, Session #6
8:50-9:10 a.m. in Room 271

In nineteenth-century America, the rape of slave women by white men was one of the realities of life in a slave-holding society. Slavery was a system that regarded human beings as property to be used in whatever way their owners desired. It would stand to reason that the death of slavery and the coming of the Union Army would put an end to that practice. In theory, at least, the Union Army’s promised to bring African-Americans liberation. However, a perusal of Union court martial records reveals that sometimes, for black women, the coming of the Union Army did not signal liberation so much as it did terror and sexual violence. Rape could be a weapon to be deployed to reassert racial hierarchies disturbed by the war, one that was employed by the soldiers who committed the rapes and condoned by the military courts charged with dispensing justice. It was also evidence of white men’s cavalier attitudes regarding the sexual availability of black women. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)

Keywords: Rape, Race, Civil War
The Education Bubble: Federal Tertiary Education Policy and the Myth of Accessibility

Hegstrom Oakey, Jesse

Faculty Mentor(s): Anne Cubilié, Douglas Honors College; Jesse Nelson, Student Success; Matt Manweller, Political Science

Oral Presentation, Session #44
3:40-4:00 p.m. in Room 301

About 40 years ago, shifts in federal higher education policy created new student aid programs for university students, the impetus for this new policy being an increase in accessibility for undergraduate attendees. Concurrent with these changes arose unintended consequences, including significant rises in university tuition, and ever-increasing student reliance on federal loans to fund their educations, a dumbing-down of academic standards, and the adoption of a business model on the part of many universities to insure continued operation. Out of these concerns comes a body of work known to economists and higher education researchers as the “Education Bubble”, which draws a comparison between the current higher education system and other financial bubbles, arguing for an eventual bursting of the bubble. In its current form the system is the epitome of a self-perpetuating problem; likely projections for the future indicate only an exacerbation of the issue. Missing from the discussion are the degree’s value to debt-burdened graduates in today’s economy, and the overall effects that the shifts in the education system have had on graduates, and on the American political sphere. Using political and economic theory this presentation explores the current system of government aid for education, the problem it represents for students and the American public, possible solutions, and the difficulties of their implementation. It also offers a critique of the concept of accessibility as it is currently implemented, arguing that it does not increase the number of educated Americans long-term, and is thus the antithesis of its goal.

Keywords: Higher Education, Politics, Economics

Electrathon Vehicle Floor

Hein, Jason

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

Poster Presentation Session #3, Constructed Object #18
2:30-5:00 p.m. in Ballroom C/D

When designing and constructing a vehicle that will be used in competition, both the strength and weight of all components should be optimized. Several students have come together to assemble such a vehicle that will compete in the Electrathon Race. My role in this construction was the floor, which will provide additional safety to the driver and support to the vehicle. The design used for the Electrathon Vehicle floor uses two sheets of aluminum that will sandwich a single sheet of light weight, yet super strong honeycomb material that when epoxied together will hold more than the 180-pound driver while adding less than ten pounds to the weight of the vehicle. While a single sheet of steel would provided the same amount of strength and safety, the design using the aluminum and honeycomb material will reduce the overall weight of the vehicle.

Keywords: Electrathon, Lightweight, Strength
Biomolecular Chemistry and Archaeology: Preliminary Organic Residue Analysis from Ceramics, Barbados, West Indies

Hendrix, Jillian; Seelye, Elizabeth

Faculty Mentor(s): Steve Hackenberger, Anthropology and Museum Studies

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

Our goal is to identify compounds or categories of compounds located on the surfaces of ceramic sherds and within cracks of the sherds. The sherds were taken from two household sites in the Caribbean; the Goddard Site house, which dates between B.C. 200- A.D. 300, and the Chancery Lane Site house, A.D. 500-1500. Sherds from both sites have been sorted by type of pottery and the presence of white or black residue. Residues will be examined under high power microscope. Some isotope and DNA analysis will be explored. Gas chromatography-mass spectrometry (GS-MS) will be used to identify possible lipids on the surfaces of the ceramics and will help in identifying the types of foods or medicinal plants that the ceramics might have contained at the time of their use. The results taken from GS-MS will then be compared to those on searchable databases, which will aid in identifying the compounds. It is our goal to present Hendrix's fuller report of findings at SOURCE 2015.

Keywords: Anthropology, Ceramics, Gas Chromatography-Mass Spectrometry

Corporal Punishment and Its Relationship to Adjustment and Educational Attainment

Herendeen, Deborah; Carlson, Amanda; Maupin, Nicole; Page, Melissa

Faculty Mentor(s): Sarah Feeney, Family Studies

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

Our research investigates the impact of corporal punishment on adjustment and level of education obtained as well as the effect of educational attainment on the use of corporal punishment. Survey responses from a sample of 220 adults between the ages of 30 and 50 were analyzed. Results showed that those who experienced severe corporal punishment (as opposed to mild) at any age reported higher perceived (negative) impact on at least one aspect of adjustment. The areas of adjustment that were studied were behavior, attitude, self-esteem, and relationship with parent. Among participants that reported receiving severe corporal punishment between ages 11–15, all four areas of adjustment were poorer. No relationship was found between corporal punishment in childhood and participants’ level of education in midlife; however, reported use of corporal punishment as discipline was significantly different based on the level of education obtained. Fewer participants with higher levels of education reported using corporal punishment on their own children than those with lower levels of education. The results of our study suggest that a relationship exists between corporal punishment and adjustment level; however, our study is limited due to the data being based on retrospective reports. Further research would improve the understanding of this topic through the use of longitudinal designs. According to our findings, future research should be focused on the age range of early adolescence.

Keywords: Punishment, Adjustment, Education
Using GIS to Model Potential Salmon Habitat Restoration in the Swauk Creek/Highway 97 Corridor

Hess, Jared; Ishimitsu, Kylie; Mueller, Kelsey; Salmons, Lucas; Shinn, Allison

Faculty Mentor(s): Mathew Novak, Geography

Oral Presentation, Session #3
8:30-8:50 a.m. in Room 137B

Hydrological systems are often engineered by humans, disturbing the natural conditions and the fish and wildlife that rely upon them. There is potential, however, to remediate past mistakes, and return the systems back to a natural state. We employ ArcGIS to describe and analyze natural system benefits gained through alternative rerouting of US Highway 97 along Swauk Creek. Historic air photos from 1942, 1952, and 1954, as well as original surveys and engineering drawings of the highway project, provide insight to the original natural system before the development of Highway 97. Georefencing and digitizing historic air photos allow for an estimate of healthy stream length and migration along with potential riparian zones, including lost floodplain connections and potential water storage. Results of this project will provide the Department of Fish and Wildlife with an alternative proposal to supplement an existing report modeling possible highway realignment and habitat restoration.

Keywords: ArcGIS, Habitat, Restoration

“The Lark Ascending” Arranged for Flute Choir

Hile, Elizabeth

Faculty Mentor(s): Hal Ott, Music

Creative Expression Presentation, Session #52
4:10-4:30 p.m. in Ballroom A

Inspired by the emotion presented in the piece, I proposed and was granted funding from the C. Farrell Scholarship for Fine Arts committee and Undergraduate Research Scholarship committee to arrange Ralph Vaughn Williams’ “The Lark Ascending” for flute choir. In arranging the work, I challenged myself to work with limited instrument colors, instrument ranges, and score adaptation—which all require a creative and flexible outlook on the work as a whole. Certainly, arranging a piece of this length and complexity was not a simple undertaking. Arranging this work required technical understanding of Williams’ piece and instrument adaptation, and challenged me to make creative choices regarding musical gesture. As per my project proposal, I am conducting and rehearsing my arrangement with the CWU flute choir, working with the group toward a cumulative performance on May 4.

Keywords: Arranging, Composition, Conducting
Carbonaceous Nanoparticle Toxicity as a Function of Ferrous Iron Content

Hinz, Daniel; Barnes, Jeff; Teng, Hsiang; Ting, Hoi; Shore, Cameron

Faculty Mentor(s): Anne Johansen, Chemistry

Oral Presentation, Session #40
3:40-4:00 p.m. in Room 140

Experiments on mitochondria indicate that toxicity of inhalable atmospheric nanoparticles that are emitted from fossil fuel combustion correlates with both ferrous iron (Fe(II)) and anthracene concentrations in collected ultrafine particles (UFP). To further understand underlying chemical mechanisms responsible for this detrimental effect, UFPs and carbonaceous nanoparticles are investigated under simplified biological conditions while analyzing Fe(II) and the representative oxidative species hydrogen peroxide (H₂O₂). Realistic concentrations of Fe(II) at sub-nanomolar and H₂O₂ at nanomolar levels are quantified using flow injection analysis (FIA) with chemiluminescence. Results show that biological electron donors including ascorbate, glutathione, and NADPH when in the presence of black carbon (printex 90, flamruss 101, printex XE) generate H₂O₂. Under biological condition Fe(II) has a very short half-life, a matter of a few minutes. However when a large pool (1 μM) of redox active Fe(III) is added to solution an equilibrium is established between Fe(III) and Fe(II) with a small pool of Fe(II) remaining at a constant concentration in the pM range. When this pool of Fe(II) is present a reduction in H₂O₂ production is observed, it is well established that Fe(II) will react with H₂O₂ to generate hydroxyl radical. These results show that carbonaceous nanoparticles and iron are able to redox cycle and in the process generate reactive oxygen species in a catalytic manner that can raise havoc in biological systems (cardio, pulmonary diseases and cancer).

Keywords: Nanoparticle, Carbon, Iron

Assessing the Expectations for Learning Commons Tutoring

Hirschey, Olivia

Faculty Mentor(s): Prairie Brown, Learning Commons

Oral Presentation, Session #13
9:40-10:00 a.m. in Room 201

Within the Central Washington University Academic Research Commons (ARC), the Learning Commons subscribed to a new system of higher education tutoring. The Learning Commons offered students math tutoring, writing tutoring, and supplemental instruction through peer-to-peer, question-based collaborative learning. The Learning Commons launched in winter 2013, and faculty, staff, and administrators have had clear expectations as to its function for students, but one key group has previously been absent from this conversation: students. Understanding students’ expectations for tutorials was vital to both their experiences in the Learning Commons and to knowledge of tutorials. This research assessed the expectations students had for Learning Commons tutoring. The questionnaire surveyed student’s demographics (age, class standing, native language), use of tutoring services (math, writing, supplemental instruction, and study groups), frequency of tutorials, reasons for using tutoring services, and benefits to tutoring services. In order to determine student’s expectations for tutoring services, 231 questionnaires were collected and analyzed to how these expectations align with Learning Commons’ goals and values.

Keywords: Learning Commons, Student Expectations, Benefits to Tutoring
Bob or Bop? A Phonological Investigation into the Markedness Differential Hypothesis and the Subset Principle

Hodges, Clara
Faculty Mentor(s): Charles Li, English

Oral Presentation, Session #13
10:20-10:40 a.m. in Room 201

This paper investigates the predictive powers of the Markedness Differential Hypothesis (MDH) and the Subset Principle (SP), two important hypotheses in second language acquisition. MDH examines the markedness values of different cross-linguistic forms and predicts that second language learners will acquire unmarked forms before acquiring marked forms, while SP predicts the opposite. To test these hypotheses, production of word-final voiced obstruent stops and fricatives by Indonesian learners of English was examined. Because previous studies of a phonological nature seem to point to the MDH as an explanation for directionality of difficulty, similar results were expected here. The findings suggest that MDH does more accurately predict the directionality of difficulty learners face than does SP when resetting their parameters. However, the picture is likely more nuanced, suggesting pathways for further research.

Keywords: Second Language Acquisition, Phonology, Subset Principle, Markedness Differential Hypothesis

Central Access Reader: The Next Generation Text to Speech Program

Holden, Wendy; Sunens, Marshall
Faculty Mentor(s): Wendy Holden, Disability Services

Oral Presentation, Session #12
10:20-10:40 a.m. in Room 140

The Central Access Reader (CAR), conceived and developed by a team of programmers and staff at Central Washington University, has provided Disability Services (DS) with a valuable tool for outreach and education. CAR is a free text-to-speech (TTS) program that reads Word Docs and clipboard text. CAR incorporates popular features from several existing text-to-speech programs with the unique ability to read math equations. Combining dual highlighting (by word and sentence) with synchronized audio helps students maintain visual focus while listening to the text being read aloud. Users can also easily create MP3 files so they can listen to their materials using any device that plays MP3s. CAR has changed the way that Central Access produces accessible materials for students with print disabilities. Converting all texts into accessible Word Docs has improved the quality of the materials that students receive while streamlining the production process. Educating faculty and staff about the importance of providing students with accessible educational materials is an ongoing process. CAR has opened the door to many conversations about accessibility, helping the DS office promote the creation of a more inclusive campus that provides individuals with disabilities an equal opportunity to fully participate in the educational process. The widespread availability and usage of CAR benefits many individuals, not just those with disabilities. Emphasizing the resources available through the DS office is an important part of our goal to help the campus community recognize that disability is a natural part of diversity.

Keywords: Accessibility, Disability, Outreach
Marine Rope Winder
Holt, Samuel
Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction

Poster Presentation Session #3, Constructed Object #14
2:30-5:00 p.m. in Ballroom C/D

During a water sport activity that involved the use of a tow rope, it was often difficult to pull the rope in and coil it up at the same time. The water sport activity could include, but was not limited to water tubing, water skiing, and fishing with anchor lines. A device was created that could pull in the rope as well as simultaneously wind it up. Once the rope was coiled up, it could be removed from the device while still allowing it to remain in a coil. The device was built using engineering techniques and principles that included the disciplines of statics and strength of materials. The device was designed with a 96-watt DC-gear motor that produced approximately 13.5 ft-lbs. of torque. This amount of torque made it possible to tow in a load of 300 pounds floating on the water. The materials used to construct the device were polypropylene, aluminum, and plywood. These materials enabled the device to be light weight, strong, and able to float in the event that it fell into the water. The Marine Rope Winder was sufficient in its ability to tow in a rope, as well as, allow it to be removed and remain coiled up. More testing has been scheduled to be completed during spring quarter 2014.

Keywords: Torque, Engineering, Strength of Materials

Sedimentological and Stratigraphic Evidence for Paleotsunami Events at Quidico, Chile
Hong, Isabel
Faculty Mentor(s): Lisa Ely, Geological Sciences

Oral Presentation, Session #30
1:30-1:50 p.m. in Room 140

We utilized geomorphic, microfossil, sedimentological, and stratigraphic methods to investigate the history of past earthquakes and tsunamis at Quidico, Chile (38.1°S, 73.2°W). The study area lies within the transition zone between two recent subduction-zone earthquakes: the great 1960 Mw 9.5 earthquake to the south and the 2010 Mw 8.8 Maule earthquake to the north. Despite Chile’s growing need to better understand its earthquake and tsunami hazards, there are few studies aimed at establishing the geologic record of these events throughout time. A combination of pits, cores, and riverbank exposures provide stratigraphic evidence of six to seven, laterally-continuous sand layers at Quidico. The sand units display landward thinning and disappear completely from the stratigraphy approximately 1 km inland from the coast, characteristic of tsunami deposits. Intervening sediment layers consists of organic-rich silts and peat. All of the sand units contain sediments of similar mineral composition and unimodal grain size distribution (120-316 μm), contrasting with the broader, bimodal distribution of sediment sizes in the organic-rich silts and peat (3-171 μm). Preliminary microfossil analysis indicates a slightly more marine diatom assemblage in the first buried sand layer than in the organic-rich silt units above and below it, indicating a marine incursion. AMS radiocarbon dates of Scirpus seeds found in units below each sand layer indicate an 800 year history of tsunami deposition at Quidico. Correlating this record with additional geologic studies and historic accounts of earthquakes and tsunamis throughout the region will collectively advance our understanding of seismic hazards in south-central Chile.

Keywords: Sedimentology, Tsunami, Chile
**Electric Vehicle Seating System**  
*Huber, Ryan*  
*Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction*

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

A few years ago, the MET department started constructing an electric vehicle. The problem was that this electric vehicle was unfinished and required a seat and racing harness. I took this opportunity to help finish the electric vehicle last fall for my senior project. This project was divided up into three phases; planning in the fall, construction in the winter and testing in the spring. A go-kart seat was incorporated into the existing frame. A five-point racing harness was attached as well. The seating system meets all regulations as outlined in the Electrathon Handbook. The seat and harness will be tested a variety of ways. The most important test will be actually driving the vehicle and getting a feel for how the seating system supports the driver. The finished vehicle will hopefully be entered in an Electrathon race as well. The testing will be finished and included in this project by the time SOURCE takes place May 15.

*Keywords: Electrathon, Seat, Harness*

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**The Mexican Beaded Lizard (*Heloderma horridum*) and Life in the Lithos**  
*Hueter, Joshua; Butterfield, Taggart; Saxby, Rachael; Olivan, Jesus; Holcomb, Kerry*  
*Faculty Mentor(s): Lisa Ely, Geological Sciences; Dan Beck, Biological Sciences*

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

Seasonal resource scarcity in the tropical deciduous forest (TDF) forces many animals, including beaded lizards, to take refuge in the soil for extended periods of time. To investigate which characteristics may be ideal when resources are less abundant, we measured soil characteristics in habitats used by Mexican Beaded Lizard’s (*Heloderma horridum*) in the TDF of Jalisco, Mexico. Utilizing a Brownian Bridge Kernel Density Estimation to identify activity centers in both wet and dry season sites, fourteen soil samples were collected in areas where beaded lizards have been observed or had a high probability of being observed. The soil characteristics measured include soil permeability, percent water content, sediment size distribution, and color. Measured habitat characteristics include percent canopy cover, slope, and height of primary vegetation. All samples were collected and measured in the dry season, March 2014. Results indicate that dry and wet season soils differ in sediment size, slope, percent water, and color indicating that soil used in the dry season is different from soil used in the wet. Another notable observation was that all dry season sites had oxidized soil (determined by red color), whereas the wet season sites showed no pattern with respect to soil color.

*Keywords: Soil, Lizard, Mexico*
Analyzing Operational Amplifiers in Chaotic Circuits
Huss, Christopher
Faculty Mentor(s): Michael Braunstein, Physics

Oral Presentation, Session #21
11:40-12:00 p.m. in Room 140

A number of studies have investigated a class of simple chaotic circuits first identified by J.C. Sprott. Typically, these circuits rely on operational amplifiers (op-amps). For this project, we experimentally investigated the behavior of chaotic circuits assembled using op-amps with significantly contrasting parameters. In particular, we compared the behavior of a single circuit assembled using 741 op-amps and another assembled using LME49740 op-amps. The 741 is a general purpose op-amp while the LME49740 is optimized for high performance and high fidelity applications with ultra-low distortion, low noise and high slew rate. We selected a particular chaotic circuit, primarily for its simplicity, from the paper “Simple chaotic systems and circuits” by J.C. Sprott in the American Journal of Physics. Next, we verified the form of the third-order ordinary differential equation that models the circuit behavior. We then assembled the circuit, and qualitatively examined its behavior with an oscilloscope. We also modeled its behavior with Mathematica. We will report our findings for the relative behavior of these two circuits.

Keywords: Operational Amplifiers, Simple Chaotic Systems, Modeling of Behavior

Truck Tie Down Anchor
Israel, Jonathan
Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction

Poster Presentation Session #3, Constructed Object #6
2:30-5:00 p.m. in Ballroom C/D

Question: How does one tie down items that are put into the bed of a pickup truck without causing damage to the body of the truck and have the ring disappear as well as be flush with the body? Rationale: With the increase of pickup trucks on the road, there is a need to tie items down securely in the bed to keep the public safe while the vehicle is in motion, as well as when parked. In most pickup trucks there are post/pole holes built into the bed that allows the users to put in either tie down anchors or pole/post made from wood. The problem with the tie down anchors is that they either fold/slide to attach items to the truck, but they all sit on top of the body. This doesn’t allow the driver to place items on top of the trucks bed, give the driver the option to put the ring away, and have weight restrictions; thus requiring a device for these tasks. Over the past year a device has been proposed, designed, and built to do these tasks, as well as offer features that other tie down anchors do not have. The results have shown that this device is able to do the task it is required to do; thus allowing this device to compete with the current benchmarks out in the market.

Keywords: Truck, Anchor, Safe
Identification of the Big Five Personality Traits by Psychology Majors and Non-Psychology Majors Using Still Photographs

Jennings, Naomi; Simonis, Lindsey; Radeke, Mary
Faculty Mentor(s): Mary Radeke, Psychology

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

The purpose of this study was to investigate different factors that influence the way people identify personality traits. Previous research has indicated that facial expression, age, and race may play a role in the assessment of personality. Would a person’s interest in a particular field also play a role in the way they assess personality? We hypothesized that there would be a difference between students who had declared a major and those who had not declared a major with regard to the way they rated the personalities of individuals in photographs. It was further hypothesized that there would be a difference between psychology majors and non-psychology majors with regard to these same ratings. Personality traits, from the Big Five personality inventory, were assigned by participants to four black and white photographs. Differences in the way declared and non-declared students rated the individuals in the photographs with regard to the personality traits of Unconscientiousness and Openness were the most notable. Differences in the way psychology majors and non-psychology majors rated the individuals in the photographs with regard to the personality traits of Disagreeableness, Unconscientiousness, and Openness were the most notable. These differences could not be attributed to differences in age. Similarities of ratings as well as implications of this research are discussed.

Keywords: Big Five Personality Traits, Personality Recognition, Education

Jensvold, Hannah
Faculty Mentor(s): Jeff Hashimoto, Ellensburg High School

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

We surveyed customers at our local supermarkets to determine attitudes towards a system of reusable glass milk bottles. We created a business plan for stores to offer milk in reusable bottles. Milk bottles would be returned to the organic dairy for reuse, while customers would receive a discount from the price of the milk. We worked with local supermarkets and are advocating for the adoption of our plan in the future.

Keywords: Sustainability
Three-Phase Motor Controller Design
Johnson, Aaron
Faculty Mentor(s): Lad Holden, Engineering Technologies, Safety, and Construction

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

The presentation covers the research, design, and implementation of a three-phase motor controller. The system is designed as a conversion for motorcycles, from Internal Combustion Engines (ICE) to electric. The presentation should also include the final product, mounted on a small bike frame which is immobilized. The design includes voltage changing using buck converter theory, heat sinking of power MOSFETs, and calculations regarding vehicle acceleration as a result of energy into a system. Minor notes include experimentation with printed circuit board design and etching, and information on renewable energy generation for vehicles.

Keywords: Electric, Motor, Controller

Discovery of Optically Pumped Far-Infrared Laser Emissions
Johnson, Eric; McKnight, Mark; Penoyar, Patrick
Faculty Mentor(s): Mike Jackson, Physics

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

For nearly 45 years, the optically pumped molecular laser has been the most prolific source of coherent far-infrared radiation. This type of laser system has generated over 5,000 discrete laser frequencies from about 0.025 to 3.030 mm. At Central Washington University, our optically pumped molecular laser system is a two laser system consisting of a carbon dioxide (CO₂) pump laser that is used to excite the medium housed in the second, far-infrared laser cavity. For this investigation the media used to generate far-infrared laser emissions were the 13CD₃OH and 13CD₃OD methanol isotopologues, along with CD₃CN, and 13CD₃I. Between these four media 125 far-infrared laser emissions were generated, with 34 of these emissions being observed for the first time. The far-infrared laser emissions discovered during our investigation ranged in wavelength from 55.0 to 873.2 µm. This presentation will discuss the unique properties and operating characteristics of this specific far-infrared laser system, along with operational procedures utilized when searching for new laser emissions.

Keywords: Far-Infrared Lasing, Electromagnetic Spectrum, Laser Emissions
Faunal Analysis of Mesa Site 6
Johnson, Matt

Faculty Mentor(s): Patrick Lubinski, Resource Management

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

A faunal analysis was undertaken of the 292 specimens recovered at a 1975 excavation of Mesa Site 6, located in Grant County, Washington. One hundred and eighty-eight specimens were identified to at least the taxonomic class level, and signs of burning were observed on approximately 23 percent of the faunal collection. The analysis sheds light on some taphonomic processes which may have occurred, and indicates that the people who inhabited this site over the previous 2,000 years utilized a diverse range of faunal resources in limited quantities including large and small mammals, bony fishes, turtles, and bivalves.

Keywords: Zooarchaeology, Anthropology, Faunal Analysis

“L’Homme en animal”, Human Animals
Johnson, Michael; Burkette, Lyndsey; Andrus, Natalie; Zencak, Victoria

Faculty Mentor(s): Michael Johnson, World Languages

Creative Expression Presentation, Session #8
8:50-9:30 a.m. in Ballroom A

In conjunction with World Languages Day (May 2, 2014), students from the French program will be staging a bilingual French-English performance of The Complete Fables of Jean de la Fontaine with musical interludes from Isabelle Aboulker’s adaptation of the fables for a children’s opera. La Fontaine wrote during the reign of Louis XIV and was a keen observer of social dynamics at the court of Versailles; his fables contain valuable lessons on the nature of power that still hold true today. Moreover, La Fontaine’s observations about the continuities between animal nature and human nature fly in the face of his contemporary, René Descartes’s, philosophy and anticipated animal rights discourses. Even more fascinating is the fact that La Fontaine was able to critique both his absolute monarch and the illustrious Descartes through the seemingly innocuous medium of versified fables with anthropomorphized animals. “L’Homme en animal” highlights these two particular facets of La Fontaine’s Fables: the critique of power and his reflections on humanity and animality. During this SOURCE presentation, students involved in the production will screen a video featuring highlights from the May 2 performance followed by their reflections on how the experience contributed to their own process of learning French language and culture. They will also engage the audience by encouraging them to try on some of the eighteen animal masks made for the production while also discussing the techniques used in crafting the masks.

Keywords: French, Theater, La Fontaine’s Fables
Behavioral Relaxation Training: A Stress Management Tool for Graduate Students

Juhlin, Natalie; Warrington, Savannah
Faculty Mentor(s): Sadie Lovett, Psychology; Susan Lonborg, Psychology

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

The purpose of the current study was to investigate the effectiveness of teaching Behavioral Relaxation Training (BRT) as a stress management technique for graduate students. The need for this study was highlighted by research findings revealing the maladaptive effects of stress on health and academic performance. BRT is a form of relaxation training that uses overt behaviors to teach individuals how to apply relaxation techniques when experiencing distressing emotions. Participants included four graduate students in a non-psychology major. A concurrent multiple probe design across participants was used in conjunction with pre-test and post-test scores from the Perceived Stress Scale (PSS). The PSS is a subjective 10-item questionnaire that measures the participants’ perception of stress and the degree to which participants perceived life situations as stressful during the previous month. Following baseline probes, participants received two BRT training sessions focusing on acquisition and proficiency of relaxed body postures. Results revealed that after BRT training all participants achieved greater than 80 percent relaxed postures across three post-test sessions. Social validity measures also showed participants’ evaluated BRT as an effective tool for stress management. Study limitations included that only an on-line follow-up was conducted four weeks after the final BRT post-session, so it was difficult to how well relaxed postures were maintained. However, in a social validity questionnaire, all participants agreed that they would continue using BRT as a stress management technique. Further research should compare and contrast in-person follow-up sessions.

Keywords: Behavioral Relaxation Training, Stress Reduction, Graduate Students

Impacts of Urban Growth and Energy Demand on Water

Kajca, Spencer; Weigel, Landon
Faculty Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #2, Poster #12
11:30-2:00 p.m. in Ballroom C/D

Hydraulic fracturing in the United States has created a plentiful and inexpensive source of domestic energy. This new technology has brought economic opportunity and cheaper prices at the pump for every American. Unfortunately it does not come without cost. Fracking has created a series of environmental issues and potential public health concerns. The demand for new laws to offset these pollution externalities is growing every day. Cost benefit analysis has determined that waste water processes, exploration and emissions from production are negatively affecting our nation’s water supplies. Proper regulation and public disclosure has been a challenge since the 2005 “Halliburton loophole”, an energy policy bill which exempted hydraulic fracturing from many of the nation’s key environmental-protection laws. Under the new loophole, energy companies are able to skirt regulation from the Clean Water Act, Safe Drinking Water Act, Clean Air Act, Resource Conservation and Recovery Act and Comprehensive Environmental Response, Compensation and Liability Act. Companies are also not required to tell the public the exact contents of the fracking fluids. Many of them are believed to be flammable and chemically similar to spray-paint. The US EPA estimates that there are 144,000 wells in the US receiving upwards of 2 billion gallons of waste water a day, 20 percent of which is related to natural gas operation. Our analysis will determine the effectiveness of current regulatory regimes in controlling the effects of hydraulic fracturing on local ground water quality, specifically the Clean Water Act and the Safe Drinking Water Act.

Keywords: Water, Pollution, Natural Gas
The Archaeology of Obsidian Occurrence Across Stone Tool Manufacture and Use Along the Mid-Columbia River, Washington

Kassa, Sonja; McCutcheon, Patrick

Faculty Mentor(s): Patrick McCutcheon, Resource Management

Poster Presentation Session #2, Poster #47
11:30-2:00 p.m. in Ballroom C/D

In the Pacific Northwest, recent research of obsidian artifacts has suggested that the distance from an obsidian source and the number of sources used decreased over time. My research employs an evolutionary archaeology framework that considers the occurrence of obsidian sources across 656 obsidian artifacts from 18 archaeological sites along the mid-Columbia river in Washington State. To understand prehistoric obsidian occurrence, it is necessary to study stone tool manufacture and use, source diversity, and source-to-site distances. My research uses a model of stone tool cost and performance. Employing this model allows hypotheses to be tested about changing obsidian occurrence over time. How obsidian was employed in stone tool manufacture, maintenance, and use was described using paradigmatic classification. To understand how these stone tool attributes related to obsidian source diversity, a geochemical analysis was employed to trace obsidian artifacts to their geologic source. I chose samples for geochemical sourcing based on artifact type and quality, and included all artifact sizes in an attempt to capture source diversity. Of the 656 artifacts, 653 were assigned to one of 10 sources located in Washington, Oregon, and Idaho. Results indicate three local sources (one high- and two low-quality) comprise 93 percent of the collection, occurring as generally unused bifaces, cores, and flakes. Seven non-local, higher-quality sources represent 7 percent of the artifacts as two bifaces and small flakes. Testing our hypothesis demonstrated that local low-quality obsidian occurred as informal tools throughout time, while nonlocal high-quality sources were used for formal tools periodically over time.

Keywords: Archaeology, Obsidian Sourcing, Toolstone Geography
course analysis, this study examines K-8 Iranian school textbooks by exposing religious propaganda that is suffocating objective inquiry in social sciences. Examples from these textbooks reveal the nature of this propaganda and serves as a powerful reminder to question what children are taught in schools around the world.

Keywords: Theocracy, Curriculum, Ideology

The Sounds of Colors and Tastes: An Experimental Extension of the Bouba Kiki Effect
Kawachi, Bridgett
Faculty Mentor(s): Vanessa Hunt, Science Education

Des Moines Center - Poster Presentation, Poster #1

The Bouba Kiki effect refers to a correlation between shapes and sounds that transcends cultural barriers. It has been demonstrated experimentally that individuals of all ages and cultures will tend to associate a rounded shape with the sound “bouba” and an angular shape with the sound “kiki” (Maurer, Pathman, & Mondloch, 2006). This association lends support to the hypothesis that language evolved from sounds linked with concepts, prior to the development of more complex speech. In this study, I asked if the Bouba Kiki effect could be extended to the concepts of color and taste. Eighty-five child and adult participants were each asked to characterize a range of warm and cool colors as either “bouba” or “kiki”. These participants were further presented with sparkling and flat water, and milk and dark chocolate, and asked to characterize the taste as a “bouba” or a “kiki”. The colors blue and red were consistently respectively identified as “bouba” or “kiki”. A strong association was also demonstrated between the taste of milk and dark chocolate and the two sounds. I tentatively conclude that the Bouba Kiki effect extends to concepts other than shape, and propose refinements to the methodology that would explore the effect of age and cognitive development on these associations.

Keywords: Linguistics, Bouba Kiki Effect, Synesthesia

Contextual Use of the Sign “BLACK” in a Signing Chimpanzee
Keenan, Susan Ann; Jensvold, Mary Lee
Faculty Mentor(s): Mary Lee Jensvold, Primate Behavior and Ecology

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

Gardner and Gardner (1989) cross-fostered several chimpanzees as deaf human children immersed in American Sign Language (ASL). Many studies examined and observed how the chimpanzees would develop and learn signs from ASL. Tatu, one of these chimpanzees, has been observed signing BLACK in varied conversations throughout her life. It was often thought that she used BLACK to describe items she prefers. This study explored that hypothesis. Sign logs, an archival database, contain records of the chimpanzees’ use of signs. We selected all instances of the use of BLACK between February 2001 to May 2005. Ten caregivers rated items on a list of topics as positive, negative, or neutral. Tatu signed BLACK in topics rated positively and rarely signed BLACK in topics rated neutral or negative.

Keywords: Chimpanzee, Word Use, American Sign Language
The Androgynous Disguise: Marian Halcombe’s Hidden Misogyny
Kent, Jessica; Chaddock, William; Thomas, James Tyler
Faculty Mentor(s): Christine Sutphin, English

Oral Presentation, Session #37
2:40-3:00 p.m. in Room 135

This paper looks at the gender construction of Marian Halcombe in Wilkie Collins’ *The Woman in White*. It explores her apparent independence while also looking at the effects of her so-called androgyny. It argues that though Marian can be read through a feminist lens, in the end her character and role reaffirm the patriarchy, as well as showing a disgust for the state of being female. By studying Marian’s acts of agency throughout the novel, this paper strives to prove that each act results in the success of the patriarchy. Marian’s relationships to two of the male characters also illustrate her decline from an independent character to a proponent of normal Victorian gender roles. The paper concludes that, though Marian strives to be a woman of agency, her attitude, actions, and the plot of the novel itself force her to accept a traditional female role.

*Keywords: Androgyny, Agency, Feminism*

Anxiety in Social Situations
Kenworthy, Jennifer
Faculty Mentor(s): Marte Fallshore, Psychology; Ralph Greenwald, Psychology; Megan Matheson, Psychology

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

There is evidence that suggests the effects of anxiety can be reduced through the application of various breathing techniques. The purpose of this study is to see if anxiety may be reduced through the use of a particular breathing technique, breathing following an external pacer. Participants are first asked to complete a state anxiety inventory to get a baseline measurement. Then, the participants are asked to read a short passage to the researcher and a camera followed by a second administration of the state anxiety inventory. The experimental group then does the breathing exercise for 5 min. The control group is asked to sit quietly for the same amount of time. After this, the participants are asked to read a different short passage in the same manner in front of the researcher and the camera. The participants are, then, asked to take the state anxiety inventory and a trait anxiety inventory. Results are expected to show that the participants in the experimental group experience less anxiety after the breathing technique is utilized and that there is not much difference in the level of anxiety for the control group between the first and second passage.

*Keywords: Anxiety, Breathing Techniques, Public Speaking, Social Anxiety*
Lighter than Air UAV
Kinney, Patrick
Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction

Poster Presentation Session #3, Constructed Object #22
2:30-5:00 p.m. in Ballroom C/D

A small scale UAV was needed to carry cargo through a defined obstacle course, drop a payload, and return to a starting position all while being buoyant in air by usage of helium. The proposed field of usage is that of a scouting device to be used in aid of observing a forest fire. A Mylar blimp was created to achieve this goal. The blimp created was sufficient to achieve the required task of being lighter-than-air, capable of lifting sufficient weight (gondola and payload), dropping a payload, and being controllable. Overall the blimp was a success and met each required objective.

Keywords: UAV, Blimp, Lighter-Than-Air, Helium, Mylar

Seaside Bombshell
Kirckof, Joanne
Faculty Mentor(s): Andrea Eklund, Apparel, Textiles and Merchandising

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

Purpose: The purpose and inspiration behind this design was to create a sleek gown inspired from sailors uniforms and vintage fashion. I had a goal of playing with the use of box pleats in a gown and manipulating fabric to form the desired shape. Additionally, the box pleats are used in order to add depth and angles to an otherwise softer silhouette. By using two separate colors for the outer and inner box pleats, there is a peek-a-boo effect that occurs when the dress is worn and moved in. I wanted to create a garment that will always be interesting, whether it is still or in motion. Process: When designing this gown, I started by researching marine sailors and uniforms, both vintage and current. Inspiration was also taken from other nautical garments and themes such as swimsuits, the beach, seashells, and 1940's fashion. Techniques: The process of making this garment began with flat patterning the dress using slopers. A sample of the garment was then constructed using recycled bed sheets and then fit on the model. Then the final product was made using materials in navy and off-white matte satin, along with a navy Chinese satin lining. Additional materials include gold buttons and chains in order to add to the militaristic silhouette and aesthetic, along with an invisible zipper, thread, and interfacing. Special techniques used in the creation of this garment are princess seams, gathered trimmings, and box pleating for the skirt. Materials: 100-percent polyester, invisible zipper, thread.

Keywords: Nautical, Fashion, Constructed
The Nightingale: A Steampunk Fairytale
Kirckof, Joanne
Faculty Mentor(s): Jessica Pribble, Theatre

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

Using tools and techniques learned in the Costume Design class, this presentation showcases the final product of a complete set of costume designs for the fairytale The Nightingale by Hans Christian Anderson. The goal of this project was to challenge myself by combining East and West in my own interpretation of the tale’s theme of the mechanical versus nature. The steampunk aesthetic was chosen due to the heavy nature of the dependence on mechanical objects, as well as the story’s innate style of chinoiserie. These designs were conceived through many stages of research, such as; historical, emotional, and pop-culture. After making initial sketches, final renderings of the characters were drawn, traced onto new paper, watercolored, and then finalized with pencil and ink. The resulting product was taken to the Kennedy Center American College Theater Festival, where it competed with a few dozen other competitors in both realized and unrealized costume designs.

Keywords: Costumes, Steampunk, Unrealized

Abundant Weirdness: Our Journey to Breaking a World Record
Klarich, Jeremy; Darst, Jacob; Cockrum, Anna; Campbell, Luke; McDonald, Michael
Faculty Mentor(s): Dominic Klyve, Mathematics

Oral Presentation, Session #5
8:10-8:30 a.m. in Room 202

In Fall 2013, the Math Honors Seminar at Central Washington University broke the world record for largest primitive weird number ever discovered. A weird number is a number N whose set of proper divisors sums to be larger than itself, but which has no subset of proper divisors exactly equal to N. Take, for example, the number 70, which has proper divisors {1, 2, 5, 7, 10, 14, 35}. The sum of these numbers is 74, a number that is larger than our original number. Though, this only satisfies one of the qualifications for the number 70 to be considered “weird.” In particular, 70 is a weird number because no subset sum of {1, 2, 5, 7, 10, 14, 35} equals 70. The most important class of weird numbers is the primitive weird numbers – those not divisible by any others. Thousands of primitive weird numbers are known, but there is no efficient way to find them all. By early 2013, the record for the largest known primitive number was held by Dr. Sidney Kravitz, who discovered a 53-digit weird number. Using a generalization of Kravitz’s ideas, the class broke this record, finding weird numbers with 74, 127, and 226 decimal digits.

Keywords: Math, Discovery, Programming
Thinking Outside the Box: Sustainable Water for the Future
Klewin-Arkell, Sunshine
Faculty Mentor(s): Michael Pease, Geography

Poster Presentation Session #2, Poster #26
11:30-2:00 p.m. in Ballroom C/D

Anthropogenic climate change coupled with increases in per capita caloric demand will lead to increases in water scarcity. International Panel on Climate Change models suggest periods of water scarcity to increase in both severity and frequency due to lack of precipitation coupled with changes in temperature. Water conservation is crucial at all temporal and geographic scales. However, few data exist measuring institutional effectiveness of water conservation programs. Arguably more problematic, inadequate data exist measuring how much water is actually conserved via a range of conservation techniques. This research evaluates current policies and methods preventing water savings and then looks at two key states with innovative ideas on how to make water conservation a reality.

Keywords: Agriculture, Resource Scarcity, Water Conservation

Genevieve Knutz, Krissy
Faculty Mentor(s): Andrea Eklund, Apparel, Textiles and Merchandising

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

Purpose: I wanted to create the garment to show a correlation between sophistication and a younger woman. I have been told that my style is mature for my age; therefore, I wanted to create a garment that portrayed that. By having the cranberry fabric backing the lace, it allows depth and contrast in comparison to the leather skirt. These characteristics help to define the meaning of being sophisticated and feminine while still having a Victorian yet vintage twist. Process: The process to create this two-piece garment started with an inspiration of linen and lace, which is my favorite texture and style of clothing. I have also learned numerous different dyeing techniques so I wanted to incorporate those into my designs as well. By using coffee and tea, I could dye my lace to give it a vintage look and portray a softer and more elegant color scheme. When it came to the skirt, I wanted to keep it simple yet intriguing, by using pleather, depth is added to create flow and femininity. The quarter sleeve crop-top mixed with the pleather a-line skirt puts a modern spin on a Victorian influenced garment. Techniques: draping, patternmaking, hand stitching, and fabric dying. Materials: 100-percent organic white cotton, 100-percent organic cranberry died cotton, pleather with a cotton backing, invisible zipper, hook and eye, 100-percent cotton thread.

Keywords: Apparel Textiles and Merchandising, Student Design, Fashion Design
Police Hiring and Marijuana Legalization

Kohr, Devin

Faculty Mentor(s): Mary Ellen Reimund, Law and Justice

Des Moines Center - Poster Presentation, Poster #2

With the passage of Initiative I-502 in 2012, the recreational use of marijuana was legalized in Washington State. Although this reduces law enforcement’s focus on marijuana possession, it creates problems when it comes to police hiring policies and standards. This can be seen in the recent changes the Seattle Police Department and the Washington State Patrol have made to their hiring policies in regards to past marijuana usage. This research examines the impact that the legalization of marijuana is having on the hiring policies of these two police agencies. It looks at what the changes in the drug usage policies are and why the changes were implemented. This project will also discuss how the changes have impacted the hiring pools for these agencies and if they have changed the overall characteristics of the people being hired.

Keywords: Police, Marijuana, Employment

Northwestern United States Plant Extracts Show Anthelminthic Activity Against the Hookworm, Ancylostoma ceylanicum

Koppinger, Kaitlin

Faculty Mentor(s): Blaise Dondji, Biological Sciences

Oral Presentation, Session #29
1:30-1:50 p.m. in Room 137B

Approximately one billion people world-wide are infected with hookworms, intestinal parasites that cause a multitude of harmful symptoms including anemia. Studies have shown that hookworms are becoming resistant to current drugs. The goal of this project was to assess the anthelminthic effects of natural plant extracts and their chromatographic enriched fractions against the hookworm Ancylostoma ceylanicum. Syrian hamsters were used as the model host to complete the hookworm life cycle. Testing of these extracts and fractions on the adult hookworm was done using an ex vivo assay. Data showed that whole extracts and fractions of the plant Dalea ornata, actively decreased motility or induced mortality of adult hookworm ex vivo. Fractions were tested at three concentrations of 100, 50, and 10ug/ml. These three doses of the fraction showed anthelminthic activity with the lowest concentration, 10ug/ml, recording 0 percent worm survival by Day 5 of exposure.

Keywords: Hookworm, Natural Plant Extract, Anthelmintic
Introducing “Like” in Discourse to EFL Students through Corpora
Koughan-Thornburg, Karlyn
Faculty Mentor(s): Loretta Gray, English

Oral Presentation, Session #13
10:00-10:20 a.m. in Room 201

The use of discourse markers in speech is an indicator of fluency. Misuse, underuse, or non-use of discourse markers can mark a speaker as non-native and make it more difficult for that speaker to interact meaningfully within a speech community. EFL students do not always have access to native speakers from whom they can acquire discourse markers. Additionally, EFL teachers may not be aware of the uses of discourse markers or know the parameters of their use. Online public corpora may be useful tools for TESOL teachers to find examples of authentic speech that include discourse markers and exemplify their actual use. For this project, the discourse marker “like” and the quotative “be like” were searched for and analyzed in the Corpus of Contemporary American English (COCA) and the Michigan Corpus of Academic Spoken English (MICASE) in an attempt to answer the following questions: What kinds of results do searches for discourse markers yield?, Do the results clearly show the form and function of the markers?, and How might the searches and results be applied in the EFL classroom? The search results yielded clear examples of the uses of discourse marker “like” and quotative “be like” that support the findings of previous studies and show some areas in which new research can be performed, such as the nuances in meaning of quotative “it’s like.” The results provide examples that can be used in the classroom as input or modified into assignments or activities.

Keywords: Discourse Analysis, ESL/EFL, Corpus Linguistics

Financial Risk Evaluation of Supplier
Kravchun, Oxana; Flanagan, Trang; Kaur, Amanpreet
Faculty Mentor(s): Kun Liao, Finance and Supply Chain Management

Lynnwood Center - Poster Presentation, Poster #4

Every business faces financial risks which seem to affect the company’s financial performance in both the short and long run. One of the financial risks is working with an inadequate supplier, or a supplier whose financial performance is poor. If a supplier’s financial performance is poor, the supplier may go bankrupt leaving the company with no materials to work with. Even though a company may find a different supplier or may decide to manufacture certain products in the house if one of its current suppliers goes bankrupt, making the right decision or looking for a different supplier is time consuming and may cost the company a fortune. In order to avoid financial risk when dealing with supplier, every company needs to evaluate the financial risk of their suppliers. There are steps that need to be taken when evaluating a supplier: 1) Develop a critical supplier list; 2) Collect a supplier’s financial data; 3) Make projections from ratio analysis; 4) Develop a suppliers watch list; and 5) Continue closely monitoring the supplier. Evaluating the financial risk of every supplier is time consuming; therefore, companies may use their own finance or accounting departments or outsource these services to third parties. In either case, evaluating a supplier provides financial security for the company in the long run and insure its business runs smoothly and its customers are satisfied.

Keywords: Financial Risk, Supplier, Evaluation
Electronic Device Usage and Distraction In Lectures and Driving

Lacour, Suzanne; Larrabee, Elena
Faculty Mentor(s): Ralf Greenwald, Psychology

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

The purpose of this study was to examine the usage of electronic devices (such as cellphones, tablets, and laptops) by CWU students for non-classroom purposes and while driving. Non-classroom purposes is defined as non-course specific activities during lecture. The driving portion of the survey was focused only on the vehicle operator. A general survey regarding usage in both areas was administered online, including sections on individual perceptions of the distractions the usage of these devices poses both to the individual and to others. The survey focused on students over the age of 18, with heaviest participation from members of the psychology department but drawing from numerous others. Preliminary results mirror similar studies conducted at other universities and indicate a high percentage of electronic device usage in the classroom. Findings highlight the importance for academics to get a better understanding of how and why students feel the need to be online for non-academic reasons.

Keywords: Electronics, Distraction, Learning

Where College Age Students Go to Find Hook-Ups

Laidler, Ariel
Faculty Mentor(s): Duane Dowd, Family Studies

Poster Presentation Session #3, Poster #41
2:30-5:00 p.m. in Ballroom C/D

The purpose of this study was to find the common places people go to find a hook up. This study uses surveys and self report methods to gain an understanding of the hook up culture. Our study was geared towards college-aged students who we believed to be the target population of the hook-up. Of our participants, 121 were college students and 59 were not. The age scope for our study was 18 to 30 years of age. Our goal was to find statistical significance between the locations of places where people may attempt to find hook ups as compared to how successful they were. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)

Keywords: Students, Health, Culture
Student Workplace Safety
Lancaster, Ryan
Faculty Mentor(s): Sathyanarayanan Rajendran, Engineering Technologies, Safety, and Construction

Poster Presentation Session #3, Constructed Object #13
2:30-5:00 p.m. in Ballroom C/D

Worker safety continues to be a enormous concern across the country. Student worker safety has gained little attention among the research community. The goal of this research project was to identifying the current student safety training trends at CWU. A qualitative survey research was performed. A questionnaire was used to explore the training practices conducted for student workers at CWU, and how they perceive the effectiveness of training in their jobs at CWU. The survey participants were narrowed down to students who are employed by CWU through the work study program. The participants were contacted via e-mail by the CWU financial aid department. They were given the opportunity to participate in the survey via a link included in the e-mail. The data that were collected include questions that ask how well the students were trained in safety, if they feel the safety training was sufficient, and if they feel safe doing their jobs. The data show that the majority of students perceive themselves to be well trained in safety protocols pertaining to their jobs. Due to the small sample size (n=43), future research with a larger sample size was recommended for a more representative result.

Keywords: Safety, Training, Work-Study

Reduction in the Incidence of Type 2 Diabetes with Shared Medical Appointments: A Patient Centered Outcomes Research Study
Landreth, Stephanie; Watkins, Justin; Hoffman, Daniel
Faculty Mentor(s): Bernadette Howlett, Pacific Northwest University of Health Sciences; Byron L. Haney, Family Health Care of Ellensburg

Oral Presentation, Session #23
12:40-1:00 p.m. in Room 202

Each year one out of every ten health care dollars is spent on diabetes and its complications. Currently, in the United States 25.8 million people (8.3 percent of the population) have diabetes. People with diabetes are at risk for heart disease, nerve damage, eye problems, kidney disease, peripheral vascular disease, and many other complications. Treatment options for prevention of type 2 diabetes (DM2) are limited in the general population and are shown to be further limited in rural populations. Treatment for DM2 is not typically instituted until a patient reaches a level of 125 mg/dL fasting plasma glucose (FPG). The purpose of this analysis was to assess the viability of Shared Medical Appointments (SMAs) as prevention of progression from preDM2 (FPG: 100-125 mg/dl) to DM2. The study was a pilot, cross-sectional, patient-centered chart-review involving records from 42 adult patients. A qualitative comparison of proportions was conducted, based on data from a NEJM (n=3234) study of preDM2, which reported 11 percent of preDM2 adults receiving placebo (n=1082), 7.8 percent of those receiving Metformin (n=1073), and 4.8 percent of those receiving lifestyle intervention (n=1079) converted to DM2 within three years. In this analysis, 0 percent (0/42) of the SMA participants with preDM2 converted to DM2 within 3 years. Study results indicate further research is warranted. The sample size was not adequate to achieve sufficient power to conduct a hypothesis test. This analysis showed a reduction in absolute risk for development of DM2 within three years among patients who participated in SMA for at least 12 months.

Keywords: Diabetes, Shared Medical Appointments, Rural
Dystopian Cinderellas: “I Follow Him Into the Dark”
Lear, Courtney
Faculty Mentor(s): Toni Culjak, English

Oral Presentation, Session #18
12:40-1:00 p.m. in Room 135

Since the early 1900s, dystopian fiction has ballooned in popularity to the point where contemporary booksellers can hardly keep it on the shelves. Today, the smart, independent heroines who once saved the day under their own steam have undergone a makeover and emerged as female protagonists in post-apocalyptic dystopias. While the worlds are fictional, authors typically place them within recognizable locations that have been made alien through the imposition of a corrupt regime. This genre is unique because it weaves cautionary tales about the potential sociopolitical consequences of the world in which we live, and research indicates that adolescents use these stories to learn strategies for mitigating problems based on the ways that their favorite characters handle stressful situations. Although the novels are fictional, it is problematic for authors to position female dystopian protagonists as role models because of the way that young readers see these relationships as normalized and empowering. Using the novels The Hunger Games, Divergent, Delerium, Pure, Matched, and Uglies, I will demonstrate that female dystopian protagonists are bound by heteronormative constraints that reward women for being nurturing and punish them for being aggressive, thereby undermining their overall efficacy as protagonists. Authors who construct their heroines in this manner run the risk of teaching adolescents anachronistic lessons about what it means to be a strong woman. Because of this construction, it is important to illuminate the dearth of gender equity, diversity, and homosexuality in these futuristic worlds and the significance of this absence to a modern readership.

Keywords: Dystopian, Young Adult Fiction, Female Protagonists

Helping Up, Instead of Holding Down
Lecker, Derrick
Faculty Mentor(s): Anne Cubilie, Douglas Honors College; Matthew Altman, Philosophy and Religious Studies

Oral Presentation, Session #44
3:20-3:40 p.m. in Room 301

I will argue my thesis by first pointing out the similar problems experienced by past approaches that have been used to address insecurity and violence. These past strategies have been used in both foreign and domestic arenas, which have costed an unprecedented amount of money. However, the enormity of the budgets behind these approaches, like that of national defense, has not resulted in a comparable amount of success. When these heavy handed approaches have been implemented domestically, such as in America’s inner-cities, and abroad, in places like the Middle East, success has been questionable. I will argue that previous strategies success has been especially lacking when compared against the success of programs and policies where providing opportunity is the emphasis. In this paper, I will propose that the key to effectively addressing crime and violence is to manipulate foreign policy based on proven successes, while avoiding the failures of the past.

Keywords: Opportunity, Effectiveness, Poverty
Comparison of the United States and Morocco Using Hofstede’s Cultural Dimensions
Leshley, Lauren; Jacobson, Staci
Faculty Mentor(s): Nadene Vevea, Communication

Poster Presentation Session #3, Poster #54
2:30-5:00 p.m. in Ballroom C/D

This poster outlines the cultural differences between Arabic and American cultures based on Hofstede’s Cultural Dimensions. The poster examines four of the dimensions of Hofstede’s research – Individualism vs. Collectivism, Masculinity vs. Femininity, Uncertainty Avoidance and Power Distance (The Hofstede Center). Each country in the world scores differently on each of these scales, resulting in a unique combination that defines that nation’s culture. For instance, America is the most individualistic country, and self-sufficiency is among its values. Morocco, on the other hand is more collectivistic and values togetherness. In our research, we compare and contrast each country’s scores and determine what this means for individuals from each culture who interact with each other. While the focus of our poster contains Hofstede’s findings, it also includes differences and similarities in religion, family customs, relationships, and daily communication processes between the two cultures.

Keywords: Cultural Dimensions, Morocco, United States

Results from the Continued Lithic Analysis of the Sunrise Ridge Borrow Pit Site (45PI408), Mt. Rainer National Park, Washington
Lewis, Patrick; Davis, David; McCutcheon, Patrick
Faculty Mentor(s): Patrick McCutcheon, Anthropology and Museum Studies

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

Prior research on the Sunrise Ridge Borrow Pit Site artifact assemblage has shown significant intra-site variation in stone tool manufacture and use. These findings were in some ways contrary to the expectations found within theoretical models of prehistoric land use at Mt. Rainier. Unfortunately, many of the previous investigations were limited by small sample sizes and the inability to determine if subtle differences were meaningful. Our research places an emphasis on using an evolutionary archaeological framework to combine previously analyzed collections, determine if there is evidence of change through time or across space, and attempts to identify selective conditions under which stone tools were made and used. Recent large scale excavations have increased sample sizes (+2,328 artifacts ≥ ¼”) and the subsequent lithic analysis has continued to assess intra-site variation. It appears as though lithic industries are relatively consistent through time, with some variation in heavy use areas of site. Including a shift away from non-local raw materials as well as variability in environmental conditions. Typically, curated technologies, which require more preparation than expedient technologies, are represented in the lithic assemblage. This is likely a consequence of the harsh environmental conditions at Mt. Rainier rather than any particular settlement and subsistence systems taking place at lower elevations. Additional evidence of the past environmental conditions that may have altered stone tool use in the Mt. Rainier area include increased fire frequency and the absence of gastroliths, or avian gizzard stones, in recent archaeological components.

Keywords: Lithics, Archaeology, 45PI408,
**Epistemology through Buddhist Poetry: A Real Challenge to Western Thought**  
**Littman, Sarah**  
*Faculty Mentor(s): Jeffery Dippmann, Philosophy and Religious Studies*

Oral Presentation, Session #24  
11:40-12:00 p.m. in Room 271

While the Eastern and Western philosophical traditions are often perceived to be at odds with one another, by and large this is a result of a difference in approach and focus. Case in point, within George Lakoff and Mark Johnson’s text, *Philosophy in the Flesh*, they challenge often overlooked assumptions within epistemology through argument and empirical data. They make the case that, much like the regulation of the heart or lungs, the mechanisms behind thought take place unconsciously. If true, this would imply that we cannot recognize the way we form our thoughts or use language. That is why the full title of their text is actually, *Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought*. However, there is a certain irony to this title, as it claims to challenge Western thought while remaining very much within its tradition. In the Eastern philosophical perception, introspection is the focus. Especially in the case of Chinese Buddhism, mental reflection, control, and cultivation are all essential for progression. Though it is far from a simple task, the monks and nuns of Chinese Buddhism claim that with diligence, anyone may gain awareness of their cognitive processes. In particular, poetry from Buddhist masters acknowledges their form and use of language, but then encourages us to move beyond the illusion. Granted, in almost every case the corporeal human perception is inescapable, Chinese Buddhists serve as proof that, in reality, human beings can transcend our natural cognitive tendencies through diligence and strict self-discipline.

*Keywords: Epistemology, Chinese Buddhism, Poetry*

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**“Feast Your Eyes” Performance in American Sign Language**  
**Loudenback, Jer**  
*Faculty Mentor(s): Jer Loudenback, World Languages*

Creative Expression Presentation, Session #16  
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 CWU. Group project presentations by second year students will include “The Story of Ferdinand”, 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*
Microhabitat Use and Thermal Ecology of Termites In a Tropical Dry Forest of Jalisco, Mexico

Loughran, Caleb; Rayburn, Micah; Parker, Brad

Faculty Mentor(s): Daniel Beck, Biological Sciences

Poster Presentation Session #1, Poster #33
8:30-11:00 a.m. in Ballroom C/D

Termites are among the most abundant and important organisms in tropical dry forests. These insects are subject to extreme daily temperature fluctuations. At our study site in Chamela, Jalisco, the arboreal genus *Nasutitermes* compensates for this by constructing large, thermally-stable termitaria. However, temperatures within the extensive trail networks that these termites construct on trees throughout the forest are largely unknown. We investigated patterns of distribution of these trails with regards to exposure to sun and their internal thermal environment. We recorded various trail traits (size, host tree type, sun exposure, etc.) of 74 trails on 74 trees. In addition, we used dataloggers to record internal and external temperatures of 12 termite trails over 24 hour periods. The majority of trails (>40 percent) appeared on trees of moderate bark roughness, while relatively few (<10 percent) were on smooth-barked trees. Interior trail temperatures were strongly insulated from external temperatures. Daytime internal temperatures tended to be cooler and less variable than external temperatures. Differences between the internal and external trail temperatures ranged from 0°C to >5°C, and tended to vary with tree type and exposure to solar radiation. Internal and external trail temperatures tended to equilibrate at night, however, in some cases internal trail temperatures were warmer at night than the external temperature. Our results suggest that termites are choosy in where they place their trails in the forest, and that the striking effect that the trails can have on the internal thermal environment underscores their importance for termite thermoregulation.

*Keywords*: Termite Trail, Temperature, Thermal Biology, Chamela, Jalisco

Se puede, y se debe: Educating Heritage Students

Luna, Itzia; Pinto, Edward; Meza, Isaac

Faculty Mentor(s): Alejandro Lee, World Languages

Oral Presentation, Session #27:10-1:30 in Room 135

My presentation will introduce the key terminology to heritage language education: heritage language, heritage language learner and speaker, and heritage culture. Second, I will explain the significance of the three types of bilingualism (receptive, sequential, and simultaneous) and how they inform curriculum design for K-12 students. Third, I will address the need to separate heritage learners from L2 students. Lastly, I will give details of the different forms of assessments and the disadvantages that may arise from them.

*Keywords*: Heritage, Language, Spanish
Decreasing Smoking Frequency

Lynch, Andee

Faculty Mentor(s): Shu-Fei Tsai, Language, Literacy, and Special Education

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

The purpose of the behavior study was to decrease smoking frequency in a single subject. Data were collected to determine if changes in the dependent variable were caused from the independent variable or confounding influences. In addition, the researcher wanted to replace the undesired behavior of smoking with a new behavior of exercising. The intervention was to decrease the participant’s smoking frequency to less than three cigarettes per weekday after he arrived home from work. The intervention also included the replacement of smoking behavior with thirty minutes of physical activity each day to help create new habits in the participant. ABAB reversal design was used to implement the intervention. The participant was a twenty-nine-year-old male with a fifteen-year smoking history. Permanent product recording was used to collect data on the participants smoking frequency after arriving home from work during the weekday. Confidentiality was maintained by changing the participants name and data were kept in a secure and private location.

Keywords: Behavior, Intervention, Frequency

DM Card Storage Innovations

MacAdam, David

Faculty Mentor(s): Dwayne Douglas, Information Technology and Administrative Management

Oral Presentation, Session #7
10:30-11:00 a.m. in Room 301

DM Card Storage Innovations will offer a unique and yet unseen product for the collectible card market. Our mission is to give card collectors high-quality and affordable tools to more effectively store their collections through innovation. The company will launch with a base three product line, with more in the works, designed around the different budgets and needs of our customers. There is no company currently offering a product like the one we will deliver. Other card protection systems use cardboard or cheap plastic printed with licensed art. We intend to offer unprecedented value to the customer by offering products at similar prices, but higher quality. Current estimates for the most popular collectible card game place it at roughly six million registered players. This number doesn’t even begin to approach the number of unregistered players, as well as the number of other hobbies people collect cards for. This market is established and ready for what we plan to bring, not to mention the fact that anyone who collects cards will most likely need more than one of the products we plan to offer. Also, since we will be offering a product at a similar price point but with exponentially higher value than that of what currently exists, we stand to gain an above average increase in demand upon launch. By utilizing our price strategy of slightly dipping into base profit per unit while relying on high quality components and the increased value to the customer, we expect massive profit gains.
Perceived Parental Support and Academic Outcomes in College Students

Mailhot, Brittney

Faculty Mentor(s): Sarah Feeney, Family Studies

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

The relationship between perceived parental emotional and financial support, and the academic success of college students was studied. It was hypothesized that parental emotional support would be positively correlated with academic outcomes, while financial support would be negatively correlated with academic outcomes. The sample consisted of 317 currently enrolled college students. Results showed that parental emotional support was positively associated with academic orientation but not GPA. Parental financial support was not significantly associated with either academic orientation or GPA. Using a different measure of financial support, we found a negative correlation between financial support and GPA.

Keywords: Parental Support, Academic Outcomes, College Students

Poincare Doughnuts: An Investigation of Non-Euclidean Orthogonal Circles in Euclidean Space

Mailhot, Daniel

Faculty Mentor(s): Dominic Klyve, Mathematics

Oral Presentation, Session #5
8:50-9:10 a.m. in Room 202

Finding new and interesting characterizations of familiar mathematical concepts appeals to a wide audience, even those who would never consider themselves to be mathematicians. This investigation takes a specific case of the Poincare hyperbolic disk, and looks at it through the lens of Euclidean geometry. When two circles are orthogonal, they intersect at right angles. Considering a given circle O, and the set of all circles orthogonal to and with the same radii as O, a new set of concentric circles become apparent. By looking at the properties and relationships of these new circles, in the Euclidean plane, unique and interesting relationships can be found. Namely, this set of orthogonal circles illustrates, both visually and mathematically, trigonometric values for the otherwise unassuming angle measure of 22.5 degrees. Whereas finding trigonometric values for this angle measure would usually require the use of the half angle formula, this set of orthogonal circles serves to not only readily produce those values, but also provide simple and elegant visual representations of foundational trigonometric identities.

Keywords: Mathematics, Orthogonal, Trigonometry
Analysis of Daily Activity Times for the American Pika (*Ochotona princeps*) in the Eastern Cascades of Washington

Marquis, Amanda  
*Faculty Mentor(s): Kristina Ernest, Biological Sciences*

Oral Presentation, Session #39  
2:40-3:00 p.m. in Room 137B

American pikas are small mammals related to rabbits. They are often described as being diurnal (active during the day), with peak activity times in the morning and evening. We explored the daily activity times of pikas by analyzing a previously collected set of images from motion-activated cameras. As part of another study, two cameras were set in the field for several weeks in summer 2011 and 2012 to detect pika movement. Each image had a time stamp when it was taken. We combined the data from all the dates that cameras were in the field, then counted the number of pika images taken in hourly intervals for the 24-hour cycle. Since motion-sensitive cameras take repeated images if an animal triggers them, we only used images that were at least 10 minutes apart. We analyzed the time of 57 different images, representing above-ground activity of one to three pikas. The pikas at this location were most active in the mid-morning hours, and again late evening. They showed another spike of activity around midnight. The peak in activity at mid-morning and late evening hours is consistent with previous studies of pikas. What was surprising was the midnight activity, and that we detected some activity at almost all hours of the day and night. Knowing when pikas are most active will be useful for climate change studies, because pikas are sensitive to hot weather and would be expected to change their activity patterns in response to warmer climates.

*Keywords: Mammals, Behavior, Pika*

*Fernandez v. California*

Marri, Tanya  
*Faculty Mentor(s): Teresa Divine, Law and Justice*

Oral Presentation, Session #10  
10:20-10:40 a.m. in Room 137A

The Fourth Amendment of the Constitution of the United States ensures protection from unreasonable search and seizure. Over the years, there have been several exceptions which proved possible the warrantless searches of homes. One of the most important exceptions to the rule is the consent search authorized by a co-tenant. There has been one substantial case dealing with the issue of co-tenant authority for a reasonable search. In *Georgia v. Randolph* (2006), the Supreme Court ruled that an officer cannot rely on a co-tenant’s consent when an opposing party is present and objecting. In *Fernandez v. California*, officers detained a defendant for domestic violence, assault, and robbery. Later, the police showed up at the defendant’s apartment and received oral and written consent for a search of the home from a co-tenant. *Fernandez v. California* deals with an event in which a co-tenant consents to a search when the original objector to the search is not on the premises. In 2014, a decision by the Supreme Court was made on *Fernandez v. California* stating that *Georgia v. Randolph* did not extend the objection to the search beyond the objector’s presence. This paper will analyze the impact and implication of co-tenant consent on criminal justice and delve into the Supreme Court’s decisions regarding co-tenant consent as an insight into *Fernandez v. California*.

*Keywords: Search, Seizure, Warrantless*
Lean Construction Games in the Classroom
Martin, David; Plugge, Warren
Faculty Mentor(s): David Martin, Engineering Technologies, Safety, and Construction

Oral Presentation, Session #32
1:30-1:50 p.m. in Room 202

Lean Construction is a recently developed construction project delivery approach that was adopted from Toyota. Its primary tenets are to streamline the production process and eliminate waste. Students in an undergraduate construction management program learn about and participate in Lean Construction exercises through classroom lectures, active learning, and an industry-led workshop. This paper continues the research that began in the winter quarter of 2013 and presents additional findings acquired during the winter 2014 quarter. The same three classroom games that students played to learn some basic Lean Construction fundamentals are continued in this paper to a new group of students. Learning outcome assessments were performed and the results are presented and compared with the previous results from the winter 2013 quarter.

Keywords: Lean Construction, Active Learning

An Evaluation of Fish Passage Through Small Urban Streams in Central Washington
Martin, Kelsey; Green, Ethan; Herdmann, Jennifer
Faculty Mentor(s): Paul James, Biological Sciences

Oral Presentation, Session #39
3:20-3:40 p.m. in Room 137B

A study was conducted to assess fish passage through culverts and buried sections of two urban streams in Ellensburg, Washington. Both streams, Mercer Creek and Wilson Creek, had historically supported anadromous populations of steelhead and coho salmon, but both are now locally extirpated. In July 2012, 6024 PIT tagged juvenile coho salmon (Oncorhynchus kisutch) were released at four different sites in the two streams. Release sites were located upstream and downstream of the majority of covered sections in each stream. Several sites were sampled throughout the city in 2012-13 using a backpack electrofisher and a mobile PIT tag antenna to determine if upstream or downstream movement that had occurred. Results showed that both upstream and downstream movement occurred, with some fish being detected at dams on the mainstem Columbia River. While some of the released fish successfully out-migrated past several culverts, sampling efforts revealed that some sections within the city were impassable and may pose problems for reintroduction efforts. More research is needed to determine the condition of the impassable stream channels that are buried beneath the city.

Keywords: Coho Salmon, Urban Streams, Reintroduction
Water Quality Fluctuations and Macro-invertebrate Diversity within Intertidal Rock Pools, Jalisco, Mexico

Martin, Kelsey; Cross, Sidney; Brombach, Annalisa

Faculty Mentor(s): Daniel Beck, Biological Sciences

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

Tide pools that form along rocky coasts provide opportunities for investigating the interplay between the physical and biotic environments in these distinct, easily definable microhabitats. These rock pools are inundated by the ocean most of the time; however, the time they spend isolated and exposed can impose sharp variations in the abiotic factors for each tide pool microhabitat and can in turn affect the organisms that live in them. The tide pools included in this study were located near Chamela in Jalisco, Mexico on the Careyitos beach (19.437, -105.027). Tropical locations such as this receive considerable solar radiation, which can increase the diurnal temperature and salinity fluctuations within the tide pools. Seventeen tide pools of various sizes and elevations were selected for this study. Using the Shannon-Weiner biodiversity index, we determined species richness and evenness within each pool. Relative elevation was measured for each pool, and salinity and temperature were recorded with a YSI model 85 probe every 45 minutes for a 10 hour period. After the pools became shaded, temperature began to decline while salinity continued to increase. Cross-referencing the biodiversity against the water-quality data provides an indication of how well macro-invertebrates survive with various levels of disturbance (i.e., exposure). Our results suggest that those tide pools that were moderately exposed (i.e., intermediate) showed the greatest species diversity, a trend consistent with the intermediate disturbance hypothesis.

Keywords: Tide Pools, Biodiversity, Water Quality

Sherlock Holmes: A Radio Drama with Foley
Martinez, Avril

Faculty Mentor(s): Jason Tucholke, Theatre

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

I will presenting my sound design from CWU’s radio show drama Sherlock Holmes. For this presentation I will talk about the process of how I designed the show based on inspirations and influences and how they affected the creation of my design concept. In my presentation of my work, I will present the cue sheets that I had created to run the show and some of the recordings I made as well as some screen shots of how I mixed the sounds in Audacity. Then, I will present my stage book and speak about how I set up the stage for the live sound effects. I will talk about what was used to create my sounds on stage and how it correlates with what it was like in the 1940’s radio dramas. I will speak also about how I managed to do it all without using any money from the budget and with scraps found in different parts of the department.
Building a Natural Trumpet

Martinson, Sarah
Faculty Mentor(s): John Harbaugh, Music

Oral Presentation, Session #45
2:40-3:00 p.m. in Ballroom A

The natural trumpet is a baroque era ancestor of the modern trumpet. Without valves or other technical means to change notes, this seamless, single piped instrument uses only the performer’s embouchure to accurately control pitches. Using the harmonic series, the natural trumpet has the capability of producing a limited number of tones. Understanding the historical construction and evolution of the trumpet is essential for all trumpet performers and brass musicians. Confusion and struggles can easily occur in musicians who do not fully understand the basic physical properties of their instruments. This presentation focuses on the building techniques and the construction process of the natural trumpet as taught at the Natural Trumpet Making Workshop in Bloomington, Indiana. Sponsored by the C. Farrell Fine Arts & Research Scholarship, the one-week construction workshop of the natural trumpet stemmed from traditional historic building practices from 17th century Nuremburg, Germany. The presentation will cover the steps of hand constructing a natural trumpet, a brief historical background of the instrument, and a presentation of the hand-built trumpet created at the workshop.

Keywords: Farrell, Trumpet, Metalsmithing

The Morning After: Oral Contraceptive Effects on MCF-7 Breast Cancer Growth Rate and Morphology

Marzano, Jami; Waters, Kaitlin; Heyano, Mindy; Clark, Jane; Johnson, Samantha
Faculty Mentor(s): Ian Quitadamo, Biological Sciences

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

Oral contraceptives have empowered women globally and provided reproductive choice. Research indicates that over 60 percent of sexually-active women in the US alone use some form of oral contraceptive. When making a choice, many women balance the freedom that contraceptives provide with potential biological consequences. This study investigated the effects of three oral contraceptives and determined their quantitative impact on MCF-7 human breast cancer proliferation rate and cellular morphology. Results showed that the combination pill (estrogen and progesterone) showed the least, mini pill (estrogen) showed the most, and plan B (progesterone) showed intermediate cancer growth rates. Morphological changes occurred between control and oral contraceptive-treated MCF-7 cells but fewer structural differences were observed across all three experimental conditions. Based on our results, we conclude that oral contraceptives with higher estrogen levels produce higher growth rates in MCF-7 human breast cancer cells. We recommend that women considering oral contraception should carefully weigh the benefits against potential risks associated with using this form of birth control.

Keywords: Breast Cancer, Contraceptives, Freedom of Choice
Wine Tourism Best Practices
Masberg, Barbara
Faculty Mentor(s): Barbara Masberg, Recreation and Tourism

Oral Presentation, Session #51
5:10-5:30 p.m. in Room 202

Wine tourism has been described as visitation to vineyards, wineries, and wine festivals to taste wine and experience the attributes of the wine region. However, the basic premise of wine tourism is providing other amenities, events, activities, and facilities to attract visitors for more than just wine tasting. Various development and destination marketing organizations pursue complementary business development (i.e., lodging, restaurants, retail, and recreation) and seek ways to diversify the activities of the area (i.e., trails, rafting, or golf) attracting more visitors. The purpose of this presentation is to introduce the concept of wine tourism and provide best practices. This would be an introduction to the concept to be followed by specific examples.

Keywords: Wine Tourism, Attributes

Remote Environmental Monitoring System for Sustainable Water Management of Hay Production in Washington State
McClure, Jen
Faculty Mentor(s): Timothy Sorey, Chemistry

Poster Presentation Session #1, Poster #12
8:30-11:00 a.m. in Ballroom C/D

Washington farmers are faced with pressing concern of water management. Washington State depends on high economic value crop exports, such as timothy and alfalfa hay. As the snowpack declines in the cascades, Yakima River Basin farmers must efficiently irrigate their fields using very little water. Washington hay fields use surface and sprinkler irrigation. Studies have shown that sprinkler irrigation uses less water compared to surface irrigation. No study has been performed evaluating the specific quantity of the water and the quality of the water flowing to and from the hayfield. The research proposed is designed to test irrigation water Kittitas County. Specifically, this portion of the project will incorporate a microprocessor interfacing with several sensors to analyze quality of irrigation water so that timothy and alfalfa farmers in Washington State can make informed decisions about water management plan to maximize the quality and quantity of hay product.

Keywords: Agricultural Chemistry, Programming, Irrigation
Evaluation of the Toxicity to Mammalian Cells of Plant Extracts with Anthelminthic Activity

McCornack, Jocelyn

Faculty Mentor(s): Blaise Dondji, Biological Sciences

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

Hookworm infection is one of the most common and important tropical diseases in the world, affecting over 700 million people within impoverished areas worldwide. Frequent deworming with benzimidazoles is the current treatment. However, this method has begun to show resistance, rendering it necessary to develop new treatments. Despite the need, research and production has been essentially neglected for the past three decades because drug development for impoverished areas provides little commercial gain. Within Dr. Blaise Dondji’s lab and in collaboration with Dr. Gil Belofsky, the plants Dalea ornata and Oemleria cerasiformis have already shown in vitro activity against hookworm, but their toxicity remains to be tested. My current plan will be to test the toxicity of the plants to mammalian cells because they must demonstrate their safety before in vivo testing. Safety will be assessed by measuring the death and efficiency of cell division using C2C12 mouse myoblasts and hamster spleen cells.

Keywords: Hookworm, Treatments, Toxicity

Trypanosoma cruzi Recombinant Protein Expression in Escherichia coli

McDonald, Jay

Faculty Mentor(s): Gabrielle Stryker, Biological Sciences

Poster Presentation Session #1, Poster #24
8:30-11:00 a.m. in Ballroom C/D

Chagas disease, or American Trypanosomiasis, is a parasitic disease found throughout Central and South America. It is caused by the single-celled parasite, Trypanosoma cruzi, and transmitted by Triatominae, or kissing bug, a large blood-sucking insect that is often found in rural adobe homes. Trypanosomes have a unique structure, the paraflagellar rod (PFR), which runs along the length of the flagellum. The PFR is composed of a lattice of cytoskeletal filaments and is critical for cell motility. The proteins of the PFR in T. cruzi have been shown to be immunogenic, protecting mice from an otherwise lethal challenge with the parasite. Two previously unidentified PFR-like genes, PFR-5 and PFR-6, were discovered when the T. cruzi genome was sequenced. The aim of this project was to determine if these two putative PFR proteins are associated with the flagellum. Portions of the PFR-5 and PFR-6 genes have been cloned into expression plasmids. These plasmids are expressed in Escherichia coli to produce recombinant proteins which would be harvested, purified, and injected into mice to generate PFR-specific antibodies. Unfortunately, no recombinant protein was detected in the E. coli cultures. Further research will require the recloning of the PFR-genes to obtain recombinant E. coli.

Keywords: Chagas Disease, Paraflagellar Rod, Vaccine Potential
Spam Filtration Using Massively Parallel kNN in CUDA
McElroy, Patrick; Smithrud, Joshua
Faculty Mentor(s): Razvan Andonie, Computer Science

Oral Presentation, Session #12
10:00-10:20 a.m. in Room 140

Spam-classification is a fundamental, unseen element of everyday life. Unconsciously, every email-user relies on spam-classification/filtration systems to properly remove the unwanted, while leaving the desired without requiring user-input. As email systems become more robust, and email communication becomes more prolific, it becomes necessary for spam-classification systems to continue to run accurately and efficiently, while remaining all but invisible to the user. This presentation details our massively parallel implementation of spam-classification using the k-Nearest Neighbors (kNN) algorithm on NVIDIA GPUs using CUDA. The kNN algorithm is a classification algorithm that operates as follows: given a dataset of points (training set) with known attributes and known classification, a point with known attributes but unknown classification is classified based on a weighted average of its most similar points among the training set. The algorithm can be broken down into three phases: the distance calculation phase, the sorting phase, and the classification phase. Of the three phases, the sorting phase is the most complex and computationally demanding. As such, our primary goal has been to optimize this aspect in particular. Utilizing the computational abilities of GPUs, we have developed an implementation that greatly improves the performance of the algorithm by using a massively parallel reduction for the sorting phase. The experimental results of our spam filtration system have demonstrated that our implementation is efficient and highly scalable. As such, we believe that it proves to be a feasible solution to the growing demands of spam-classification systems.

Keywords: Spam, CUDA, kNN,

Resolving Gnetum Evolutionary History
McFadden, Angela
Faculty Mentor(s): Linda Raubeson, Biological Sciences

Oral Presentation, Session #20
12:40-1:00 p.m. in Room 137B

Gnetums are non-flowering seed plants of the tropics. This group of about 30 species has long been fascinating to botanists because it shares some distinctive morphological characteristics with flowering plants. Both the relationships of the group to other seed plants and the relationships of the Gnetum species to one another are poorly understood. With that in mind, we focused our work on using molecular techniques to generate a phylogenetic tree for the genus Gnetum. We created libraries of total genomic DNA, used the libraries to produce millions of 101 base-pair single end sequencing reads using Illumina technology, and then used bioinformatics to identify and assemble the chloroplast genome. Thus far, we have assembled the chloroplast genomes for 10 species of Gnetum. The resulting data set, composed of 77,567 shared nucleotide positions, was analyzed using Maximum Parsimony and Maximum Likelihood models. In both of these models, the confidence level for most nodes is very high, and the trees show clades consistent with biogeography, New World Taxa separate from Old World Taxa. In the future, we would like to add additional species to our current model to further elucidate the relationships and evolutionary history of this genus.

Keywords: Phylogeny, Biogeography, Chloroplast Genome
One Spark! Start an Idea, Not Fires!
McKinnon, Kimberly; Sandy, Elizabeth; Webber, Jonathan; Walton, Anneka; McKinnon, Camilla
Faculty Mentor(s): Christine McKinnon, Chief Joseph Middle School; Lori Sandy, Chief Joseph Middle School

First Lego League, Constructed Objects Demonstration
Demonstrations between 11:40-1:00 and 1:10-2:30 in the SURC Pit

The problem we tackled was wildfires caused by hot catalytic converters. We met with nine experts to research our problem. Our solution uses ceramic insulation sandwiched between two pieces of metal. Our analysis shows that other covers are expensive, hard to make and don’t work to keep the temperature under 450°F, the temperature at which grass ignites to start wildfires. Our solution is innovative in its application – every other catalytic cover is metal only. It uses a layer of insulation and is easily made and applied by many mechanics for under $50. We shared our solution with CH2MHill engineers at their safety meeting, at the Mid-Columbia Science Fair, and with our local mechanics. One Spark! Start an Idea. Not fires.

Keywords: Wildfire prevention, Ceramic, Catalytic converters

Far-Infrared Laser Emissions from Optically Pumped Methanol
McKnight, Mark; Penoyar, Patrick; Pruett, Matthew; Palmquist, Nathan; Ifland, Sumaya
Faculty Mentor(s): Mike Jackson, Physics

Oral Presentation, Session #21
12:00-12:20 p.m. in Room 140

The invention of the LASER (an acronym for Light Amplification by Stimulated Emission of Radiation) in 1960 came with no specific application in mind. Initially, some critics dubbed it “the solution in search of a problem.” It was only after the laser was invented that scientists and entrepreneurs found the laser’s real potential and created enormous amounts of applications spanning from technology used in everyday life to medical and defensive applications. At Central Washington University, an optically pumped molecular laser system is used to search for new sources of far-infrared radiation. The far-infrared region is loosely defined as light having wavelengths ranging from about 0.030 to 2.000 mm. With this experimental system, 71 far-infrared laser emissions were discovered using the methanol isotopologues $^{13}$CHD$_2$OH, CH$_3$$_{18}$OH, CHD$_2$OH, and CHD$_2$OH as the lasing medium. Additionally, several of these newly discovered laser emissions have been used to support the spectroscopic assignments of laser transitions previously proposed by other researchers. This presentation will outline the experimental system and method used in the search for new sources of far-infrared laser radiation along with a brief discussion of the experimental results and their role in performing spectroscopic assignments of molecular transitions.

Keywords: Laser, Far-Infrared, Spectroscopy
Non-School Activities and the Hispanic/White Achievement Gap

Medina, Darla Davey

Faculty Mentor(s): Michael Mucahly, Sociology

Oral Presentation, Session #19
11:40-12:00 p.m. in Room 137A

This research returns to the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K) to study the inequalities in educational achievement. The majority of research on stratification in early childhood education and cognitive development has focused on race and social class as predictors of educational development. A plethora of research has been devoted to the educational stratification that exists between Black and white children. A look at Hispanic high school students have been included in recent research, though their inclusion in early cognitive development studies remains largely ignored. This research seeks to ascertain whether the well-documented patterns of educational stratification between Hispanics and white students at the secondary school level, actually gains its foothold in the first few years of formal schooling. I focus on the cognitive development of Hispanic and white children as they begin their formal learning in kindergarten through the completion of the first grade. I test three possible explanatory variables that are specific to the Hispanic community: nativity, assimilation, and first language spoken at home. I also address the impact that non-school factors have on the cognitive development of Hispanic and white children. If schools help to level the playing field for its students, then what happens to the children when they are away from the equalizing impact of the school? Hispanics are the fastest growing minority in our country right now, yet have received insufficient attention in research on inequalities in early childhood learning. This article addresses this gap in the literature on cognitive development.

Keywords: Hispanic, Education, Stratification

Measurement of Far-Infrared Laser Frequencies

Mehl, Patrick

Faculty Mentor(s): Mike Jackson, Physics

Oral Presentation, Session #21
12:40-1:00 p.m. in Room 140

Optically pumped molecular lasers have been used to generate thousands of laser emissions in the far-infrared region. These laser emissions can be used in a variety of applications, from terahertz imaging to conducting diagnostics on tokamak plasmas. To date, their primary use has been as frequency standards in high-resolution spectroscopic investigations into stable molecules and free radicals. For these laser emissions to be useful as reference standards in the far-infrared region, their wavelengths and frequencies need to be accurately determined. Most measurements of far-infrared wavelengths can be readily conducted to a fractional uncertainty on the order of a few parts in one thousand, about a factor of 1000 less than necessary for high-resolution investigations. The alternative is to measure the frequencies of these laser emissions which can be conducted with a fractional uncertainty on the order of a few parts in ten million. In this presentation, an overview of the three-laser heterodyne frequency measurement system will be presented along with some of the frequencies that have recently been measured with this system.

Keywords: Frequency, Laser, Beat
The Russian Paradox: Kropotkin’s Influence on International Eugenics

Melton, Joseph

Faculty Mentor(s): Roxanne Easley, History

Oral Presentation, Session #15
10:20-10:40 a.m. in Room 271

My research examines the divergent paths of eugenics as demonstrated by the speeches at the First International Eugenics Congress in London in 1912. I specifically target the intersection of the oppressive science and anarchism by unpacking Peter Kropotkin’s speech, “The Sterilization of the Unfit.” In my presentation I intend to draw comparisons between Russia’s desire to improve infrastructure and social welfare and the West’s insistence on sterilizing degenerates. I examine language that suggests that eugenics was all or nothing. This is evidenced by Russia’s inability to provide an alternative to sterilization that could effectively inhibit the growth of existing degeneration without further oppressing the lower class, which according to Kropotkin, was the catalyst for degeneration.

Se puede y se debe: Educating Heritage Students

Meza, Isaac; Luna, Itzia; Pinto, Edward

Faculty Mentor(s): Alejandro Lee, World Languages

Oral Presentation, Session #27
1:30-1:50 in Room 135

There are many challenges in teaching heritage language learners because of the different levels of linguistic proficiency, cultural competence and identity. In the case of Spanish heritage speakers in the Central Washington region, most of them share a common background: their families come from rural areas in Mexico, and therefore, speak a Spanish vernacular that stigmatizes them. While some critics argue that it is important to teach a formal variety of Spanish and improve students’ writing skills, Kim Potowski (2002) contends that error correction should not be the framework. It would be more beneficial if heritage language teachers expanded their knowledge of Spanish vernacular to account for the fact that their students have a unique way of speaking, rather than dismissing such traditionally stigmatized forms of colloquial speech.

Keywords: Heritage, Language, Spanish

Free Speech, Critical Thinking and Anti-Communism on a College Campus

Miller, Scott

Faculty Mentor(s): Daniel Herman, History

Oral Presentation, Session #6
9:10-9:30 a.m. in Room 271

This examination uses the reactions of students and the public to the event known as the Gus Hall Affair on the Central Washington State College campus to define the competing discourses of free speech and anti-communism in the 1960s. In addition, the examination shows that campus free speech movements across the United States in the 1960s started at a grassroots level before the more well-known protests of the decade.

Keywords: Free-Speech, Critical-Thinking, Anti-Communism
Rethinking Black Masculinity and Sexuality

Millhouse, Camron
Faculty Mentor(s): Cynthia Coe, Philosophy and Religious Studies

Oral Presentation, Session #43
3:00-3:20 p.m. in Room 271

The commodification and misrepresentation of Black masculinity and sexuality, specifically within American societies, has and continues to lead to a type of dehumanization that is unique to African American males. I contend that this occurs in part due to what I will call sexual alienation. Sexual alienation consists of someone being reduced to an object because their identity is projected into parts or qualities of their body. In order to combat this sexual alienation, patriarchal masculinity must be either become more flexible or be altogether abolished as it is now. In addition to this, the misrepresentation of Black masculinity and sexuality in the media must be combated with images of blackness that accurately reflect the diversity of different classes of Black males. This can be accomplished by synthesizing the efforts of several activists to articulate and demonstrate a less stringent view of what it means to be a Black male in America. In this era, technology is becoming evermore engrained in our lives and as a result it is time to stop merely giving lip service to the power that the media has in shaping our perspectives and our lives. By understanding how media has significantly shaped culture in the past as well as how it continues to do so today, humanity can take a step forward in terms of understanding how we come to have the perceptions that we do.

Keywords: Masculinity, Sexuality, Media

The Effects of Relationship Initiation on Relationship Satisfaction

Montgomery, Lindsay; Logan, Gabriela
Faculty Mentor(s): Sarah Feeney, Family Studies

Poster Presentation Session #3, Poster #36
2:30-5:00 p.m. in Ballroom C/D

This study examined the impact of initiation behaviors on romantic relationships. In an online survey, we asked participants whether they or their partner initiated certain behaviors and conversations within both past and present relationships. We then compared those who reported initiating to those who reported their partner initiated on levels of satisfaction and frequency of payment on dates. In our sample of 147 young adults (ages 18-25), we found that those who said, “I love you” first were more generally satisfied within the relationship. We also found that the partner who initiated contact was more satisfied with the level of emotional support and levels of communication. Those who initiated contact also reported that they paid while on dates more consistently throughout the duration of the relationship as well. The Principle of Least Interest theory states the idea that the person who displays the least care/interest in the relationship is the more powerful partner. Based on this principle, we expected that the non-initiating partner would be more satisfied in the relationship, as that partner would have more power; however, our findings directly contradicted this hypothesis, suggesting a need for refinement of this theoretical framework. Overall, research on relationship initiation is relatively scarce in the field of family science and should be further explored to determine its impact on all aspects of relationship satisfaction.

Keywords: Relationships, Initiation, Satisfaction
**cleave**

**Mooney, Molly**

*Faculty Mentor(s): Katharine Whitcomb, English*

Creative Expression Presentation, Session #1
9:10-9:30 a.m. in Room 135

*cleave* is a lengthy experimental hybrid poem focusing on the dynamics of an abusive relationship. The piece focuses on how the relationship of the speaker to her abusive partner begins, escalates, and briefly on the relationship’s aftermath and ways in which it continues to affect her. The piece is written from a first-person perspective that addresses the speaker’s ex-husband. The project primarily explores themes of interpersonal relationships, sexuality, and identity. (*Editor’s Note: This presentation may contain adult themes, content, or imagery.*)

*Keywords: Violence, Sexuality, Relationships*

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**Epiphany**

**Morrow, Ebonesiah**

*Faculty Mentor(s): Katharine Whitcomb, English; Ian Buviti, McNair Scholar Program*

Creative Expression Presentation, Session #1
8:50-9:10 a.m. in Room 135

The creative writing project being presented is my novel-in-progress, *Epiphany*. *Epiphany* is comprised of a collage of creative writing forms including sonnets, villanelles, sestinas, vignettes, pantoums, and fiction pieces. Inspired by Sandra Cisneros’s *The House on Mango Street*, my novel-in-progress focuses on the evolution of the main character self-identity as she and her peers grow up in Tacoma Washington. This evolution takes place Through Iman, a young Afro-Caribbean American, coping with anxiety while trying to understand her dysfunctional yet unbreakable family; Tiffany, a young African-American portraying the consequence of daughters who are left orphans, growing up in the urban areas of Washington state; the Trill-hood Boyz, a group of young men who seem to be, “a group a womanizers, their actions not violent yet gory, but each and every Trill-hood Boy has a story.” Through these characters and many more, I share experiences and observations that have molded me into the young woman I am today. By the end of the novel, Iman will have a firm belief that words and actions are equally important and powerful. She challenges the meaning of “action speaks louder than words;” and stresses the importance of observation and reflection. At SOURCE, I will, through a PowerPoint presentation, share an overview of *Epiphany*, as well as my journey so far: Reasons for compiling *Epiphany*, the inspiration for my novel, and the process, so far, of creating it. With my audience, I will also share a brief character analysis as well as a few excerpts.

*Keywords: Faith, Observation, Reflection*
I conclude that the early stage of the worker’s revolt and massacre in Santa Marta, Colombia in 1927 is an example of United States’ business imperialism in Colombia. I examined the connection between the United Fruit Company, the Colombian government and the US State Department. My research is helping to answer the question of the level of involvement the United States and the United Fruit Company had in the events surrounding the massacre at Santa Marta, Colombia. There are communications from the embassy in Bogota, Colombia to the US State Department covering the beginning stages of the worker’s revolt, and the response from the Colombia government. These consular reports include discussions from the ambassador, to the US State Department, that the Colombia government has given assurances to protect American interests and the interests of the United Fruit Company. The reports further document that the United States and the United Fruit Company stood to benefit from a Colombian government crackdown on labor. These communications take place from November of 1928 to September of 1929. This paper expands on the ties the Colombia government had with the United States, and the ties between both the United States and the Colombia government with the United Fruit Company.

Keywords: Communist Strike Workers

In this study, I observed how the DMRT1 gene affects Geckos with temperature-dependent sex determination during reptile development. To do this, I observed the rate of transcription of the DMRT1 gene in the Gecko species Gekko japonicus. Pregnant geckos were caught around Nanjing, China. After the females laid their eggs, the eggs were incubated at three different temperature regimes. For each temperature regime geckos were randomly placed in one of four different treatment groups. These groups included dissection at either oviposition, after 1/3 of development, or 2/3rds of development, and a hatching group, which were sexed at 120 days of age. Total RNA was extracted from the dissected embryos. Relative rates of transcription of the DMRT1 gene were assessed using quantitative PCR (qPCR).

Keywords: Temperature-Dependent Sex Determination, DMRT1, Gekko japonicus
**CO₂ Production Using Yeast and Different Brands of Sugar**  
*Murphy, Jennifer; Clark, Carissa; Roberts, Autumn*  
*Faculty Mentor(s): Jennifer Murphy, Selah Junior High School*

Poster Presentation Session #2, Poster #22  
11:30-2:00 p.m. in Ballroom C/D

Ninth-grade students learned that yeast needs water, oxygen, and sugar to produce carbon dioxide. Tests have been done during class to see what ratio of sugar to yeast is needed to create the most carbon dioxide. Using that ratio, students used different brands of sugar to see which one will produce the most carbon dioxide. A comparison of sugar brands and carbon dioxide production is made.

*Keywords: Yeast, Sugar, CO₂*

**Charging an iPod Using Citrus Fruits**  
*Murphy, Jennifer; Beksinski, Casey; Madrid, Dylan; Martinez, Mason*  
*Faculty Mentor(s): Jennifer Murphy, Selah Junior High School*

Poster Presentation Session #2, Poster #23  
11:30-2:00 p.m. in Ballroom C/D

Ninth-grade students learned that in order for electronics to work, electricity has to flow and electricity is charged particles called ions. Using what they know about ions, students picked citrus fruits to conduct electricity and charge an iPod. They tried to answer this question: which citrus fruit will charge an iPod the fastest. A comparison is made between two citrus fruits and their charging times.

*Keywords: Electricity, Charge, Fruit*

**Which Produces More Starch: A Shade Plant or a Sun Plant?**  
*Murphy, Jennifer; Moreno, Maria; Naverrete, Vanessa*  
*Faculty Mentor(s): Jennifer Murphy, Selah Junior High School*

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

Ninth-grade students learned that plants need sunlight to do photosynthesis, which produces starch. Two types of plants have been chosen, a shade and a sun plant. The students placed the plants in their places, sun plant in the sun and shade plant in the shade. They tested every week for the starch content in the leaves of each plant. A comparison is made between the plants and the amount of starch produced.

*Keywords: Plants, Starch, Photosynthesis*
Range Land Policy Impact on Riparian Habitat

Nash, Christopher

Faculty Mentor(s): Rex Wirth, Environmental Studies

Poster Presentation Session #2, Poster #10
11:30-2:00 p.m. in Ballroom C/D

This poster displays how livestock and range land management practices have affected our riparian habitats in Washington State and the United States. Currently, livestock on range land disrupt the other natural ecosystems which coincide with it. These systems (forest and riparian) are becoming altered by the grazing patterns and presence of livestock, which result in stream bank erosion, loss of vital vegetation, and the large amounts of waste produced by livestock, which concurrently is one of the largest categories of non-point source pollution that is deposited into our state’s and nation’s rivers, streams and estuaries. Range land management practices have in large, been unaltered since the days of pioneers and transcendentalism. Newer modern practices should be put into policy which reflect our current scientific knowledge of how the management of these range lands can better coincide with the natural systems that surround them.

Keywords: Policy, Environment, Riparian Habitat, Range Land

Timing and Source of Alkali-Enrichment at Mt. Etna, Sicily Using Clinopyroxene Geobarometry and in situ Sr Isotope Data

Nelson, Kaitlyn; Viccaro, Marco; Bendaña, Sylvana; Wilson, Joshua

Faculty Mentor(s): Wendy Bohrson, Geological Sciences

Poster Presentation Session #1, Poster #42
8:30-11:00 a.m. in Ballroom C/D

Since 1971, Mt. Etna, Europe’s largest and most active volcano, has exhibited increased eruption frequency and explosivity. In association with this increased activity, researchers have documented higher abundances of alkali elements such as potassium and rubidium as well as elevated Sr isotopes ($^{87}$Sr/$^{86}$Sr) in Etnean lavas. The source of this alkali-enrichment has been hotly debated, with end-member hypotheses involving mantle vs. crust. While some researchers favor changes in the character of the mantle source region due to subduction, in situ plagioclase compositional data suggest the mineral crystallizes in the shallow crust (upper 12 km) and Sr isotopic data provide strong evidence for late-stage crustal assimilation as demonstrated by increasing $^{87}$Sr/$^{86}$Sr in magma after plagioclase had begun to grow. To further evaluate the mantle vs. crustal debate, clinopyroxene, which forms at deep and shallow levels within the magma chamber, was targeted for in situ analysis. Compositional and isotopic data were collected for ten samples erupted between 1329 and 2004. The largest, most complexly-zoned clinopyroxene were analyzed for elemental concentration by electron microprobe, and these data were used to calculate pressures of formation for each crystal. Pressures range from deep (~27 km) to upper crust (~6.0-6.6 km). In situ $^{87}$Sr/$^{86}$Sr of clinopyroxene data will be combined with this information to provide a window into the middle to lower crustal dynamics of the Etnean magma storage system, as well as a characterization of mantle and crustal contributions of the recent alkali-enrichment event.

Keywords: Mt. Etna, Volcanology, Eruption
A Geochemical Analyses of Surface Water/Groundwater Interactions near a Proposed Groundwater Recharge Site in Northern Kittitas Valley

*Nenninger, Christopher*

*Faculty Mentor(s): Carey Gazis, Geological Sciences*

Poster Presentation Session #1, Poster #39
8:30-11:00 a.m. in Ballroom C/D

This research project examines the extent of connection between groundwater and surface water near a proposed infiltration pond site in Northern Kittitas Valley. The Yakima River Basin (YRB) is in a situation where all of the surface water rights have been issued. As a result, during low water years, junior water right holders do not get their full allotment of water. In order to address this issue, members of the City, County, State, and Federal Government, as well as representatives from the Yakama Nation, environmental groups, and irrigation districts in the YRB came together in order to formulate a solution, the Yakima River Basin Integrated Water Resource Management Plan. Part of that plan is groundwater storage. The first step is a pilot project where water is diverted during high flow to infiltration ponds around Kittitas Valley and Wapato. This research focuses on using geochemistry to understand surface water/groundwater interaction near a proposed infiltration pond site in eastern Kittitas Valley. To accomplish this, samples are taken from surface and ground water near the site and analyzed for cation, anion, and isotope geochemistry. Anion and cation data for this project is obtained using the Dionex DX 500 Ion Chromatograph in CWU’s Chemistry Department. Stable isotope data for this project is obtained using the Geology Department’s Thermo Finnegan Delta XP Mass Spectrometer. The results of these analyses will be presented and used to determine the source regions of groundwaters and the extent to which they are recharged by nearby surface water.

*Keywords: Groundwater, Geochemistry, Isotopes*

Artificial Selection on an Inducible, Stably Inherited Defensive Trait in Yellow Monkeyflower

*Neuffer, Sam*

*Faculty Mentor(s): Alison Scoville, Biological Sciences*

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

Organisms often respond to environmental challenges by altering their physical traits. Surprisingly, some environmentally-induced traits can be inherited by subsequent generations—a phenomenon known as epigenetic inheritance. *Mimulus guttatus* (Yellow Monkeyflower) exhibits genetic variation in three interrelated traits: baseline production of trichomes (sticky hairs that deter insects), degree to which trichome production increases in response to leaf damage, and epigenetic inheritance of this response. In order to characterize the genetic basis of these three traits, we have produced replicate populations artificially selected for either high baseline trichome production or high response to damage. Preliminary results show a strong response to selection. We plan to sequence DNA from each population in order to identify genomic regions associated with each trait, and to determine to what degree the three traits share a genetic basis. The results will elucidate the relationship between genetic and epigenetic variation in an ecologically significant trait.

*Keywords: Epigenetic Inheritance, Genomic Studies, Artificial Selection*
CatMobile Steering Spindles
Newman, Landon
Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction

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

The Electric Vehicle club has a vehicle that is not yet complete: this fall the vehicle included the carbon fiber body, the steel frame, the rear wheel drive system, steering column, and the front tires. There had not yet been a steering system implemented in order to operate the vehicle, along with many other key components to make the vehicle operational. The objective was to at least make the vehicle a rolling chassis by the end of this academic year which would require a steering system of some sort. A lot of engineering occurred to create a steering system that would function well, be safe, light weight, and simple. First, the wheels are mounted on a spindle which allows them to spin with minimal resistance. Then, a device that would have the spindle mounted to it and have a rotational axis was engineered; it is called the bearing pocket. Finally, a part that would make the bearing pocket and spindle rotate had to be created, this part is called the steering arm. The result of these completed components is a steering system that will operate smoothly through a turn, is lightweight, and is a fairly simple design.

Keywords: Engineering, Manufacturing, Performance

MightyTieton BeerWorks
Newstead, Peter
Faculty Mentor(s): Dwayne Douglas, Information Technology and Administrative Management

Oral Presentation, Session #7
11:00-11:30 a.m. in Room 301

MightyTieton Beerworks will begin as an outreach-brewery and bicycle shop set in the artist community of Tieton, Washington. Tieton’s spectacular setting and proximity to the area’s outdoor activities will complement BeerWorks’ marketing, bringing people in from skiing, hiking, fishing, and cycling to our brewery and tasting room. In addition, we will have a converted Airstream-Mobile-Beer-Delivery-Vehicle (AMBDV) as an outreach and marketing tool, so that we can serve the public at football tailgating functions as well as weddings and private parties. With our adjacent bicycle shop we will bring beer-drinkers and future customers to BeerWorks by sponsoring events that take advantage of both the dry weather and the spectacular terrain. Tieton is set atop an ancient lava flow that serves as a ramp into the high mountains of the Cascades. Its perch provides a cooling breeze during hot Yakima Valley summer days. Its location at the end of the road also provides direct access to wilderness hiking, limitless car-free paved roads for spectacular cycling and direct access to world-class mountain biking as well as being right on the back-route to Yakima from skiing at White Pass. Our craft-brewery will benefit from and complement the community of artisans, urban, and rural designers, and creative events Mighty Tieton already conducts. BeerWorks will join existing producers: an organic goat cheese creamery, a cidery, a winery, a free-range meat farmer and a Mexican bakery to make Tieton just that much more diverse and interesting a destination.
**e-Titrator, a Web-Based Titration Calculator for Chemical Education.**  
*Ngo, Kevin*  
*Faculty Mentor(s): Yingbin Ge, Chemistry*

Oral Presentation, Session #50  
4:30-4:50 p.m. in Room 140

Titration is an analytical chemistry technique commonly used to determine the concentration of an acidic or basic solution. In general and analytical chemistry courses, students are taught about the concept of chemical equilibrium and use this concept to determine the pH of mixed acidic and basic solutions. The pH calculation can be a great challenge for many students because it involves carefully choosing and solving the proper equations under various conditions. As a result, a web-based acid/base titration calculator (dubbed e-Titrator) with a user-friendly interface is created to help students learn these pH calculations. Students may also use the e-Titrator to double check the results of their own work. In the e-Titrator interface, users first enter the concentrations and other relevant information of the titrant and analyte. Then a virtual titration is easily done at the clicks of a “Titrate” button. The e-Titrator not only calculates the pH value of the mixed solutions but also provides a complete titration graph of pH vs. the volume of the titrant. In addition, details of the calculation can be displayed serving as a step-by-step tutorial. A mobile application will be developed in the future for the rapidly increasing number of users with smart phones.

*Keywords: Titration, e-Titrator, pH Calculation*

**Purchasing at Hyatt Regency Danang Resort**  
*Nguyen, Hiep; Nguyen, Tien; Nguyen, Mai*  
*Faculty Mentor(s): Kun Liao, Finance and Supply Chain Management*

Lynnwood Center - Poster Presentation, Poster #2

Hyatt Regency Danang Resort, founded in 2010, is a business in the hospitality field. Hai Chau Beach Tourism Incorporated is the investor owner and Hyatt Hotel Management is the managing owner of the resort. Hyatt was founded with the mission to provide excellent hospitality service to their customers. Besides providing hotel services, they also have restaurants and spas, which require ingredients, materials, and other equipment. The resort needs to purchase these supplies to run smoothly and, thus, they have a lot of suppliers. In this study, we’ll devote our time to learning about Hyatt’s purchasing department, how they select their suppliers to meet the high standards of a five-star resort, and how globalization impacts their purchasing process.

*Keywords: Supply Chain, Purchasing, Supplier Selection, Globalization*
Navarette v. California: Fourth Amendment, Vehicles, and Anonymous Tips
Nguyen, James
Faculty Mentor(s): Mary Ellen Reimund, Law and Justice

Oral Presentation, Session #10
10:00-10:20 a.m. in Room 137A

The case of Navarette v. California is under review by the US Supreme Court. The case involves drunk driving and the Fourth Amendment. The US Constitution allows us to live our everyday lives without fear of having our privacy rights unjustly invaded by government officials. In Navarette, an anonymous citizen tip, without additional corroboration of wrong doing provided the reasonable suspicion for the stop for reckless and drunken driving. After making the stop, police smelled marijuana and upon further investigation found bags of marijuana leading to the arrest of Lorenzo and Jose Navarette on possession, transportation and sale of marijuana. In an earlier case of Florida v. J.L., the court found that an anonymous call without additional corroboration was not be enough to justify the police to do a search of the suspects. The issue before the court now will be whether the Fourth Amendment requires an officer who receives an anonymous tip for drunk or reckless driving to corroborate the wrong doing before making the stop. Will the guidelines for police change depending on the type of crime they are investigating? This presentation will discuss the facts of the case and the implications that the decision would have on the potential erosion of protections under the Fourth Amendment in regard to what constitutes sufficient reasonable suspicion for police to base their investigation of citizens.

Keywords: Fourth Amendment, Vehicle Stops, Reasonable Suspicion

Exposure to the Pesticide Chlordane is Associated with Increased Risk of Metabolic Syndrome
Nikolaus, Cassandra
Faculty Mentor(s): David Gee, Nutrition, Exercise, and Health Science

Oral Presentation, Session #23
12:00-12:20 p.m. in Room 202

A large collection of epidemiological research supports the general association between a variety of persistent organic pollutants and chronic disease states. Specifically, exposure to chlordane, an insecticide banned from use in the United States for more than 30 years has been associated with metabolic syndrome in earlier studies. This study focused on oxychlordane (a metabolite of chlordane) and its relationship with metabolic syndrome and its individual risk factors. This study included 3,465 adults from the National Health and Nutrition Examination Survey (NHANES) 1999-2004, in which anthropometric and biochemical measures of health were compared with the lipid-adjusted serum levels of oxychlordane. Age, gender, and ethnicity-adjusted odds ratios (ORs) for metabolic syndrome across quartiles of oxychlordane concentrations when compared to subjects in the lowest quartile concentration and those with levels below the limits of detection were 1.56 (95 percent CI, 1.04-2.35), 2.16 (1.60-2.93), and 2.92 (2.00-4.27; P<0.01). In addition, adjusted-ORs for abdominal obesity and hypertriglyceridemia were 1.30 (0.94-1.79), 1.38 (1.03-1.83), 1.94 (1.32-2.85; P<0.01) and 1.78 (1.13-2.81), 2.11 (1.42-3.12), 2.79 (1.74-4.48; P<0.01), respectively. Despite the ban on this pesticide’s uses, this analysis of NHANES data from 1999-2004 shows that the impact of this compound is still being seen. The population of the United States continues to be exposed to chlordane through consumption of fat-containing foods such as fish, dairy, and meat because this compound accumulates in the adipose cells and resists metabolic degradation. This concept of environmental factors being an additional factor to the increasing prevalence of metabolic syndrome and other lifestyle diseases is novel to the dietetics field.

Keywords: Metabolic Syndrome, Persistent Organic Pollutants, Organochlorine Pesticides
Acceptability of Adding Inulin to Fudge Brownies
Nitta, Cheryl; Hudson, Josh; Hahn, Erika
Faculty Mentor(s): David Gee, Nutrition, Exercise, and Health Science

Poster Presentation Session #1, Poster #62
8:30-11:00 a.m. in Ballroom C/D

More than 90 percent of Americans do not meet the recommended dietary allowance (RDA) of fiber that ranges from 25-35 g per day.¹ The aim of this work was to investigate the acceptability of fudge brownies enriched with inulin and to study the effects of inulin on the chewiness, hydration, and textural properties of fudge brownies. Three levels of inulin batter were tested: an unaltered control (515 g brownie mix:0 g inulin), a first experimental formulation (E1) (515 g brownie mix:50 g inulin), and a second experimental formulation (E2) (465 g brownie mix:50 g inulin). Analysis of extended triangle tests indicated that sensory judges distinguished significant differences between the control brownies and E1 (p<0.001) and between the control and E2 (p<0.001). The preference test showed that E1 was preferred over E2. The chewiness intensity test revealed no significant differences among the brownie formulations. Hydration brownie properties were investigated by analyzing the moisture content. The control brownies had a significantly higher moisture content than E2 (p<0.05). Textural properties of brownies were studied by penetration, compression, and retraction force. Brownie penetration, compression, and retraction force was significantly increased with E1 than the control (p<0.01). E2 compression and retraction force was significantly increased compared to the control (p<0.01). However, there were no significant differences in textural properties between E1 and E2. The addition of inulin to a commercial fudge brownie mix may be considered acceptable to consumers.

Keywords: Brownies, Dietary Fiber, Prebiotic
The CWU Science Talent Expansion Program (STEP), supported by the National Science Foundation and COTS, continues work toward increasing the number of students completing science, technology, engineering, and mathematics (STEM) degrees. STEP focuses on recruiting and retaining traditionally underrepresented students in STEM disciplines by providing academic, social, and financial support. Efforts to recruit STEP students are accomplished through the fully-institutionalized STEM recruiting program housed within CWU Admissions. Retention efforts focus on preparing students for rigorous STEM classes by engaging them in inquiry-based projects that encourage and develop critical-thinking skills, and allowing them to perform student-designed research projects. Freshman students participate in the STEP Freshman Science Seminar Series, a series of courses that explores interdisciplinary STEM topics. Freshman students write proposals to engage in faculty-mentored research and teaching experiences during their sophomore year. STEP transfer students engage in two courses that prepare them for faculty-mentored research and teaching experiences. STEP has served 465+ students over the past decade (2003/04-2013/14). Statistical measures demonstrate that STEP is succeeding in improving retention and academic performance of STEM majors. When compared to the STEM control group, STEP students declare STEM majors to a greater extent and have higher GPAs. Students have indicated that the key aspects of STEP that enhance student success include participation in the STEP Living Learning Community (LLC), close professional ties between students and faculty/staff, and financial support. The now fully-institutionalized CWU STEP program can serve as a model for non-STEM disciplines to improve recruiting and retention of students, particularly underrepresented students.

Keywords: STEM, Recruiting, Retention

“Je te RT et tu me follow back”: The Influence of the Oral Code on French-Speaking Online Social Media

O'Connor, Joseph

Poster Presentation Session #3, Poster #60
8:30-11:00 a.m. in Ballroom C/D

Given the omnipresence of technology and public fascination with social media, it comes as no surprise that Internet linguistics is a rapidly growing field. The language of French social media has not yet been investigated. This study examines the coexistence of written and oral codes in French language employed on Twitter and Facebook. Because French language users are notorious for their attention to quality and adherence to linguistic purity, the use of cyberlanguage has
generated considerable debate in the French-speaking world. This study addresses: (1) Where does French cyberlanguage fall on a spoken, written, hybrid code continuum? (2) Which code is dominant in online social media? (3) What linguistic differences exist between Facebook and Twitter? (4) How widespread are English borrowings in French social media? To answer these questions, corpora of 2,000 Twitter postings and 500 Facebook postings were gathered. The data were analyzed according to criteria that differentiate spoken and written language established by Crystal (2001). For further analysis, specific elements of the written and oral codes were applied. In response to the first two questions, initial findings revealed that the written code is still robust, but strongly influenced by the oral code, thus creating a space for entirely novel registers (Crystal 2011). For the third question, Twitter and Facebook shared most linguistic processes, but Facebook exhibited a higher frequency of features characteristic of written register. Additionally, contrary to commonly held beliefs, English borrowings were not shown to be widespread in social media.

Keywords: Linguistics, Facebook, Twitter

Progress Toward the Total Synthesis of Credneramide A and B
O’Neal, Kathryn
Faculty Mentor(s): Stephen Chamberland, Chemistry

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

In a chemical synapse, the process of synaptic transmission is as follows: when an action potential reaches the axon terminal, it opens voltage-gated calcium channels, allowing calcium ions to enter the terminal. Calcium causes synaptic vesicles filled with neurotransmitter molecules to fuse with the membrane, releasing their contents into the synaptic cleft. The neurotransmitters diffuse across the synaptic cleft and activate receptors on the postsynaptic neuron. High cytosolic calcium in the axon terminal also triggers mitochondrial calcium uptake, which, in turn, activates mitochondrial energy metabolism to produce ATP to support continuous neurotransmission. Many common antidepressants work to inhibit the calcium oscillations in neurons. Two newly discovered natural products, credneramide A and B, were found to inhibit calcium oscillations in cerebrocortical mouse neurons. Phenethylamine, the parent compound of credneramides, targets dopaminergic neurons, resulting in fewer side effects than antidepressants targeting serotonin. We carried out the known reaction between propargylmagnesium bromide and acrolein to assemble 1-hexen-5-yn-3-ol. Then, we lengthened the backbone of the molecule using a chemical reaction known as a Johnson ortho-ester Claisen rearrangement to afford the compound oct-4-en-7-yne ethanoic acid. After these steps have been successfully completed, we will continue the synthesis further, ending with the crednaramide A and B.

Keywords: Neuroscience, Organic Synthesis
Building Bridges with Music and Documentary

Ogden, Michael; Sanders, Maria; Blink, David

Faculty Mentor(s): Michael Ogden, Film and Video Studies

Video and Creative Expression Presentation, Session #17
9:40-11:00 a.m. in the SURC Theatre

Music is a universal language. Through music, audiences experience an aesthetic expression of culture that needs no translation to understand. A team of CWU faculty and students documented the cultural exchange between Yakima, Washington, and Morelia, Mexico, as part of a Sister City relationship with music building the bridge between cultures. This session will focus on the process and outcomes from this cultural exchange, the role of music, and present a teaser of the documentary on the subject. Cap-stoning the session will be the performance of an original piece of music composed for the Yakima Valley Community College Salsa Band’s cultural exchange experience.

Keywords: Documentary, Music Performance, Cultural Exchange

Salmonid Passage in Oak Creek Basin of Central Washington

Olsen, John; Fox, Michael

Faculty Mentor(s): Matthew Loeser, Biological Sciences

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

Aquatic organisms are facing threats due to increases in land and road development. Culverts provide passage for water, but may act as a barrier to aquatic organisms including endangered salmonid species. A culvert is defined as a crossing for stream water flow under a road, usually made of steel or aluminum. Culverts can increase the velocity of water flow, create large drops into stream pools and cause debris build up which all affect the ability for aquatic organisms to move upstream. This study looked at the culverts in the upper Oak Creek basin watershed in order to assess their functionality for the passage of aquatic organisms. It is part of an ongoing project led by The Nature Conservancy to improve stream and forest quality. A modified version from US Forest Service the AOP (Aquatic Organism Passage) procedure was used to evaluate accessibility for salmonid species based upon culvert slope, stream ratio and outlet drop. Of the sites surveyed, 83 percent of them did not pass the criteria for the US Forest Service for both adult and juvenile salmonid passage. Culvert width and slope frequently fell below minimum criteria of accessibility for aquatic organisms. This study suggests that the majority of culverts in the Oak Creek Basin may create a barrier to salmonid species and potentially other aquatic organisms.

Keywords: Culvert, Salmonid, Passage
Analyzing Student Essay Responses from the Geoscience Literacy Exam

Olson, Thomas

Faculty Mentor(s): Anne Egger, Geological Sciences

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

The Geoscience Literacy Exam (GLE), designed by the InTeGrate project, assesses Earth, climate, atmospheric, and ocean science literacy as defined in documents developed by those communities. The GLE includes three levels of questions: single-answer multiple choice, multiple-answer multiple choice, and short essay. While the multiple choice questions had been validated and are in use, the essay questions had been pilot-tested but the answers not analyzed for validity. The goal of this project was to examine 364 student responses to an essay about complex systems to see if the question is valid and to better define a rubric for scoring. Students in online (n = 45) and face-to-face (n = 150) versions of an introductory Earth Science class for non-majors at the University of Akron were given the question in two exams. Responses were scored and analyzed in an Excel spreadsheet using a four-point rubric that addressed all components of the question. In addition to scoring student responses, misconceptions, understanding of the question, and additional details were noted. In both exams and both classes, a consistent bimodal pattern appears in the score distribution, with one mode near 2.5 and the other at 0. We interpret this to suggest that a large percentage of students (who contribute to the 0 mode) didn’t understand the question. Two common misconceptions were equating “system” and “cycle” and including the exosphere as one of the major Earth systems. In conclusion the question should be revised to give students a better opportunity to answer the question well.

Keywords: InTeGrate, Earth Systems, Undergraduate Education

A Combined Molecular Dynamics, Rigidity Analysis Approach for Studying Protein Complexes

Orndorff, Brian

Faculty Mentor(s): Filip Jagodzinski, Computer Science

Oral Presentation, Session #50
4:10-4:30 p.m. in Room 140

Proteins form complexes when they bind to other molecules, which is often accompanied by a conformation change in one or both interacting partners. Details of how a compound associates with a target protein can be used to better design medicines that therapeutically regulate disease-causing proteins. Experimental and computational techniques for studying the binding process are available, however many of them are time and money intensive, or are computationally expensive, and hence cannot be done on a large data-set. In this work, we present a hybrid, computationally efficient approach for studying the stability of protein complex. We use short Molecular Dynamics (MD) simulations to generate a small ensemble of protein-complex conformations, whose flexibility we then analyze using an efficient graph-theoretic method implemented in the KINARI software. For our data-set of proteins, we show that our combined MD-rigidity analysis approach provides information about the stability of the protein-complex that would not be attained by either of the two methods alone.

Keywords: Applied Computing, Protein Complexes, Flexibility
The Silent Massacre: A Game
Pace, Terri
Faculty Mentor(s): Rex Wirth, Political Science

Oral Presentation, Session #28
1:10-1:30 p.m. in Room 137A

Come play a game. It is called “The Silent Massacre”. It involves your wits against the deadly spread of disease and eventually total environmental degradation. Research will include the current United States map of the National Disease Cluster Alliance. Several toxins will be mentioned but to make the game fair, we will focus on trichloroethylene. Come up with the right solution and you might save lives, maybe even all of mankind. There will be prizes!

Keywords: Policy, Games, Environmental

Chemical Sourcing of Obsidian Lithic Fragments from the Grissom Site (45KT301) to Study Intra- and Inter-Site Source Variability
Parfitt, Anne; McCutcheon, Patrick
Faculty Mentor(s): Patrick McCutcheon, Anthropology and Museum Studies

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

The Grissom (45KT301) site, located in northeast Kittitas County, Washington, dates from 2500 B.P to the Historic period. While much of the assemblage remains unanalyzed, recent preliminary analysis revealed a high frequency of obsidian chipped stone artifacts. A technological, functional, and material analysis of 167 pieces of obsidian in addition to X-Ray Fluorescence (XRF) analysis of 51 pieces was undertaken in order to provide information on the number of obsidian sources represented, source frequencies through time, and the distribution of geochemical sources across the site. Nine unique sources were identified in the XRF analysis, including one local tachylyte source, two southern Washington sources, five central Oregon sources, and one western Idaho source. While questions about source frequencies through time could not be definitively answered, an intra-site comparison across space showed more sources represented in southern excavation units than in units from the northern end of the site. Source variation across technological class was highest in bifaces and lowest in cores, while an inter-site comparison with three southern Cascade sites did not show a direct correlation between distance from source and source abundance at any of the sites.

Keywords: Archaeology, Lithics, Provenance
The Build-to-Order Supply Chain

Parks, Adam; O’Keefe, Justin; Pasonok, Valeria
Faculty Mentor(s): Kun Liao, Finance and Supply Chain Management

Lynnwood Center - Poster Presentation, Poster #3

Customers’ demand for customized products are pushing companies and manufactures to adapt the mass customization concept into a build-to-order process. We will be researching the dynamic process of supply chains as they provide customers with custom options while using a standardized and efficient process. We will be looking into modern companies, both brick-and-mortar and e-commerce/online, from different industries, and how competition has kept efficiencies up and costs down. We will also look at the strategies these companies implement, and how they are similar to each other. Our online research will show us how these companies are making customized products that do not sacrifice cost or quality.

Keywords: Supply Chain, Build-to-Order, Customization

GiddyUpPayUp: A Public Relations Campaign

Patterson, Mia; Homer, Alexandra; Monterrey, Samantha; Nelsen, Hailey; Reynolds, Ann
Faculty Mentor(s): Elizabeth Kerns, Communication

Oral Presentation, Session #42
3:00-3:20 p.m. in Room 202

The Public Relations Student Society of America (PRSSA) annually hosts a national campaign case study competition for public relations students known as the Bateman Competition. More than 120 universities compete with teams of four to five students. Central’s 2014 Bateman team had five team members and two alternates. The competition requires students to research, plan, implement, and evaluate a strategic public relations campaign in their community based on a topic given by National PRSSA. This year, Fiserv Inc., a leading provider of financial services and technology solutions, was the corporate sponsor and challenged each team to increase awareness and usage of Fiserv’s person-to-person digital payment service, Popmoney. CWU students applied in May 2013 to participate in the competition and in August 2013 conducted primary research regarding previous campaigns last summer. PRSSA National announced the campaign topic in August 2013. From September through December, the team worked cohesively on further research, planning and the campaign development, which could not be executed until February 1, 2014. The CWU campaign, GiddyUpPayUp, peaked with a 5K run, with proceeds donated to the CWU Foundation for a PR scholarship. All of the events for the campaign were powered by Popmoney, including registration for the 5k event. In addition to the Pop of Orange 5K, the team held a PopPong night in the SURC to bring awareness to Popmoney. Furthermore, the CWU Bateman team was also able to host a series of financial awareness nights in the residence halls to talk to on-campus residents about Popmoney.

Keywords: Popmoney, Public Relation, Campaign Competition
The Quest for Equality: African American Males Breaking Barriers in Professional Sports (1920-2013)
Patterson, Mia
Faculty Mentor(s): Raymond Hall, Africana and Black Studies

Oral Presentation, Session #4
8:50-9:10 a.m. in Room 201

African Americans have confronted segregation and racism since the 1600s and the establishment of Jamestown heralded hardship that allowed for the manifestation of racism in today’s society. The first ship carrying indentured servants, free African Americans and slaves arrived at Jamestown in 1640 (Hine, William and Stanley, 2011). Great Britain declared African Americans, who were not free, were to be “slaves for life,” and thus began the segregation of African and European Americans (Hine, et. al. 2011: 60). After Emancipation, Jim Crowism, the practice of segregating and discriminating against African Americans, permeated everyday lives of African Americans. Despite segregation, African Americans were eagerly seeking involvement in athletics of all kinds, only on a more isolated basis because of Jim Crowism. During the Jim Crow period, African Americans were banned from competing in professional and amateur sports with white Americans. Nevertheless, African Americans made significant contributions both in and out of the professional sports sector. With the development of semiprofessional and professional leagues in popular culture, African Americans eventually challenged the boundaries of Jim Crowism to be recognized in the professional sports industry. This presentation will summarize my research and evaluate the advancement of professional sports from all-white institutions to the inclusion of African American males from the early 1920s to the early 2000s. It will also discuss the social and political movements of the 1930s and 1940s, as well as how specific African American male athletes broke racial barriers and influenced the professional sports sector over time.

Keywords: African Americans, Professional Sports, Males

Computational Modeling of Focused Sonic Booms
Pearce, Christopher; Grist, Richard
Faculty Mentor(s): Andrew Piacsek, Physics

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

When a supersonic aircraft undergoes a maneuver, such as acceleration, the sonic boom it produces can undergo focusing, producing a ‘superboom’ to observers on the ground. This focusing is similar to what happens to light after passing through a lens. The studying of superbooms in relation to aircraft shape has the potential to allow supersonic commercial flight over land in the future. While studying these super booms, an analytical approach is not plausible, because nonlinearity and diffraction in sound propagation make the equations too complicated. We use a computational approach to model the sonic boom focusing, allowing us to predict features of the super boom. This research project involved modifying physical and computational parameters of a nonlinear progressive wave equation (NPE) in an attempt to improve the model’s accuracy. These initial parameters include: time steps, grid spacing, initial magnitude, and character duration of the incoming boom. The goal is to match computational results to waveforms of actual super booms recorded during NASA flight tests of F-18B aircraft. Our findings show that increasing the number of time steps and creating a finer grid mesh improved agreement on the maximum pressure, but not on other features of the waveform. Modifying physical parameters of the initial wave did not have an appreciable effect on the resulting superboom waveform.

Keywords: Sonic Boom, Computational, Nonlinear
Brownies Fortified with Milne MicroDried Blueberries and Carrots as a Method to Increase Fruit and Vegetable Consumption

Pequignot, Kate; Nikolaus, Cassandra; Jensen, AnneCherise
Faculty Mentor(s): David Gee, Nutrition, Exercise, and Health Science

Poster Presentation Session #1, Poster #51
8:30-11:00 a.m. in Ballroom C/D

Fruit and vegetable consumption is associated with decreased risk for multiple chronic diseases. In the United States, the average intake is well below recommended intake despite this knowledge. This study focused on utilizing fortified brownies as a vehicle for fruit and vegetable consumption. Brownies were mixed with dried blueberries or carrots so that a three inch by three inch serving of brownie supplied a full serving of fruit or vegetable, respectively. Sensory evaluation of each variation utilized 73 untrained Central Washington University students. Between-groups ANOVA tests showed that all brownie variations were consider similarly tender (p=0.16) and sweet (p=0.35), utilizing a 13 point scale. However, the brownies containing blueberries were significantly less moist and less preferred than the control, unfortified brownies, and carrot-containing brownies (p<0.001, for both). There were no significant differences in moisture or preference between the control and carrot-containing brownies. Objective analysis of the brownies using a universal texture analyzer revealed significant differences in the peak upward and downward forces required to insert and remove a probe into all variations of the brownie batter (p<0.001, for both). Significantly more force was required to penetrate the baked blueberry brownie compared to the control and carrot variations (p<0.001). No significant differences were found between variations when a drying test was performed. The analysis shows that consumers are likely to accept brownies fortified with dried carrots. Brownies can provide a full serving of vegetables to consumers. Food producers can use this method to sell their product as a healthier dessert.

Keywords: Fruit and Vegetables, Consumption, Brownies

A Confidence Interval for the Density of Abundant Numbers

Pidde, Melissa
Faculty Mentor(s): Dominic Klyve, Mathematics

Oral Presentation, Session #5
8:30-8:50 a.m. in Room 202

For more than 2,000 years, mathematicians have studied the “sum of divisors” function σ(n). To give an example, since the divisors of 12 are 1, 2, 3, 4, 6 and 12, the sum of the divisors of 12 is σ(12) = 1+2+3+4+6+12 = 28. Depending on the value of σ(n) we can classify an integer n as deficient, perfect or abundant. An integer n is said to be perfect if σ(n) = 2n, deficient if σ(n) < 2n, and abundant if σ(n) > 2n. Notice this makes 12 an abundant number since σ(12) = 28 > 2(12). We notate the proportion of integers which are abundant numbers as dA. The current bounds on the proportion of abundant numbers are .2476171 < dA < .2476475. This presentation will cover how I used statistics to close the gap and give a new estimation of the proportion of abundant numbers.

Keywords: Statistics, Density, Abundant Numbers
Se puede y se debe: Educating Heritage Students
Pinto, Edward; Luna, Itzia; Meza, Isaac
Faculty Mentor(s): Alejandro Lee, World Languages

Oral Presentation, Session #27
1:50-2:10 in Room 135

Teaching heritage students requires a wide variety of best practices that focus on the development of the students’ vocabulary, cultural competence, and grammar, in addition to the four language skills (reading, writing, listening, and speaking). I will focus on the best practices of encouraging students to read many genres, providing a range of writing topics, assigning oral interviews with the community, and granting students the freedom to speak both English and Spanish in the classroom. Another effective teaching strategy for heritage language learners is using a macro-approach.

Keywords: Heritage, Language, Spanish

Creating and Utilizing “Drain, Waste, and Vent Plumbing Trainers” to Enhance Student Learning in a Construction Management Program
Plugge, Warren; Carns, Dave
Faculty Mentor(s): Warren Plugge, Engineering Technologies, Safety, and Construction; Dave Carns, Engineering Technologies, Safety, and Construction

Oral Presentation, Session #32
1:10-1:30 p.m. in Room 202

This presentation explains how “drain, waste, and vent plumbing trainers” were designed, built in-house, and incorporated into a mechanical systems course within a construction management program to enhance student understanding of a basic drain, waste and vent system for a residential bathroom. An explanation of how a need for the physical model was identified is included, with reference to student learning styles. Designing and constructing the model and integration of the model into the classroom is also presented. In addition, discussion of the potential benefit of utilizing the drain, waste, and vent trainer as a demonstration tool to enhance student learning in two separate courses is included and discussed. Future opportunities to expand the model and create similar models to be used in a construction management program are also presented.

Keywords: Drain, Waste, Vent, Plumbing, Mechanical Systems, Student Learning, Construction Management
Effects of Lying on Memory for Positive and Negative Events  
**Polage, Danielle**  
*Faculty Mentor(s): Danielle Polage, Psychology*

Poster Presentation Session #3, Poster #42  
2:30-5:00 p.m. in Ballroom C/D

This study examined the effects of lying on the liar’s memory for the truth. Participants first filled out a Life Events Inventory that asked them to rate the likelihood that various events had happened to them before age 10. Participants were then 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 was true when prompted with the question “How do you know you never...?”. Participants lied both by claiming non-experienced events had happened to them and also by denying that true events had happened. During the interview, participants created full narratives about the events and attempted to convince the experimenter that their stories were true. Participants filled out a second Life Events Inventory after the interview and the change score between the pre- and post- lie manipulation was calculated. The results showed that participants inflated their belief in false negative events after claiming these events had happened to them as compared to controls. In addition, participants decreased their likelihood ratings for true positive events after claiming these events had not happened to them (relative to true positive events that were not lied about). These results demonstrate that lying can influence memory for the truth and that participants’ memories for positive and negative valence lies differ. The potential application of these results will be discussed.

*Keywords: Memory, Lying, Deception*

Corporate Style Education Reform and the Latino Community  
**Pray, Steven**  
*Faculty Mentor(s): Rex Wirth, Political Science*

Oral Presentation, Session #19  
12:00-12:20 p.m. in Room 137A

Education reform has taken on a new meaning to the Latino community in the United States. Some of the most salient reforms to the Latino community such as standardized testing, proliferation of charter schools, advancing competition, and managing schools in a top-down approach will all be examined in detail. Numerous studies such as one published by Stanford University will be used to quantify data pertaining to the issues. This paper will also include the perspectives of educational historians such as Diana Ravitch. A comparative analysis of reforms in the United States and Finland will also be used to suggest the most effective ways of reforming America’s education system. Issues such as poverty and English language barriers that pose a threat to Latino’s at a disproportionately high rate will also be observed.

*Keywords: Education, Latino, Reform*
Developmental Changes in Vocalizations of Tibetan Macaques (*Macaca thibetana*)

Price, Erika; Sheeran, Lori; Li, Jin-Hua

*Faculty Mentor(s):* Lori Sheeran, Primate Behavior and Ecology

Oral Presentation, Session #49
4:10-4:30 p.m. in Room 137B

Little information exists on the types of vocalizations produced by Tibetan macaques (*Macaca thibetana*). Data were collected on the vocalizations of a group of 41 provisioned Tibetan macaques of both sexes and all ages at a tourist site at Mt. Huangshan, China, over two months in 2013. This allowed for the first construction of a vocal repertoire ethogram for the species, including descriptions of all observed vocalizations, the contexts in which they occurred, their production by members of each age/sex class, and their apparent intended recipients. Most vocalizations are produced by individuals of multiple age/sex classes and occur in several contexts, and the differential production of vocalizations by age classes indicates that vocalization behavior changes as Tibetan macaques develop. Similar developmental changes in vocalizations have also been documented in other macaque species.

*Keywords:* Primate, Vocalizations, Development

The World of A Cappella

Prigge, Nicole

*Faculty Mentor(s):* Gary Weidenaar, Music

Creative Expression Presentation, Session #52
5:10-5:30 p.m. in Ballroom A

A *cappella* music was born within the church and literally means “music in the chapel” but has come to be defined as music without instrumental accompaniment. In recent years, the popularity of *cappella* music has sky-rocketed, moving to the forefront of pop music. With television shows like “The Sing Off”, movies like *Pitch Perfect*, and artists like The Pentatonix leading the charge, *cappella* music is more accessible than ever. Boots ‘n’ Cats is Central’s very own premier small mixed *cappella* ensemble. The modern musical selection mixed with complex harmonies, vocal percussion, and choreography has transformed *cappella* into an accessible form of music for both the young and old. Small ensemble *cappella* has allowed the members of Boots ‘n’ Cats a chance to flex their collective cerebral muscles through self-leadership, musical arranging, choreography, fund raising, and coordinating group travel. Boots ‘n’ Cats is a rare group within Central’s very own *cappella* scene, in that every ensemble member is one on a part. This means each member is solely responsible for balance, dynamics, intonation, diction, etc. for their respective parts. Boots ‘n’ Cats will sample pieces from our International Championships of Collegiate A Cappella (ICCA) set list. This set gave us a berth to the Western Semifinals at Pomona College held April 5.

*Keywords:* A *cappella*, Music, Popular Culture
**Site-Specific Choreography Project**  
*Pruitt, Calista*

*Faculty Mentor(s): Crystal Fullmer, Physical Education, School and Public Public Health, Dance Program*

Creative Expression Presentation, Session #35  
1:30-1:50 p.m. in Ballroom A

In choreography class there was an assignment for a site-specific project in which we chose a place on campus that had both positive and negative space. This allowed the choreographer to manipulate the movement created between the spaces. I will be presenting my site-specific choreography project in a video format. As a choreographer I chose the trees between Dean Hall and the Science Building because the leaves were changing to reds and oranges. It was the middle of autumn when the leaves were beginning to fall and this gave me a sense of a fluttering fairy, or an animal in the woods.

The solo I created was inspired by the nature I observed in the location. I revisited my childhood memories and how being in the woods made me feel as inspiration for movements. As a child, when I would play in the leaves I had a sense of freedom, as if nothing I did was wrong. All of these thoughts were present in my mind as I was creating movement for the project. I used the element of the falling leaves as a centerpiece in my dance. I used the choreographic devices that were taught in class to help me compose my work. Such as level changes, acceleration and deceleration, and also repetition. I enjoyed this project because for the first time playing in the woods and my love of dance were united.

*Keywords: Dance*

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**Effects of Funding on Public School Graduation Rates**  
*Purkey, Krystelle*

*Faculty Mentor(s): Matt Manweller, Political Science*

Oral Presentation, Session #19  
12:20-12:40 p.m. in Room 137A

The most important resource for the continued prosperity of the United States of America is having highly educated citizens. The Washington State Constitution pledges to provide every child with the opportunity to get a public education by stating that it is, “the paramount duty of the state to make ample provision for the education of all residing within its borders,” (Article IX-Education, 1889). The legislature allocated 42.4 percent of its budget, approximately $13,311,962,000, to fund public school education for the 2009-2010 school year. Each school district was given a various amount of funding by the legislature, which was determined by certain characteristics and necessities of the schools: teacher experience, historical salary levels, class size, educational equipment needs, etc. If there is a direct correlation between educational funding to each school district within Washington State and graduation rates, then the school districts with the most revenue will have the correlating highest rates of graduation. By comparing the all revenues reported in the Financial Reporting Summary for the fiscal year 2009–2010 and the graduation rates stated by the Washington State Office of Superintendent of Public Instruction for the same school year. The research illustrates that there was no clear, direct relationship between the funds and the graduation rates.

*Keywords: Education, Funding, Graduation*
Picture Naming in Signing Chimpanzees
Putzier, Amanda; Bettini, Anna; Keenan, Susan Ann; Jensvold, Mary Lee
Faculty Mentor(s): Mary Lee Jensvold, Primate Behavior and Ecology

Poster Presentation Session #3, Poster #61
2:30-5:00 p.m. in Ballroom C/D

Gardner and Gardner (1989) cross-fostered the chimpanzees, Tatu, Dar, Moja, and Washoe, as deaf human children immersed in American Sign Language. Opportunities to look through picture books, magazines, and photos have been a part of the chimpanzees’ daily routine since early on in their lives. The items chimpanzees choose to communicate about may indicate preferences or show flexible use of signs. This study performed a content analysis on the pictorial items the chimpanzees are signing about. Sign logs, an archival database, contain records of the chimpanzees’ use of signs. We selected all instances of chimpanzee signed interactions with magazines, pictures, photos, and paintings. Signed interactions included conversations between chimpanzees and caregivers as well as a chimpanzee privately signing to him or herself. A total of 74 sign logs were selected for analysis. Coders categorized each item as food, clothing, beauty, vegetation, animal, or other. All of the chimpanzees signed about pictures. Tatu had the highest number of records. She signed about pictures of food more often than any other category. Relationships between the chimpanzees and the items they sign about will be discussed on the poster, including examples of pictures and signs.

Keywords: Picture Naming, Chimpanzee, American Sign Language

Industrial Farmers: 21st Century Point Source Polluters
Puz, Abraham
Faculty Mentor(s): Rex Wirth, Environmental Studies

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

Concentrated animal feeding operations (CAFO) or more commonly known as factory farms is a relatively new way of feeding an increasing population while agricultural land used for animal husbandry decreases. Crowding of livestock has helped make the meat and dairy industry more efficient as a result of the economies of scale realized by large livestock husbandry operations. As a result of decades of the desire for food security within the United States the livestock production industry has flourished by passing on the negative environmental externalities to third parties in the form of surface and ground water contamination in the form of excess nitrogen, pathogens, and other pollutants which can contaminate drinking water and seriously disrupt fresh water cycles and ecosystems. These pollutants, at the high levels produced by CAFOs, should be considered illegal under the Clean Water Act. In addition animal byproducts from these CAFOs emit methane, hydrogen sulfide, and ammonia which are three of the many pollutants regulated under the Clean Air Act. These pieces of environmental legislation are for the most part ignored when it comes to industrial farming. As the legislation currently stands, the decreasing, or failing to increase, standards has left many CAFOs unchecked by the EPA and other federal and state agencies. Clearly we live in a growing world with growing demands, but the key is to design a plan that doesn’t sacrifice long term environmental stability for short-term financial gain and food security.

Keywords: Industrial Farming, Environmental Legislation, Policy Solutions
Stratigraphy of Glacial Horse Lake, Wenatchee, Washington
Querry, Brian
Faculty Mentor(s): Breanyn MacInnes, Geological Sciences

Poster Presentation Session #1, Poster #41
8:30-11:00 a.m. in Ballroom C/D

Glacial Horse Lake (Wenatchee, Washington) was obliterated by the first Missoula flood that flowed through Wenatchee. Did this first Missoula flood change the environment and hydrology of Glacial Horse Lake and cause the demise or was the lake already in recession? To answer this question, we examined the glaciolacustrine deposits in detail in Horse Lake Canyon near Wenatchee, and qualitatively examined the varves in the deposit. Next, we used a grain size analyzer to obtain the mean grain size of each sample to distinguish laminae or beds from each stratigraphic layer. Then we statistically verified the results by using z-scores to quantify the variations of mean grain sizes between laminae or beds. At the end of the stratigraphic record the varves increase in thickness indicating increased sediment deposition in Glacial Horse Lake prior to the first Missoula flood. This increase in sediment accumulation could be the result of additional inflow of water from the Cordilleran Ice Sheet as it melts. Therefore, Glacial Horse Lake was likely already in recession prior to the first Missoula flood, and the first flood obliterated what was left of the lake.

Keywords: Stratigraphy, Glaciolacustrine, Varves

Are You an Extrovert or and Introvert: What Does the Face Say?
Radeke, Mary; Stahelski, Anthony; Hanson, Max; Garriott, Joseph; Jennings, Naomi
Faculty Mentor(s): Mary Radeke, Psychology; Anthony Stahelski, Psychology

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

This study examined the relationship between perceived facial expression and personality attributes of individuals in four still photographs. Participants were asked to identify facial expression, emotion, and personality traits of individuals in black and white photographs. Significant differences were found between facial expressions (happy, angry, and sad) with regard to emotion and personality attributes. Implications of this research are discussed.

Keywords: Personality Traits, Facial Expression, Emotion
Supply chain management information systems play a critical role in the ability of firms to communicate and analyze the movement of materials of value upstream and downstream of the supply chain. These information systems enable operational flexibility as well as increased productivity and responsiveness of supply chain, while minimizing risk and cost. This study creates a decision chart evaluating the weaknesses and strengths of implementing such a system. We will examine how information systems will improve supply chain operations, whether or not it will be effective for certain industries, and how to implement these systems for firms seeking to change their supply chain strategy. This research studies literature covering the theories and application of information systems, past cases of companies integrating information systems in their supply chain, and the examination of the success or failure of each decision made by the examined companies. We recommend integrating information systems into supply chains of industries that focus on moving product of higher value, and industries that make high volumes of movement where tracking is of high importance.

*Keywords*: Supply Chain Optimization, Intercommunication, Operational Flexibility

Work-related musculoskeletal disorders (WMSDs) continue to be a major concern for the construction industry. It is critical for construction workers to be educated on ergonomic risk factors (ERFs) to reduce/prevent WMSDs. Current trends on worker training pertaining to ERFs, workers’ perception towards ERFs and their ability to identify and control them has not been studied. This study aims to fill this gap with the following objectives: (1) to identify the construction crafts’ perception of ERFs compared to other hazards; (2) to understand the trends in worker training pertaining to ERFs; and (3) to report the construction crafts’ current ability to identify and control ERFs. The study methodology involved the development and distribution of a short questionnaire. Questionnaires were received from 315 construction workers from the western United States. It was found that majority of the workers perceive ERFs as a major hazard and discuss ERFs regularly during their pre-task meetings. However, it was found that a staggering 28 percent have not received any training on ergonomic interventions. Review of crew pre-task plans suggested that only 40 percent of the workers identified and controlled ERFs. It is evident the construction community has an opportunity to reduce WMSDs by proper worker training on ERFs.

*Keywords*: Construction Safety, Work-Related Musculoskeletal Disorders, Worker Training, Ergonomics, Hazard
Parental Involvement and the Engagement of Youth in Property Crimes

Ramirez, Laura

Faculty Mentor(s): Gilberto Garcia, Political Science

Oral Presentation, Session #2
8:50-9:10 a.m. in Room 137A

According to the US Department of Health and Human Services, in 2006 more than 25 percent of people arrested for property crimes were under age 18 and boys made up 68 percent of juvenile arrests for property crimes. The demographic of these numbers include a majority of Latino and African American males. Society has conditioned minority individuals to believe they are incapable of succeeding. As a result, this has historically led them to find refuge in the streets. Family is critical to the success of every person, and can have a significant influence on the decisions younger generations make. Using data from the National Longitudinal Study of Adolescent Health (Add Health) this study will examine the following question: does parental involvement affect the engagement in property crimes? The attempt to answer this question can help determine whether parental involvement can decrease delinquency among African American and Latino youth.

Keywords: Criminology, Juvenile Delinquency, Property Crime

The Ego-Function of Rhetoric in Leaves of Grass

Rampa, Peter

Faculty Mentor(s): Steve Olson, English

Oral Presentation, Session #18
12:00-12:20 p.m. in Room 135

This project presents rhetorical analysis of the function of egotism within Leaves of Grass. There’s a common approach that takes for granted the idea that egotism in Leaves is unavoidably reflective of Walt Whitman’s character—critical discussion, as a result, is often mired by attempts to present egotism as a strength or weakness of the author rather than a feature of the text. By utilizing the rhetorical studies concept of ego-function, this project proposes a conceptual framework that allows for a non-biographical analysis of egotism in Whitman’s work. The ego-function of rhetoric is particularly suitable for this task because it identifies the process through which a speaker and listener establish selfhood through verbalized expression. Taken further, the ego-function of rhetoric is useful for examining the language of a social movement and the ways in which a speaker fosters large-scale unification through the shared affirmation of personhood. In other words, egotism comes forward as a crucial component in the persuasive success of poems like “Song of Myself” and “Kosmos.” Ultimately I suggest that in order for Whitman’s critics to better understand the enduring success of Leaves of Grass, it’s imperative that we reposition egotism as a feature of the text and not its author.

Keywords: Rhetoric, Whitman, Ego
Growth Versus Glycogen and Lipid Energy Storage Prior to Winter in Common Side-Blotched Lizards, *Uta stansburiana*

**Rathburn, Elizabeth Anne**

*Faculty Mentor(s): Jason Irwin, Biological Sciences*

Poster Presentation Session #1, Poster #31
8:30-11:00 a.m. in Ballroom C/D

Ectotherms are subject to climatological factors, specifically seasonal temperature variations that influence overall survival. Studies have looked at populations of common side-blotched lizards, *Uta stansburiana*, adults however this study investigates the mechanisms for survival of side-blotched lizard hatchlings and the relationship between energetics and developmental growth. It was hypothesized that hatchlings initially prioritize obtained energy towards growth to ensure survival, and then shift the energy consumption priority during late summer and fall towards energy storage in the form of both lipid and glycogen. Lizards were collected over a four month period (August-November) in which the carcasses were dissected allowing for the measurement of fat body tissue content as well as concentrations of glycogen present in ~25-75 mg subsamples of liver. Results suggest a correlation between lipid storage and glycogen storage. Fat body content in hatching lizards significantly differed over time (*F*=5.318, *p*=0.002, *r*²=0.512), and a graphical trend relating a significant increase in fat body content between the months of September and October. While the total glycogen content did not show a significant difference between dates (*p*=0.228, *r*²=0.138), graphical trends also reveal an increase in total glycogen content between the months October and November. This suggests that after a month of rapid growth the hatchlings switch priority from growth to energy storage in both fat body and glycogen in liver tissue.

*Keywords: Winter Energetics, Reptile, Uta stansburiana, Lizard*

Hydroshield: No Hassle Sandbag Solution for Flood Protection

**Rathnam, Hari; Gandhi, Shyam; Chaliparambil, Rahul; Tamhane, Sanya; Puram, Manjesh**

*Faculty Mentor(s): Ram Rathnam, Chief Kanim Middle School, Fall City; Chitra Rathnam, Chief Kanim Middle School, Fall City*

First Lego League, Constructed Objects Demonstration
Demonstrations between 11:40-1:00 and 1:10-2:30 in the SURC Pit

Anywhere it rains, it can flood. According to FEMA, one of the most common disaster in the United States is the flood. The US government spends about $4.1B annually on disaster relief for the past 10 years and the 200 casualties that annually occur. Our solution, Hydro Shield, is the no mess sandbag that can help protect properties from flood damage in an eco-friendly way. It uses sodium polyacrylate which on reaction with water becomes a barrier to flood.

*Keywords: Eco-Friendly, No-Mess Sandbag, Flood Relief*
**Application of Dalea ornata (Fabaceae) Extractives Toward Inhibition of the Hookworm Ancylostoma ceylanicum**

*Ray, William; Winterstein, Eric; Koppinger, Kaitlin*

*Faculty Mentor(s): Gil Belofsky, Chemistry; Blaise Dondji, Biological Sciences*

Oral Presentation, Session #29
1:10-1:30 p.m. in Room 137B

Under the principal investigator Dr. Gil Belofsky of the Department of Chemistry, this research project is focused on the discovery and application of novel compounds from the plant *Dalea ornata*, commonly known as the Blue Mountain prairie clover. The process of isolating each compound was accomplished through techniques such as Sephadex LH-20 size exclusion chromatography and linear continuous gradient chromatography over silica gel. Eight different phenolic compounds have been isolated, with several more nearly pure. Advanced nuclear magnetic resonance spectroscopy techniques were utilized to elucidate the structure of each isolated compound. In the event that additional amounts are needed, re-isolation of compounds will be performed for expanded biological testing. Initial *ex vivo* biological testing of *D. ornata* extracts have demonstrated anthelmintic activity towards the hookworm *Ancylostoma ceylanicum*. The World Health Organization projects that one billion individuals are currently infected with hookworms or related soil-transmitted, parasitic nematodes. While medications are available to treat acute cases, there is no current treatment to prevent hookworm infection. Determination of the *D. ornata* compound(s) associated with the observed anthelmintic activity will likely provide further insight into mechanisms of inhibiting and preventing hookworm infections.

*Keywords: Chromatography, Spectroscopy, Chemistry*

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**Social Settings, Substance Use, and Sexual Behaviors**

*Reddaway, Amanda*

*Faculty Mentor(s): Duane Dowd, Family Studies*

Poster Presentation Session #3, Poster #38
2:30-5:00 p.m. in Ballroom C/D

This study examined the relationship between substance use, hooking up, and the context in which it occurs. It was hypothesized that the social setting would moderate the relationship between hooking up and alcohol, marijuana, and hard drug use. The convenience sample included 356 college students between the ages of 18-24. Participants completed an online survey about their frequency of attendance at different party types, as well as frequency of substance use and frequency of sexual behavior at these parties. Responses were recorded on seven-point, semantic differential scales. Findings show that the social setting has no moderation on alcohol and hooking up, partial moderation on marijuana and hooking up, and full moderation on hard drug use and hooking up. The discussion is focused on the dangers of risky hook-ups and substance use, particularly in certain social settings, and how these results can be used for educational and preventative efforts regarding sexually transmitted infections, unplanned pregnancies, and negative emotional effects. *(Editor’s Note: This presentation may contain adult themes, content, or imagery.)*

*Keywords: Hooking Up, Substance Use, Parties*
Reaction Time Differences in Video Game and Non-Video Game Players  
Richardson, Benjamin  
Faculty Mentor(s): Ralf Greenwald, Psychology

Poster Presentation Session #3, Poster #49  
2:30-5:00 p.m. in Ballroom C/D

This study represents the first phase of a broader study investigating potential brain processing differences between video gamers and non-gamers. The purpose of the current study was to investigate reaction times to visual stimuli in individuals who regularly play action games versus individuals who do not. Stimuli used were based on the visual oddball paradigm in which participants respond to standard and rare occurring visual targets. Results indicate that the speed of decision-making and reaction are increased for those who regularly play video games, and had started playing video games at a younger age. Findings suggest an interacting effect of years experience with video games, and gamer or non-gamer identifying status as determined by the average amount of game play per week. The current results have implications for possible neural processing differences concerning working memory in individuals who have more experience with video games.

Keywords: Video Games, Psychology, Reaction Times

Ion Trajectory in Saturn's Magnetosphere near Titan  
Richardson, Jordache  
Faculty Mentor(s): Darci Snowden, Physics

Poster Presentation Session #1, Poster #2  
8:30-11:00 a.m. in Ballroom C/D

The purpose of this research is to try and determine how particles of varying energy are being distributed in the induced magnetosphere of Titan, Saturn’s moon. This information would prove valuable in understanding the plasma interactions with Titan as well as other experiments conducted by Cassini, an unmanned spacecraft that orbits Saturn. In order to calculate where the particles would be distributed, I created a MATLAB code that tracks a particle’s movement using a fourth order Runge-Kutta approximation through a constant electric and magnetic field and modified it to track multiple particles of varying energy to see how those particles will distribute. Using the data collected during Cassini’s fly-bys of Titan and comparing it to the results of the model, I will be able to find how particles are distributing in Titan’s magnetosphere.

Keywords: Energy, Distribution, Magnetosphere
Assessing Occupancy of Amphibians Using Environmental DNA on Snoqualmie Pass
Richbourg, Sara; Reavill, David; Fergus, Craig
Faculty Mentor(s): Steve Wagner, Biological Sciences; Caren Goldberg

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

We used a molecular genetic technique, the quantitative polymerase chain reaction (qPCR), to assess the occupancy of species (coastal tailed frogs and Pacific giant salamanders) on Snoqualmie Pass. Traditional methods of detecting amphibians involve visual encounter surveys, trapping, or hand capturing. Detection can be challenging because amphibians are cryptic and can vary their use of habitat seasonally. Aquatic species shed DNA into the environment. Therefore, we used an environmental DNA (eDNA) approach to non-invasively detect amphibians at four sites on Snoqualmie Pass. For each site, we collected four replicate samples by filtering one liter of water for each and a distilled water control for a total of 20 samples. Then DNA was extracted and then quantitative PCR reactions conducted using species-specific primers for the mtDNA cytochrome b gene. This technique will be a valuable tool to assess if amphibians colonize new areas as barriers are removed and crossing structures built to enhance connectivity in the Snoqualmie Pass corridor.

Keywords: Amphibians, Environmental DNA, qPCR

Religion: Doctrines of Detriment
Ridgeway, Joe
Faculty Mentor(s): Matthew Altman, Philosophy and Religious Studies

Oral Presentation, Session #33
1:30-1:50 p.m. in Room 271

A contemporary critique of organized religion and faith which draws on Friedrich Nietzsche’s philosophy as well as historical events and episodes with the intent to prove that religion is now an unnecessary and detrimental human construct, and that one can be a moral person without adhering to any particular religion.

Keywords: Nietzsche, Religion, Faith.
Ellensburg Book-Mobile
Robertson, Jaclyn; Bean, Amanda
Faculty Mentor(s): Judy Backlund, Language, Literacy, and Special Education

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

The purpose of this project was to bring books into the hands of Ellensburg children who are of low socioeconomic status. Research tells us that learning disparities between the rich and the poor start immediately, even before a child reaches kindergarten. Sixty-one percent of low-income families have no books at all in their homes for their children. Having access to books can be a large determining factor in reading achievement of students. Therefore, Ellensburg School District teachers and CWU students have come together to counteract this reading disparity by giving Ellensburg children, especially those of low-economic status, access to books. The Book-Mobile is a project spearheaded by Mandi Laurent, a local first grade teacher at Lincoln Elementary School. She knew that when her first grade students left her classroom for the summer, many of them would not read a book until school started up again in the fall. The Book-Mobile is a traveling library full of books that stops at the lowest income neighborhoods in Ellensburg. This past summer the Book-Mobile delivered books to children who wouldn’t otherwise have access to books during summer. Hundreds of children were able to check out books. Jaclyn Robertson and Amanda Bean were involved in the whole process of creating the Book-Mobile, including leveling and organizing the books and helping at the Book-Mobile stops. With these books, children were able to progress in their reading skills over the summer, ready to tackle school again in the fall. The Book-Mobile will hit the road again this summer!

Keywords: Literacy, Education, Poverty

Stream Water and Soil Water Chemistry Following the Table Mountain Wildfire, Washington
Roccanova, Vincent
Faculty Mentor(s): Carey Gazis, Geological Sciences

Poster Presentation Session #1, Poster #40
8:30-11:00 a.m. in Ballroom C/D

The purpose of this project is to characterize stream water chemistry and soil water chemistry in response to wildfire activity in the Table Mountain area. The Table Mountain wildfire was started by several lightning strikes on September 8, 2012. Wildfire can have detrimental effects to water quality and stream ecosystems. For example, increased loads of nutrients such as nitrogen and phosphorus can cause eutrophication in streams, depleting oxygen in water which is important to aquatic animals, especially fish. These changes in water quality can also affect humans who depend on these streams for irrigation and other uses. Wildfire can potentially cause such nutrient increases to occur through the process of biomass burning. Stream water and soil water samples were collected from the Table Mountain wildfire area from the winter of 2013 until the spring of 2014. These samples have been analyzed for pH, conductivity and alkalinity. Additional analyses are underway to determine trace element concentrations using Inductively Coupled Plasma Mass Spectrometry and major ion concentrations using Ion Chromatography. Data will be presented that compares the chemistry of stream waters and soil waters at three types of sites that have been impacted to varying degrees by the Table Mountain wildfire: severely burned, moderately burned, and unburned. This dataset will thus describe how water chemistries have varied during the first two years following the Table Mountain wildfire at affected versus unaffected sites.

Keywords: Geochemistry, Streams, Wildfire
The Impact of Social Network on Supply Chain

Rogers, Laura; Sims, William; Vo, Ann; Xiong, Kabao

Faculty Mentor(s): Kun Liao, Finance and Supply Chain Management

Lynnwood Center - Poster Presentation, Poster #5

The possible impact of social networking on a supply chain can be highly useful in creating a new supply chain or improving one that already exists. Social media allows one to share what is on their mind, and most of the population has some sort of social media account. Businesses can pull information from online posts to improve their business; for example, by making a new product. Businesses can use their own social media accounts to market their new products to consumers. Demand for the products will affect the supply chain, and the question is whether suppliers will make too much or not enough of the products? Will the customer reviews be good or bad? Social media can test the flexibility and strength of a supply chain. The supply chain should be able to plan the demand of a new product or service and also be able to communicate so every part of the supply chain is on the same page.

*Keywords: Social Network, Supply Chain, Communication*

Characterizing PKC-1’s Role in 5-HT Dependent Behavioral Adaptation and Depressed Foraging in *Caenorhabditis elegans*

Ronk, Seth

Faculty Mentor(s): Lucinda Carnell, Biological Sciences

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

Understanding the neural basis for response to chronically elevated serotonin is important for pharmaceutical treatment of mood disorders, such as depression and schizophrenia. Chronic elevation of neurotransmitters can cause adaptation, or a diminished response, to the neurotransmitters. We have developed an assay which utilizes locomotion in the model organism *Caenorhabditis elegans* to study changes in genes/proteins involved in behavioral adaptation to serotonin. We have identified two mutant strains that fail to undergo adaptation to serotonin, protein kinase c-1 (*pkc-1*) and *def-1*. We also identified a novel phenotype in these mutants, depressed foraging. The purpose of this study is to characterize the cellular mechanisms by which *pkc-1* modulates serotonin-dependent behavioral adaptation and to investigate the link of the depressed foraging phenotype and serotonin-dependent behavioral adaptation. Identification of cellular mechanisms that cause serotonin-dependent behavioral adaptation will further the understanding of how antidepressant drugs, which chronically elevate serotonin, influence the nervous system.

*Keywords: C. elegans, Serotonin, Behavior*
Migrant Labor in Washington State: Smuggling or Trafficking?
Rosales, Erika
Faculty Mentor(s): Rex Wirth, Political Science; Gilberto Garcia, Political Science

Poster Presentation Session #2, Poster #6
11:30-2:00 p.m. in Ballroom C/D

In the 1990s, the problem of trafficking emerged internationally and in the United States of America. Conflicts between trafficking and smuggling have brought to the attention of the general public and the government via legislation. Smuggling and trafficking are different crimes and the terms cannot be used interchangeably. There is a clear distinction between smuggling and human trafficking. How can smuggling be distinguished from trafficking? This topic has not been thoroughly explored, and more studies will be needed to determine a possible solution. Smuggling has always been a problem in America. According to United Nations Office on Drugs and Crime (UNODS), individuals who are smuggled are vulnerable to abuse and can be exploited. Smugglers take advantage of the migrants that are willing to breach the law when they do not have legal access of migration (UNODS, 2013). The US Department of State began to monitor trafficking in person in 1994 when the Department’s Annual Country Reports on Human Rights Practices began to cover trafficking victims (Human trafficking.org, 2013). However, their focus was on women and girls for sexual purposes but now it has expanded (Human trafficking.org, 2013). This poster illustrates the essential differences and links them with policy solutions that begin with careful timely assessment of detainees at the border.

Keywords: Illegal Migrant Labor, Human Trafficking, Exploitation
L’Elisir d’Amore Scene
Sacchi, Joseph; Hemenway, Sarah
Faculty Mentor(s): Gayla Blaisdell, Music, Opera

Creative Expression Presentation, Session #52
4:50-5:10 p.m. in Ballroom A

L’Elisir d’Amore premiered in Milan in 1832. The music was composed by Gaetano Donizetti (1797-1848), who wrote more than 60 operas in addition to orchestral and chamber music. This piece is a perfect example of the bel canto tradition that dominated Italian opera in the early 19th century. Bel canto singing is based on ease, purity, and evenness of tone production and demands great vocal agility. This romantic comedy is one of Donizetti’s most frequently performed operas. In the opera, Nemorino, a young villager, is in love with the beautiful farm owner Adina. Adina is not interested in Nemorino. Her philosophy is to change her affections every single day. Dulcamara, a traveling purveyor of patent medicines, arrives in the village, advertising a potion capable of curing anything. When the doctor has finished his routine, Nemorino shyly asks if he sells the elixir of love. Dulcamara claims he does and pulls out a bottle of Bordeaux wine. Though it costs him his last ducat, Nemorino buys it and immediately drinks it; Dulcamara explains that he has to wait until the next day for results (by which time Dulcamara will be gone). Our scene begins when Adina appears and Nemorino begins to feel the effect of the “potion.” Certain he will be irresistible to her the next day, he feigns cheerful indifference. She becomes increasingly annoyed and to punish him, Adina decides that she will flirt with the handsome Sergeant Belcore.

Keywords: Love, Inebriation, Comedy

Compass 2 Campus: Community Mapping and the Role of Mentoring
Sanchez, Felisa; Fuss, Rebekah
Faculty Mentor(s): Janet Spybrook, Language, Literacy, and Special Education

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

This project is centered around the idea that mentoring can have a profound impact in the community by preparing students at an early age for postsecondary education. This study was conducted to understand the community that we will be working with, in relation to mentoring programs that have proved to be successful such as Compass 2 Campus. In order to better serve the community, we investigated perceptions of individuals about the education system. Wapato School District met criteria for low academic achievement and then community mapping was done to get more details. Two community members were interviewed and questions such as the following were posed: What is your perception of the schools in Wapato? How do you feel about school administrators and teachers helping out students? Do you feel like the school is helping students with their postsecondary education plans? Pictures of the community were taken within a six-block radius of the school and the community park. Statistics were gathered from Office of Superintendent for Public Instruction (OSPI). The community mapping will be applied as the Compass 2 Campus program is implemented in fifth-grade classrooms in Wapato starting September 2014. The conclusion of the project was that connecting with the community and maintaining open communication is vital to the success of the mentoring program.

Keywords: Mentoring, Education, Postsecondary
Site Specific
Sande, Elizabeth
Faculty Mentor(s): Crystal Fullmer, Physical Education, School and Public Health, Dance Program

Creative Expression Presentation, Session #35
1:10-1:30 p.m. in Ballroom A

The site specific assignment in the choreography course included creating a movement work at an outdoor location on campus. I chose a bridge with the fall leaves as a covering from the towering trees above, accompanied by the sound of the creek and all its inhabitants. The site stood out to me as I was walking through campus and I felt that it could communicate the message I wanted to send. A bridge represents a joining of two sides; my piece was about being pulled between the two different sides, becoming unaware of what was right. The presentation will be viewed through video. I chose to use movement that showed the pulling between two paths. Since the bridge is rather narrow, most of the movement travels backward and forward. I use level changes; including the cold hard ground as well as the soft golden leaves above. I dance with the bridge rather than on it, because the bridge is the inspiration for my work. I discovered that infusing expressive movement, the outdoors, and an absence of music created a different way to experience movement.

Keywords: Dance, Site Specific, Bridge

How She Sees Me
Sande, Elizabeth
Faculty Mentor(s): Crystal Fullmer, Physical Education, School and Public Health, Dance Program

Creative Expression Presentation, Session #25
11:40-12:00 p.m. in Ballroom A

The final project in the choreography course was to create a full-length work of movement. We were required to find a poem and an art work that inspired us in the movement process. Numinous by Gerri Sayler, found at the Sarah Spurgeon Art Gallery, became my inspiration due to the hundreds of strands of hanging crystal-like pieces. The poem used in my work is one that was created specifically for this assignment. Heather Margrave, my childhood friend, created a poem with the art work in mind. The poem is about how she sees me, therefore creating the name of my work. How She Sees Me is performed by Katelyn White. The work uses techniques introduced to us in our choreography class. For example, the Laban Efforts of slashing, gliding, and thrusting were used in my creative process, accompanied by physically doing the choreography and writing it down. The inspiration for this project is a result of classroom experiences as well as the combination of the music and art. I want the audience to experience a sense of struggle, and yearning to find ones-self. I wanted to be sure to include several directional changes, as well as showcase the extremes of movement; moving from a quick tempo to a slow tempo to ensure that the steady piano melody did not dictate my choreography, but rather have the movement speak for itself.

Keywords: Dance, Journey, Creative Expression
It Could Have Been the Mountain Dew: *Burragge v. US* and the Limits of Legal Liability for Illicit Drug Distribution

*Sayre, Elizabeth*

*Faculty Mentor(s): Cody Stoddard, Law and Justice*

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

In order for an individual to be found criminally liable, the state must demonstrate all elements of the criminal offense beyond a reasonable doubt. Criminal law often mandates the elements of an act, intent, concurrence, harm, and causation. The following case clarifies the causal element, which is the relationship between the crime and the result. Marcus Burrage, a known drug dealer, sold heroin to Joshua Banka who died after consuming other drugs, including a portion of the heroin. Although other drugs were involved, Burrage was found guilty for Banka’s death. In order for causation to be demonstrated, the state must prove beyond a reasonable doubt that if the criminal act were removed the harm would not occur. The Supreme Court held that the state did not effectively prove the element of causation resulting in Burrage’s conviction. The court reasoned that the heroin was not the cause in fact as Banka’s death was the result of a mixture of various illicit drugs, therefore the heroin’s existence in Banka’s system is not the sole reason his death occurred. This ruling helps to clarify ambiguities that surround causation in regards to criminal liability. This restriction within the scope of criminal law is important for states to recognize because a significant proportion of all overdoses involve a mixture of drugs. This presentation will review the facts, explain the Supreme Court’s decision, and discuss the implications of this case.

*Keywords: Criminal Law, Legal Liability, Causation*

Stage Management

*Scheopner, Gregory; Jones, Kathleen*

*Faculty Mentor(s): Jerry Dougherty, Theatre*

Oral Presentation, Session #36  
1:30-1:50 p.m. in the SURC Theatre

At Central Washington University, the stage managers are in charge of running and helping keep rehearsals organized. As a result, stage managers keep prompt books. These prompt books hold all of the paperwork and show information a stage manager would need to run a show. In the event that the original stage manager could not run the show, a new one could use the prompt book to continue the show. A prompt book should be a complete record of the show and its production process so that if the show were to be remounted all the information needed would be contained in the prompt book. The stage management presentation will be a showcase of the prompt books used in *A Christmas Carol* and *Nanawatai*.

*Keywords: Communication, Organization, Problem Solving*
Knowledge about the Female Anatomy and Its Results on Sexual Behavior
Schiller, Hailey
Faculty Mentor(s): Duane Dowd, Family Studies

Poster Presentation Session #3, Poster #39
2:30-5:00 p.m. in Ballroom C/D

The purpose of this study was to assess the link between knowledge about the female anatomy and sexual behavior. It was hypothesized that greater knowledge of the female anatomy would be related to comfort in discussing sexual behaviors as well as having more sexual partners. A sample of 200 participants ages 18-52 completed a four part survey which assessed demographics, comfort, sexual interaction, and knowledge. Both hypotheses were supported. In addition, there was a strong relationship between comfort level in talking to an intimate partner and comfort level in talking about the female anatomy in general. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)

Keywords: Sexual Behavior, Knowledge

Who Is Alice?: Parody, Education, and Identity in Lewis Carroll’s Alice’s Adventures in Wonderland
Sedlacek, Cameron
Faculty Mentor(s): Laila Abdalla, World Languages

Oral Presentation, Session #18
12:20-12:40 p.m. in Room 135

This essay frames Lewis Carroll’s Alice’s Adventures in Wonderland as a Menippean satire, according to Mikhail Bakhtin’s theories regarding parody, and describes the extent that this text parodies the Victorian education system. This parody responds directly to specific tendencies and laws of the Victorian education system and is reflected in what many modern scholars have described as an empowering children’s novel. Alice’s Adventures in Wonderland relies heavily on language, specifically on the difference between knowledge and understanding, and characterization, through caricature and stereotype, to develop a parody of the adult world in nineteenth century England while at the same time providing a means for a young girl, Alice, to create her own identity.

Keywords: Menippean Satire, Bakhtinian Parody, Victorian Education

Lighter Than Air UAV
Sedy, Joe
Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction

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

Unmanned air vehicles (UAVs) are less expensive and safer to operate than traditional aircraft. A need has been demonstrated for a UAV that is lighter than air, capable of precision maneuvers, and able to carry a payload. Lighter than air UAVs are safer to operate than their heavier than air counterparts because if there is a sudden failure of their electronic or radio system, they will not fall out of the sky. The American Society of Mechanical Engineers (ASME) has put forth this project as part of a Student Design Challenge. This project is being approached as a team. The
Members of this team include Patrick Kinney and the creator of this document, Joe Sedy. Joe Sedy is responsible for the design, analyses, and construction of the gondola and its mechanical subcomponents. It was analyzed and designed at CWU. The analysis and optimization of the gondola were made possible by the skills learned in several of the engineering classes in the MET program. SolidWorks 3D modeling software was used to create the virtual models and drawings of the gondola and its subcomponents. The gondola was constructed using the Dimension U-Print 3D printer and various other tools available to students in Hogue. Finite Element Methods will be used to test the strength predictions made before a physical test is performed. The UAV created was able to complete the test course in 5 minutes and 40 seconds while carrying 29 times the minimum payload.

**Keywords:** UAV, Blimp, 3D Prototype

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**Initiating an Asteroid Observational Astronomy Program at Central Washington University**  
**Seel, Matt**  
**Faculty Mentor(s): Michael Braunstein, Physics**

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

Asteroids are thought to be formed from the same accretion disk of gas and dust as the sun and planets, thus they can tell us about the early history of the solar system. An additional important consideration for asteroids is monitoring their orbits due to the potential threat of asteroid impacts. The goal of this project was to initiate an asteroid observational astronomy program at Central Washington University. We used the IAU Minor Planet Center’s database to select and generate ephemerides for asteroids accessible to the CWU observatory and the ALADIN Applet to obtain star fields. Using the CWU 30cm telescope mounted on the roof of Lind Hall, we collected data multiple times a night over several nights for each of the selected asteroids. An Apogee Alta CCD camera running with MaxIm DL was used to obtain images of the asteroid fields and calibration frames. The images were calibrated using MaxIm DL and the CLEA Astrometry Toolkit was used to perform astrometry and photometry on the calibrated images. We have reported our results to the IAU Minor Planet Center.

**Keywords:** Astronomy, Astrometry, Asteroid

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**Building a Myth: Testaments of the Kievan Rus’ Grand Princes as Origin Myths**  
**Seelye, Elizabeth**  
**Faculty Mentor(s): Roxanne Easley, History**

Oral Presentation, Session #15  
10:00-10:20 a.m. in Room 271

During the ninth through twelfth centuries, the Grand Princes of the Kievan Rus’ were locked in a internal struggle with the other Russian princes vying for top position in Russian hierarchy. Using their dynastic link to the semi-legendary Riurik and later connection to the Orthodox Church, the Grand Princes built off these connections to form a mythology that established religious and secular legitimacy and an imperial lineage to validate state power. This paper will demonstrate that the written legacy of the Grand Princes, when broken down into its basic elements, represents different formulas of the same dynastic myth.

**Keywords:** Kievan Rus, State Building, Legitimacy

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The Dream Act: What’s the Problem?

Serrano, Jessica

Faculty Mentor(s): Rex Wirth, Political Science

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

“Give me your tired, your poor, Your huddled masses yearning to breathe free, The wretched refuse of your teeming shore. Send these, the homeless, tempest-tossed to me, I lift my lamp beside the golden door!”—Emma Lazarus. Immigration has been the primary source of growth for the United States of America. It was discovered by foreigners and the subsequent immigrants that inhabited this newly discovered land were the people who shaped the country that we live in. But many of today’s immigrants are not welcomed as in the past. One problem that can be solved is that of making the promise of Lazarus’ words engraved on The Statue of Liberty real for the undocumented children of immigrants who are being denied equal access to education. The Dream Act is the solution, but it can’t seem to make through Congress. The poster deals with the inability of Congress to pass the Dream Act year after year due to anti-immigration attitudes and overall immigration politics and policy. It utilizes a SWOT analysis that relies heavily upon Washington State’s newly passed H.O.P.E Act to lay out the strengths, weaknesses, and long term opportunities as well as the near future threats of variations on the legislation.

Keywords: Reform, HOPE, Opportunity,

Structural Reforms in Washington at Large Voting Systems and Minority Communities

Shearer, Brendan

Faculty Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #2, Poster #7
11:30-2:00 p.m. in Ballroom C/D

Although the civil rights era in America is over, there are still questions about how we can make the system work more efficiently and aggregate preferences of all voters. There is obvious under-representation of minorities relative to their population in many localities. The reasons for this may be a myriad of causes; lack of education, poor voter mobilization, large foreign born populations, or a legal or structural barrier to voting. Specifically in this proposal we seek to end multi-member-at-large voting districts as a means of election, mobilize voters through political structures/apparatus, and educate voters to participate in the process. This problem affects the Latino population in this region the most, other minorities are also at risk; but, Latinos are the largest underrepresented group. This problem came to my attention through developing a case study on the city politics and voter participation of the Latino community in Sunnyside, Washington. Although, most of their at-large election system has been repealed there is still some at-large voting in this community. There is a huge amount of under-representation in this community. This lack of representation comes from not just one source, but many. It is of the utmost importance in the American system to maintain a political system that maximizes individual utility, strengthens communities, and allows for individuals to participate effectively in decision making. The majority of American’s believe that the civil rights debates are over, but with a second look the amount of inequality in some areas of this country is staggering. We must address some of the underlying causes that create inequality and empower the community to participate in the ‘agora’ (assembly), and create a system that does not have concentrations of power controlled by one race, social class, religion, or political ideology.

Keywords: Voting, Latino, Political
Archaeological Investigations at the Sunrise Ridge Borrow Pit Site (45PI408) in Mount Rainier National Park

Sheldon, David; Limberg, Caitlin; Lewis, Patrick; Rennaker, Patrick; Kassa, Sonja

Faculty Mentor(s): Patrick McCutcheon, Resource Management

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

Archaeological investigations at the Sunrise Ridge Borrow Pit site (45PI408) in Mount Rainier National Park continue to yield information about precontact land use in the upland environment of the Cascade Mountain Range. The National Park Service (NPS) contracted Central Washington University (CWU) to conduct archaeological investigations at 45PI408 as part of mitigation for past damage to the site from historic gravel borrowing activities. Initial testing at 45PI408 was conducted between 1997 and 2001 in order to establish site boundaries. Excavations were conducted by CWU Archaeological Field School students under the guidance of Professor Patrick McCutcheon between 2011 and 2013 in an effort to characterize the site. A total of 19 1x1 meter units were excavated yielding thousands of artifacts and identifying several intact features. Analyses of the recovered materials from both testing and excavation are currently underway at CWU. These analyses include thermoluminescence dating of fire modified rock, radiocarbon dating of faunal remains and charcoal, macrobotanical analysis, analysis of the chipped stone tool assemblage, and obsidian source-to-site analysis. These analyses will refine the age of the site and allow inferences about changes in past lithic technologies through time, trade networks, and subsistence patterns. An excavation report detailing the findings of these analyses will be completed by Professor McCutcheon with the assistance of CWU students and submitted to the NPS.

Keywords: Mt. Rainier, Archaeology, Field School

Music Arranging and Performance for Geriatric Audiences

Shelton, Katie

Faculty Mentor(s): Hal Ott, Music

Poster Presentation Session #2, Creative Work #62
11:30-2:00 p.m. in Ballroom C/D

I am a passionate musician and flutist and have a deep affinity for the elderly. I have immensely enjoyed playing my flute in various venues frequented by seniors such as churches and senior centers. I love to see the smiles that come on their faces when they hear familiar tunes that they enjoy. As a musician, I am also interested in learning how to arrange music for the flute and piano that has previously been written for other instruments. I wish to arrange existing tunes that the elderly are familiar with (most of which were originally written for solo piano or voice and piano) for the flute along with a piano accompaniment, and then I will perform the arranged music in concerts at local elderly care centers. The set will consist of hymns, patriotic tunes, songs from older musicals, and well-known classical pieces. Some works to be performed such as those by Bach and Beethoven were written for the flute and piano. When works for this medium are not available, I will arrange existing music to be played by flute and piano. I will then rehearse with a pianist and perform these pre-existing pieces and arrangements at local retirement centers. I contacted Royal Vista Nursing and Rehabilitation, Kittitas Health and Rehabilitation Center, Dry Creek Assisted Living Community, and Hearthstone Cottage Retirement Center and arranged performance dates and times.

Keywords: Geriatric, Arranging, Performing
Analyzing Topographic Profiles of the Surprise Valley Fault to Determine Age

Sherrod, Joe

Faculty Mentor(s): Anne Egger, Geological Sciences

Poster Presentation Session #1, Poster #46
8:30-11:00 a.m. in Ballroom C/D

The Surprise Valley fault is a normal fault located in the northwestern portion of the Basin and Range province. In the last ~20 ka the Surprise Valley fault has experienced 5 major surface-rupturing earthquakes, and numerous fault scarps are present along its length. Analysis of topographic profiles across fault scarps can provide evidence for (1) the number of earthquakes whose surface ruptures are visible, and (2) the age of the fault scarps. Thus, analysis of many topographic profiles from multiple locations along the Surprise Valley fault can determine whether the current surface deformation is the result of one large earthquake or separate earthquakes over smaller segments of the fault. Analyzing topographic profiles involves measuring the slope of the scarp, comparing these slopes between all profiles, and grouping them accordingly. Age of fault scarps can be determined through the use of diffusion equations, and tied to known earthquake age data. If all the slopes are similar and a single event is indicated, offset can be determined and mapped. If multiple groups and, therefore, events are indicated, each group of fault scarps can be tied to a known earthquake in the past. These data can then constrain the magnitude of past earthquakes. This work will facilitate comparison of the motion and seismic hazards of the Surprise Valley fault with other known faults of the Basin and Range in its northwestern reaches.

Keywords: Topographic, Profile, Fault

Perceptions of Wilderness: An Examination of Native American Utilization of Traditional Plant Resources and Public Lands Management

Shoaf, Kelli

Faculty Mentor(s): Lene Pedersen, Anthropology and Museum Studies

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

In 2011, the National Park Service proposed a change in regulations that would allow all federally recognized tribes to request permission to gather plants on parklands for traditional purposes. This modification would reverse decades of exclusionary management to extend the scope of tribal gathering beyond specific parks with treaty-based agreements. My research uses ethnographic methods to conduct a case study of tribal and community responses to the proposed change in the Olympic National Park area. My goal is to understand how people perceive wilderness and how these perceptions reflect people’s reactions to plant gathering on parklands. Documenting people’s opinions on wilderness in context of the proposed change in regulations will add to existing literature on multiple-use land issues, expand public knowledge, and envision the direction in which collaborative land management may be shifting.

Keywords: Native American Cultures, Ethnography, Public Land Management
**Polyelectrolyte/Surfactant Complexes as Reversible Transports to a Modified Silica Surface**

*Siegenthaler, James*

_Faculty Mentor(s): Dion Rivera, Chemistry_

Oral Presentation, Session #50  
5:10-5:30 p.m. in Room 140

The design and implementation of a controlled chemical transport system could greatly advance switchable chemical reactions and be applicable for targeted drug delivery, intelligent inks, and nanotechnology. This investigation endeavors to create a system utilizing a polyelectrolyte/surfactant complex that can be used as a reversible molecular cargo transport, bringing cargo to a charged surface. The goal is to determine if such a system can be investigated using a quartz crystal micro balance and attenuated total internal reflection Fourier transform infrared spectroscopy. Modifications of control for this system are to include only changes to the chemical composition of the system including pH, surfactant types, and ionic strength. Preliminary results show that polyelectrolytes and surfactants are indeed attracted to a modified silica surface utilizing pH changes. Further work is to be done investigating the reversibility of these components and the attraction of a polyelectrolyte/surfactant complex to the modified silica surface.

_Keys: Surface, Transport, Polyelectrolyte/Surfactant_

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**Effects of Excess Testosterone on NOD Mouse Adipocyte Cell Size**

*Simianer, Courtney*

_Faculty Mentor(s): April Binder, Biological Sciences_

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

The purpose of this current experiment is to determine the effects of the steroid dihydrotestosterone (DHT) on non-obese diabetic (NOD) mice; a strain of mice that is susceptible to developing diabetes genetically. High levels of testosterone are common in women with polycystic ovarian syndrome (PCOS), a disease that affects one in three women in their reproductive years. Mice were previously treated with DHT or a placebo over a 12 week period to stimulate PCOS-like symptoms. The body weight of the mice was measured weekly and after 12 weeks of treatment four different types of adipocyte (fat) tissues; which included retroperitoneal, gonadal, inguinal, and brown fat were fixed and embedded in paraffin wax. Although all of the mice started out with similar body weights the placebo treated group had a plateau in body weight whereas the DHT treated group had a significant increase in body weight over the 12 week period. These data suggest that DHT causes weight gain in the NOD mice and, from this, we hypothesize that the size of the adipocyte tissue is going to increase in mice treated with DHT compared to the placebo treated mice. To examine the adipocytes, the different tissues will be sectioned with a Microtome and stained using hematoxylin and eosin staining; the most commonly used staining protocol for tissues. An excess amount of testosterone and increased weight gain are symptoms of PCOS, and this experiment could provide insight into how testosterone causes this change in women.

_Keys: Ovary, Adipose, Testosterone_
Cyberbullying and Behavioral Outcomes
Simpson, Clara
Faculty Mentor(s): Sarah Feeney, Family Studies

Poster Presentation Session #3, Poster #34
2:30-5:00 p.m. in Ballroom C/D

To further explore how close relationships might affect subsequent cyberbullying behaviors, the present study examines direct and indirect experiences with cyberbullying and how associated emotional pain levels related to cyberbullying experience influence subsequent cyberbullying behavior and attitude. A sample of 338 participants, aged 18 to 78, was examined. Past social media behaviors, experiences, and associated emotional pain were measured. Findings suggest that emotional pain associated with direct victimization and indirect victimization of witnessing cyberbullying affect subsequent cyberbullying behaviors.

Keywords: Cyberbullying, Social Media, Behaviors, Victimization

Land Use Change in Phoenix, Arizona 1990-2014
Skyllingstad, Reed
Faculty Mentor(s): Jennifer Lipton, Geography

Poster Presentation Session #2, Poster #28
11:30-2:00 p.m. in Ballroom C/D

Phoenix, the capital of Arizona is a city of about 1.44 million people. It has experienced significant land use change from 1990 to the present day. Today, Phoenix is surrounded by the metro areas of Glendale, Scottsdale, Tempe, Mesa, and Peoria. To answer the question of “How has urban development changed land areas around the city of Phoenix, Arizona from the early 1990’s to the present day?” A variety of methods will be used. USGS’ Global Visualization Viewer (GLOVIS) will be used to download imagery from Landsat 7 and 8 in order to compare land use change from 1990 to the present day. Once the satellite scenes are downloaded, ERDAS IMAGINE software will be used to perform classifications on each image to determine if a land area has developed into urban sprawl, or if an area has stayed the same. In addition, change detection analysis will be used in the software to highlight land use change over time. External research papers will be examined to determine the effect of land use change over the city of Phoenix, as well as surrounding areas.

Keywords: Change, Phoenix, Geography

Actuarial Model Outcome Optimal Fit (AMOOF) 3.0 --Free Research Software for Data Analyses and Advanced Probability Modeling
Smigaj, James
Faculty Mentor(s): Yvonne Chueh, Mathematics

Oral Presentation, Session #14
10:40-11:00 a.m. in Room 202

The purpose of this software is to assist in the fitting of data sets using single and mixed probability density functions (pdfs), and to calculate distribution parameters and statistics regarding these curves. Nonlinear Optimization of the log-likelihood function is used to determine the best
values for the pdf variables (MLE approach). Challenging measures such as Percentiles (Vale at Risk VaR) and Conditional Tail Expectations (Tail Value at Risk TVaR) for the resulting best-fitted pdf functions are found using numeric integration. AMOOF 3.0 primarily adds mixed pdfs, speed increases, interactive user interface improvements, and an additional real-time check on numeric accuracy. This software is an extension and enhancement of AMOOF 2.0, which was begun as an undergraduate software engineering project sponsored by the Actuarial Foundation.

*Keywords: Software, Statistics, Optimization*

**Reecer Creek Microorganisms and Macroinvertebrates**

*Smith, Abbigale*

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

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

Surveys of microorganisms and macroinvertebrates in the Reecer Creek Floodplain Restoration Project were carried out in October 2013 to characterize the small fauna in the aquatic ecosystem. These organisms form the lower trophic levels of the aquatic ecosystem. We compared their abundance to surveys in previous years.

*Keywords: Biology*

**Growler Galaxy**

*Smith, Austin*

*Faculty Mentor(s): Dwayne Douglas, Information Technology and Administrative Management*

Oral Presentation, Session #7
11:30-12:00 a.m. in Room 301

Ellensburg could really use a good growler fill station. Growler Galaxy, to be owned and operated by me, will bring the pleasure of fresh craft beers in growlers to our town. Why growlers? They’re a fun, appealing, economical way to drink beer. When you buy a growler of beer, you drink it soon. Then you don’t just toss your empty growler – you fill it again. Growler Galaxy will be your go-to place to fill it with new and interesting beer as often as you like. Why does Ellensburg need such a store? You can fill growlers at Happy’s, Iron Horse, Wineworks, and elsewhere, right? Sort of. You can fill your growler at a few establishments around town. But it’s done as a sideline, an afterthought to the main business. Selection and turnover is low. Prices are high. The growler fill business in Ellensburg is rudimentary. That’s why a dedicated growler fill station is needed and is bound to thrive. Growler Galaxy will have sixteen taps to start with – more as demand grows. Beer selection will change often (apart from a few bestselling mainstays), so customers will come back often to see what’s new. Our low prices, live-updated online tap list, and loyalty cards (and friendly and knowledgeable counter staff) will make it easy and rewarding to patronize us. My business appeals to the burgeoning taste for a variety of fresh craft beers. It advances appreciation of craft beer. It taps an untapped (so to speak) market.
Effects of Father’s Involvement on Men’s Attitudinal Measures Regarding Parenting
Smith, Keith
Faculty Mentor(s): Robert Moore, Law and Justice

Oral Presentation, Session #2
9:10-9:30 a.m. in Room 137A

The purpose of this study was to find out if the way that a man perceived his father would have direct impact on how he viewed an ideal father. This study measured if being an involved father was self-perpetuating. Thirty male students from around the CWU Lynnwood campus, as well as sixteen male participants contacted through the internet were surveyed. The men were given a survey that measured how they perceived their father’s involvement within their own lives, and what they perceived to be an ideal amount of father involvement. The men were ranked by the father involvement scores and split into quartiles (There was also a third absent father group). The top and bottom quartiles were then compared for ideal father involvement scores. Contrary to what was expected, there was very little difference between the groups’ scores. In fact, the absent father group showed slightly higher scores than the others. This would point to the opposite effect than expected. Very little work has been done comparing a man’s views on his father, and his view of an ideal father. Hopefully this work will inspire others to look at that interaction. While this work suffers from a small sample, a homogenous sample, and variables that could have been better operationalized, it is still informative to know that men’s views on parenting may not just be the result of what they saw growing up. It is also possible that with a more finely tuned survey, a positive correlation can be found.

Keywords: Parenting, Fatherhood, Absent

Genetic Analysis of Ancient Bison Mitochondrial DNA
Smith, Samuel
Faculty Mentor(s): Joseph Lorenz, Anthropology and Museum Studies

Poster Presentation Session #2, Poster #36
11:30-2:00 p.m. in Ballroom C/D

The Kittitas Valley is located on what is considered the very periphery of the range in environments of which the species Bison bison can naturally survive. Since bison can be broken up into two separate sub-species, the Canadian Woodland Bison and the Great Plains Bison, it is my argument that by using genetic analysis of the mitochondrial DNA in the bones there is a potential for a better paleo-climatic model to be constructed for the Kittitas Valley. This project itself is broken up into two parts. The first part is to tell if it is possible to extract mitochondrial DNA from faunal remains found within the Kittitas Valley, using the polymerase chain reaction (PCR) method for mitochondrial DNA on ancient bison zooarchaeological remains. Assuming that mitochondrial DNA can be extracted using PCR, an analysis of the types of environments in which both those species currently live, would be able to help solidify a paleo-environmental model. However even if DNA is not extracted the bones can still help set up a paleo-environmental model that could be argued for at sites with bison remains.

Keywords: Zooarchaeology, Mitochondrial, Paleo-Environments
KCWU FM: Broadcast Engineering
Smith, Stephanie
Faculty Mentor(s): Lad Holden, Engineering Technologies, Safety, and Construction

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

This presentation will be on the setup of servers, maintenance, and networking of a radio station. The presentation will also include information on the responsibilities of a broadcast engineer, streaming and bit rate encoding of music over radio waves, details of an Axia network, as well as the different parts necessary to help the network function correctly and optimally. Also discussed will be the importance of maintenance and network security within a radio station, an overall review of the different technology used on location at a radio station, and the events outside of the radio station.

Keywords: Broadcasting, Networking, Audio-Over IP

Music Advocacy in Ellensburg
Snedeker, Jeffrey; Bisson, Rebecca; Bliley, Vanessa; Jordan, Julian; Kurtenbach, Clara; Munden, Mikhail; Simons, Connor; Stewart, David
Faculty Mentor(s): Jeffrey Snedeker, Music

Oral Presentation, Session #45
3:00-3:40 p.m. in Ballroom A

UNIV 309 Civic Engagement was offered by Professor Jeffrey Snedeker in Winter 2014. The intent was to offer students a service-learning opportunity in the area of advocacy of music in the curriculum of the Ellensburg public schools. Students in the class conducted surveys of Ellensburg School District staff, students, parents, and community members to arrive at some baseline values of music education in the district. This SOURCE presentation will give students in the class the opportunity to present their findings individually, in anticipation of their collective contribution to the 2013-14 Annual Report of the Ellensburg Music Coalition, a community music advocacy organization, to the Ellensburg School Board and administration.

Keywords: Civic Engagement Music Education Advocacy
Duration of Days without Washing Dishes
Spadoni, Amanda
*Faculty Mentor(s): Shu-Fei Tsai, Language, Literacy, and Special Education*

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

This study attempted to decrease the amount of days that the participant went without washing her dishes. The participant would let her dishes pile up for days leading to unsanitary situations. For example, the participant would not soak her dishes in the sink when she was done eating or cooking she would simply just set it on the counter. This would lead to whatever leftover food that was left on the plate to be caked on and take a long amount of time to wash off. Therefore, the study used ABAC design to help to reduce the number of days that the participant would let her dishes pile up for. After observing the behavior of the participant and realizing that this was a behavior that needed to be changed, the researcher made the behavior apparent to the participant and she volunteered herself for the study. Through the use of two different interventions, in an attempt to reach the goal of only having the duration of one day of letting her dishes pile up. The two different interventions included a stimulus intervention, which included having pictures of what her kitchen looked like when it was clean up on the cupboards. The second intervention included the pictures as well as verbal prompting to ensure that the behavior was to be performed. The outcome of the study showed that the participant was able to reduce the duration of the amount of days between washing dishes.

*Keywords: Behavior Study, Special Education, Teaching and Learning*

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Mathematical Modelling of Highway Traffic Policies
Squire, Benjamin; Mann, John-Paul; Minor, Nathan
*Faculty Mentor(s): James Bisgard, Mathematics*

Oral Presentation, Session #14  
9:40-10:00 a.m. in Room 202

Extensive research has been done to model and simulate traffic flow in order to answer valuable questions in the implementation of different traffic policies. A major open question is whether or not the stay right except to pass rule is an efficient traffic policy in terms of traffic flow and safety. We develop a particle-interaction based model which stems from how cars react and make decisions using locally restricted knowledge and observe how snapshots of these processes over a large closed continuous road govern the dynamics of the overall traffic flow. Through computer simulation, we observe and analyze the difference among four traffic policies or rules which determine how cars react to an impending accident: 1) passing on the left or right if able (free passing); 2) passing strictly on the left and then returning to right most lane (single driving); 3) passing on the left and then returning to any open lane on the right (single passing); and 4) not allowing any passing (no passing) in both low and high density traffic.

*Keywords: Mathematical, Modeling, Simulation*
Would Not Existing Put a Limitation on the Idea of Infinity?

Stankus, Melanie

Faculty Mentor(s): Gary Bartlett, Philosophy and Religious Studies

Oral Presentation, Session #33
1:10-1:30 p.m. in Room 271

Rene Descartes gives an ontological argument for the existence of God in his “Fifth Meditation.” He claims to have a vivid and clear idea of God, and a vivid and clear idea of God having the property of perfection. Perfection entails the property of existence, because in order for something to be perfect, it has to actually exist. Therefore, God has the property of existence, that is, God exists. Descartes’ argument relies on his vivid and clear perceptions. Earlier in his Meditations, he argued that a vivid and clear perception is unquestionable, or self-evident. I argue that Descartes’ ontological argument for the existence of God does not prove the existence of God because Descartes could not have vividly and clearly perceived God to have the property of perfection. Given that a vivid and clear perception is unquestionable, if I prove that God’s property of perfection is questionable, Descartes’ ontological argument falls apart. The goal of my paper is to show that God’s property of perfection is inseparable from God’s property of infinity, God’s property of infinity is questionable, and thus God’s property of perfection is questionable. Since God’s property of perfection is questionable, it could not have been provided by a vivid and clear perception.

Keywords: Philosophy, Ontology, God

Interactions between Tourists and Juvenile Tibetan Macaques (Macaca thibetana) at Mt. Huangshan, China

Staven, Asa

Faculty Mentor(s): Steve Wagner, Biological Sciences; Lori Sheeran, Anthropology; Jin-Hua Li, School of Life Sciences, Anhui University, Hefei, Anhui Province, China

Oral Presentation, Session #49
4:30-4:50 p.m. in Room 137B

Primate tourism research has rarely focused on the interactions of free ranging juvenile and infant monkeys with humans. We investigated young Tibetan macaque (Macaca thibetana) interactions with tourists, researchers, and park staff at the Valley of the Wild Monkeys, Mt. Huangshan, China. One hypothesis stated macaques would display more aggressive behaviors toward unfamiliar humans than frequent visitors. We also hypothesized that the boldness of a monkey depended on its mother’s boldness and the support of its peers. For each interaction, data were collected on monkey identity, human categorization, monkey and human behaviors, and monkey proximity to humans. Non-metric multidimensional scaling was used to investigate patterns of individuals’ interactions with categorical data (e.g., mother’s rank, monkey’s age class, and sex). The data showed significantly more interactions initiated by monkeys than humans (92.61% vs. 7.39%; χ²=1414.579, d.f.=2, p<0.01). There was a trend toward subadult and juvenile individuals being the most bold with higher inclinations toward aggressing at humans, while infants rarely engaged humans. Boldness did not seem to correlate with mother boldness or sex, but instead showed association with age class. Aggression rates affected individual tourists frequently more than researchers, park staff, or groups of tourists, with a partiality toward boy visitors (z=1.91, p<.05). Many of these aggressive actions were linked to tourists provoking monkeys with gestures or providing food separately from regularly scheduled feedings. We suggested several management strategies to decrease juvenile and human interactions which include reducing food thrown by tourists, educating tourists to use non-threatening behaviors, and placing fencing as a barrier on the platform.

Keywords: Tourism, Macaque, Interaction
How Big is that Hole? Using ArcGIS to Calculate the Volume of Sediment Needed to Mitigate Erosion of an Archaeological Site

Stcherbinine, Sean
Faculty Mentor(s): Mathew Novak, Geography

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

Damaged sections of the Sunrise Ridge Borrow Pit archaeological site in Mount Rainier National Park, Washington, were investigated to calculate the volume of sediment removed during the construction of a road. Damage consisted of the excavation of a borrow pit where a significant amount of sediment was extracted and archaeological materials disturbed. Central Washington University began a process that assessed the degree of disturbance and erosion, as well as recovered archaeological data during several field schools. The final step of this process is to determine the volume of sediment removed so the site can be converted to its original form. ArcGIS 10.2.1 was used to estimate current versus original topography in order to calculate the cubic meters of sediment required to fill-in damaged areas and mitigate the effects of erosion. Current and original topography were estimated using ArcGIS interpolation tools, which converted discrete total station elevations into two continuous topographic surfaces. Volume difference in these surfaces was calculated using ArcGIS’s cut and fill measurement. This study suggests a minimum of 637 cubic meters of sediment would be necessary to convert the site’s current topography to its original, unaltered gradient. These results will aid in mitigation efforts associated with this site, as well as represent how GIS can be used to calculate sediment loss in a dynamic setting.

Keywords: Geographical Information System (GIS), Archaeology, Compliance

Do They Make a Sound?
Stone, Jackie
Faculty Mentor(s): Crystal Fullmer, Physical Education, School and Public Public Health, Dance Program

Creative Expression Presentation, Session #25
12:00-12:20 p.m. in Ballroom A

Do They Make a Sound? is about opening societies eyes about a topic that is widely discussed but that many do not see or confront. In this piece, three different stories are shown by students to show how bullying comes in different forms as well as different outcomes. According to bullyingstatistics.org, one in four adolescents have been bullied physically, verbally, socially, or by social media. With this high of a number, it is a topic that needs to be explored and actions need to be taken. In Do They Make a Sound? the goal is to have the audience experience the various emotions and experiences that the dancer portrays. Through the arts, the audience is able to view or go along the journey with the storyteller and gain an understanding from the piece itself. The other purpose of the piece is to let people know that they are not the only ones who have gone through the struggles. In the choreography class, we had to look at art pieces and poems to find inspiration for a artistic piece through dance, and Do They Make a Sound? does that but, in addition, sheds light on a complicated topic that needs the attention.

Keywords: Dance
Reecer Creek Sinuosity and Large Woody Debris  
*Streepy, Westley*  
*Faculty Mentor(s): Jeff Hashimoto, Ellensburg High School*

Poster Presentation Session #1, Poster #54  
8:30-11:00 a.m. in Ballroom C/D

Surveys of channel location and woody debris were carried out in the Reecer Creek Floodplain Restoration Project in October 2013. Results were compared to previous years’ work to analyze changes in the channel morphology.

*Keywords*: Geomorphology

Controls on Fault Geometry During Early Stages of Extension in the Larkspur Hills, Northwest Basin and Range  
*Strickley, Diana; Egger, Anne*  
*Faculty Mentor(s): Anne Egger, Geological Sciences*

Oral Presentation, Session #30  
1:50-2:10 p.m. in Room 140

Detailed analyses of normal faults in domains of the Larkspur Hills, northwest Basin and Range, offer insight into factors controlling fault initiation, growth, and distribution in extensional regimes. N-trending faults in the southernmost domain share trends of major range-bounding structures and Pliocene linear volcanic vents; in contrast, NNW- and NNE-trending faults dominate further north and into south-central Oregon. Stress analyses and comparison with experimental and field data suggest that preexisting structures control fault geometries in the northern domains, while faults form perpendicular to $\sigma_3$ in the southern domain. NNW-trending structures were favorably oriented to slip under E-W extension, so reactivated and continued as the dominant fault orientation in northern domains. NNE structures have the most offset, however, possibly due to pre-existing NE-oriented structures that reactivated as links between newer segments, forming structures with zig-zag traces and an average orientation optimal to slip. The change in fault orientations is abrupt, occurring across a major NNE structure. A regional transition is thus captured within the Larkspur Hills, suggesting they overlie a structural boundary at depth that separates isotropic crust from crust with a pre-existing NW-trending fabric.

*Keywords*: Fault Initiation, Pre-Existing Structures, Extension

Heliocentric  
*Sumner, Alexander*  
*Faculty Mentor(s): Jeff Hashimoto, Ellensburg High School*

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

We invented Heliocentric, a technology using mirrors and solar tracking to increase energy output of modern photovoltaic cells. We built the Heliocentric system then compared it to standard solar panels to see which has a greater energy output.

*Keywords*: Solar, Renewable, Energy
How Sustainable Becomes Unsustainable in Resource Use: Insights from Behavioral Economics
Sun, Lixing; Takei, Hideki
Faculty Mentor(s): Lixing Sun, Biological Sciences; Hideki Takei, Information Technology and Administrative Management

Oral Presentation, Session #28
1:50-2:10 p.m. in Room 137A

Common-pool resources are often overexploited, leading to a deplorable condition known as the tragedy of the commons. Here, we present a behavioral economic model (Prisoner’s Dilemma) to show how this can happen. Furthermore, we reveal inadequacies in current economic models based on demand and supply, and population biology models based on population replacement rate for sustainable use of biological resources. By combining behavioral economics and population biology, we demonstrate how suboptimal becomes optimal in harvesting renewable resources. This new approach should have a significant policy implication in management, conservation, and sustainable use of biological populations.

Keywords: Behavioral Economics, Resource Use, Sustainability, Ecology, Conservation, Tragedy of the Commons

A Rabbit in the Bike Shed
Sylvester, Alexander
Faculty Mentor(s): Michael Ogden, Film and Video Studies

Video Presentation, Session #26
12:20-12:40 p.m. in the SURC Theatre

A Rabbit in the Bike Shed is an experimental film project being produced during the spring quarter of 2014 for credit in the film department as apart of COM492 Practicum. The project centers around the theme of chaos using drug use and users as a vehicle for the theme and concepts found in the subtext. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)

Keywords: Chaos, Drugs, Disassociation
Behavioral economics has been used for better result of prediction and assessment of human behaviors and attitudes in various areas such as strategic planning, policy making, medical cares, education, religious service, environmental management, marketing, and sales. While behavioral economics is considered one of new areas of economics, its basic approach was already observed in classical economics such as *An Inquiry into the Nature and Causes of the Wealth of Nations* by Adam Smith (1776) and *Capital: A Critique of Political Economy* by Karl Marx (1867). These classical economics discussed human behaviors based on both economic rationality and intuitive (psychological) rationality while the weight was much heavier on the economic rationality. Behavioral economics has the same approach. However, it focuses more on intuitive rationality to develop better models to explain the human behaviors in the informed knowledge-society. In the informed knowledge-society, we tend to have a wide variety of behaviors based on not only economic rationality but also intuitive rationality. This is why behavioral economics and its models are used for the better result of prediction and assessment of our behaviors. This presentation will explain not only basic concept and models of behavioral economics but also practical applications of the models. We chose framing effects and prospect theory for the presentation.

**Keywords:** Behavioral Economics, Human Behaviors, Economics

City Block 24 in Ellensburg, Washington, was occupied by Euroamericans and overseas Chinese starting in the late 1800s. A 1989 community archaeology project excavated a portion of downtown and recovered cultural materials mostly from the late 1800s and early 1900s. The excavated fauna was not analyzed or reported at the time. My project involved examining all of the fauna recovered from half (18) of the 5 x 5 foot excavation units, a sample of 457 specimens. Identified taxa are dominated by domesticated species, including pig, cattle, chicken, dog, and cat, but there is also one wild species, pheasant. Most of the modified bones were saw-cut, except for the chicken, dog, and cat elements. Pig bones were primarily lower limb, foot elements and vertebral remnants of pork chops. Unlike other sites from the 19th century West Coast, most of the identifiable bones were pig and chicken instead of cattle.

**Keywords:** Ellensburg, Historic Faunal Analysis, Archaeology, 19th Century, Pig, Chicken, Cattle, Dog, Cat, Bones
Bioavailable Iron in Equatorial Pacific Ocean Aerosol Samples

Teng, Hsiang; Ting, Hoi; Hinz, Dan; Shank, Lindsey

Faculty Mentor(s): Anne Johansen, Chemistry

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

Oceanic iron fertilization experiments performed in remote regions have established that iron additions draw carbon into the ocean at least over the months-long time frame of the experiments. However, the mechanisms that control iron speciation in atmospheric aerosol particles before and after deposition into the surface ocean remain largely unknown. This is in part due to the analytical challenge of quantifying iron at environmentally significant sub-nano molar levels. Here, we explore the near-real time determination of pico-molar levels of both Fe(II) and H$_2$O$_2$ produced from real marine aerosol particles collected over the Equatorial Pacific Ocean, as a function of both sunlight and electron donors such as dimethyl sulfide and organic acids. Results indicate that Fe(III) is reduced in the presence of light with electron donors that are already present in the collected aerosols, and that external additions of electron donors have an enhancing effect in some of the samples. These results contribute to resolving current inconsistencies in chemical models on the speciation of iron, formation of H$_2$O$_2$ and sulfur cycle in the marine atmosphere.

Keywords: Oceanic iron, Aerosol, Photochemistry

Alone in the Storm: The Dangers of Isolation and Weather in Rudyard Kipling’s “At the End of the Passage” and Bithia Mary Croker’s “To Let”

Thomas, James

Faculty Mentor(s): Christine Sutphin, English

Oral Presentation, Session #37
3:00-3:20 p.m. in Room 135

Two of the most well-known elements of Victorian Britain are its literature and its empire. Both Rudyard Kipling and Bithia Mary Croker were writers who lived and wrote in India during this period. Both writers produced stories, Kipling’s “At the End of the Passage” and Croker’s “To Let,” which followed the conventions of the Victorian ghost story genre, a genre that was wildly popular in Britain at this time. However, unlike most of their contemporaries, Kipling and Croker set their ghost stories outside of Britain, in colonial India. In these stories, the authors utilize isolation, weather, and hauntings to present a gritty and more realistic picture of life in India than their readers were accustomed to. The themes of isolation in these stories are used to demonstrate the perils of the resistance by British people in India to socializing with the native people of India. The weather is used as a commentary on the under-preparedness of the men and women who came to India and the consequences of their underestimation of natural hazards. Finally, the hauntings in these stories can be seen as the British imperialists being haunted by their own imperial practices, as the ghosts in both stories are British, not Indian. Through these stories, Kipling and Croker attempt to dispel some of the romantic illusions of the exotic reaches of the empire, while simultaneously criticizing elements of British imperial attitudes and practices.

Keywords: Victorian, Imperialism, Haunting
Washington School Psychologists’ Stages of Concern with RTI Implementation.
*Tiffany, Shayla; Melton, Stephanie; Little, Suzanne; Marrs, Heath; Bogue, Heidi*

*Faculty Mentor(s): Suzanne Little, Psychology*

Poster Presentation Session #3, Poster #47
2:30-5:00 p.m. in Ballroom C/D

This presentation will thoroughly present the literature surrounding the Concerns Based Adoption Model (CBAM), and its application to the study of school psychologists concerns with the implementation of response to intervention (RTI). The Concerns Based Adoption Model consists of seven stages known as the Stages of Concern. Although CBAM is typically used to assess teacher concerns; this study takes a different approach and applies this model to concerns of school psychologists related to the implementation of RTI. These seven stages provide an approach to observing the process of implementing educational change, such as RTI. RTI involves a multi-tiered system of instruction and methods that are used before proceeding to complete an evaluation of special education. It includes early intervention delivered as part of general education to assist students in remediating academic and behavioral deficits. Due to this multifaceted and time-consuming process, previous research has found that many school psychologists have concerns including, collaboration with other educators, concerns of overall implementation, and consequences of implementation. As more school districts are shifting to RTI, it is important to acknowledge the change and related concerns. The Concerns Based Adoption Model is an appropriate model for assessing these concerns. Kaplan (2011) conducted a similar study with school psychologists in Massachusetts and found that the majority of school districts were implementing RTI and that there were high levels of concern with the rewards and effects of RTI. In order to measure Washington State school psychologists’ concerns with RTI, CBAM will be used.

*Keywords: Response to Intervention, Concerns Based Adoption Model, Perceptions of School Psychologists*

*A Prayer for Purpose*
*Tinhof, Sierra*

*Faculty Mentor(s): Crystal Fullmer, Physical Education, School and Public Public Health, Dance Program*

Creative Expression Presentation, Session #25
12:20-12:40 p.m. in Ballroom A

This presentation will allow the audience to experience a four-minute work of original choreography performed live, as well as a seven-minute presentation on both the artistic and choreographic process of its creation. This dance was originally created for PED 301 Choreography, which teaches an integrated arts method of creating original dances. My dance is in the style of Tanztheater or “dance theatre,” which blends elements of both concert dance and dramatic performance to create a multifaceted work of art. In this work, titled *A Prayer for Purpose*, I have explored the artist’s life; specifically, the struggle to create art of a meaningful and lasting nature which touches the hearts of the audience. Inspired by the charcoal sketch titled *Self Portrait* by 20th century German artist, Käthe Kollwitz, and Emily Dickinson’s poem “If I can stop one heart from breaking,” I created the dance by drawing out significant images and ideas from these works as well as my own artistic journey to generate a basic phrase of movement. By augmenting this basic phrase using the choreographic devices learned in the course, the four-minute dance that is *A Prayer for Purpose* was born.

*Keywords: Dance, Tanztheater, Integrated Arts*
Flight Attendants: Stars of the Airline Industry
Tolbert, Shanice
Faculty Mentor(s): Dorothy Chase, Recreation and Tourism

Oral Presentation, Session #42
3:20-3:40 p.m. in Room 202

This presentation will explore the differences and inequalities between United States’ airlines and internationally owned airlines by comparing the treatment of their most visible employee: the flight attendant. For years the airline industry focused their advertising campaigns around the sex appeal of flight attendants over their actual duties, which have more to do with passenger safety than hospitality. Hospitality is an added bonus that passengers receive as part of their inflight experience. When examining these differences, this presentation will review current public perceptions and employer requirements regarding dress and other regulations for flight attendants in their individual nations. Research will also explore how these differences in regulations among the airlines affect their load factors, their target markets, and their influence in the tourism industry. By understanding these differences and inequalities, we can improve the perceptions and equalize the treatment in both US and internationally based airlines.

Keywords: International Tourism, Gender inequality, Airline Industry

A Failure of Modern Leadership
Tollackson, Ryan
Faculty Mentor(s): Anne Cubilie, Douglas Honors College

Oral Presentation, Session #33
2:10-2:30 p.m. in Room 271

This presentation will examine Cicero’s and Machiavelli’s accounts of leadership in accordance with other texts regarding the production of leaders. The examination will show that our society falls victim to one form of leadership while ignoring the other, ultimately more desirable, form. Cicero’s model of leadership is contingent on an individual’s wisdom and virtuous qualities being at the forefront of the individual’s interaction in society. This being said, it is clear that power and prestigious standing within the society is not of greatest importance for Cicero; much to the contrary it is often a fault. In order to allow for this virtuous leadership to rise to the top of society, however, it is necessary that the surrounding society be just throughout. Using the ideas set forth in Plato’s Republic, we can see that a virtuous potential leader, if improperly nourished by unjust and self-interested society, will produce leadership of the variety discussed in Machiavelli’s The Prince. I argue that our society produces leadership in the Machiavellian sense, and ignores true, just leadership; given the parallels between our society and Cicero’s, I will discuss how to produce proper modern leadership.

Keywords: Leadership, Obligation, Virtue
**Pelton Wheel Housing**  
*Townsend, Garrett*  
*Faculty Mentor(s): Roger Beardsley, Engineering Technologies, Safety, and Construction*

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

Students in the Mechanical Engineering Technology department have knowledge of a Pelton Wheel and how it works. This project is to create a housing unit for a five-inch diameter Pelton Wheel. A Pelton Wheel is used to generate electric power from the motion of water. This housing will be used as a lab exercise for the Fluid Mechanics class at CWU. This housing will have the capability to connect to a generator via a coupling. There will also be a prony brake dynamometer allowing students to see the relationship between torque and RPM. Students will be able to calculate the power that is generated by using engineering principles. This project will showcase the benefits of a Pelton Wheel and give students the opportunity to see these benefits for themselves.

*Keywords: Torque, Power, Fluids*

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**When a Man Bleeds: Fears of the Feminine and Reproduction in John Carpenter’s The Thing**  
*Tranchell, Thomas*  
*Faculty Mentor(s): Liahna Armstrong, English*

Oral Presentation, Session #47  
4:10-4:30 p.m. in Room 135

A patriarchal society requires that conventionally feminine roles be fulfilled by women. Fulfilling these roles can be as mundane as being assigned the task of washing the dishes and laundering the clothes. The roles can be more complex, such as being expected to be the primary caregivers for any children as well as bearing these children. When no women are present to fulfill these roles, an all-male society must cope with taking on such duties. In John Carpenter’s 1982 film *The Thing*, the all-male residents of an Antarctic scientific outpost must not only fulfill the daily tasks traditionally borne by women but also survive in the face of an invasion from an alien who wishes to reproduce among them. In this presentation, I will demonstrate the deep-seated persistence of standard gender roles by demonstrating ways in which the male occupants of the outpost in Carpenter’s film subjugate each other into feminine roles, battle the invasive species bent on reproducing itself, and ultimately cause their own destruction. Representations of the feminine through the actors, the special effects, and the sets will also be considered. *The Thing* is a classic example of men—and patriarchal societies—fearing most that which they understand the least: reproduction and the feminine.

*Keywords: Feminism, Reproduction, Fear*
Towards the Synthesis of 1,3-Azaborines as Potential HIV-1 Protease Inhibitors

Treich, Nicholas

Faculty Mentor(s): Levente Fabry-Asztalos, Chemistry

Oral Presentation, Session #40
3:00-3:20 p.m. in Room 140

Drug discovery for HIV/AIDS has resulted in many life-saving therapies, making a great impact on modern medicine. Even though new therapies are constantly being developed, many drugs are highly susceptible to resistance development, have poor bioavailability, and cause several side effects. With that in mind, there is an urgent need for the development of new types of inhibitory compounds that have better resistance profiles, higher bioavailability, higher affinity and lower toxicity. The use of boron in medicinal chemistry has been growing substantially over the last decade since the development of the first FDA approved drug, Velcade, in 2003. Boron containing compounds have been previously overlooked due to preconceived notions regarding boron’s toxicity. With those ideas resolved, boron is being implemented in modern pharmaceutical therapeutics for a variety of diseases. Regarding HIV/AIDS, novel cyclic boronates are currently being synthesized with the intention of acting as dual-mode, both competitive and associative, inhibitors of the HIV-1 protease. The boronated analogues are being synthesized with the intent that they will demonstrate greater inhibitory activity than their non-boronated analogs.

Keywords: HIV, Inhibitor, Organic Chemistry

Challenges of College Students with Asperger’s Syndrome

Tsai, Shu-Fei

Faculty Mentor(s): Shu-Fei Tsai, Special Education

Oral Presentation, Session #22
12:00-12:20 p.m. in Room 201

To date, there are more and more students with Asperger’s syndrome attending colleges. Because their communication and interaction impairments, they may feel social isolated, social anxiety and loneliness (White, Ollendick, & Bray, 2011). They also have challenges in multiple areas, such as academics, time management, independent living skills, and study skills (Adreon & Durocher, 2007). In order to get support and service in higher education, students with Asperger’s syndrome need to disclose their disability to their college’s office of disability services. Moreover, not every instructor and other students have the knowledge of Asperger’s syndrome. As a result, students with Asperger’s syndrome need to advocate for themselves (Eckes & Ochoa, 2005) and let instructors know what accommodations they need. Responding to their experiences, possible coping skills and support will be discussed in this presentation. The information will assist colleges in development of the support system and delivery of effective services to students with Asperger’s syndrome.

Keywords: Asperger’s Syndrome; Support System; Self-Advocacy
The Quest for Political Power: Latinos in the City of Sunnyside, Washington
Valencia, Jamie; Davidson, Austin; Galvan, Eric; James, Kyle; Rockseth, William; Vo, Binh
Faculty Mentor(s): Gilberto Garcia, Political Science

Poster Presentation Session #2, Poster #8
11:30-2:00 p.m. in Ballroom C/D

In 2012, Toppenish, Grandview, and Sunnyside, with a significant Latino population, reported minimal representation in government. Smaller communities fared better in local representation: In Mabton, three of the five city council members were Latino; in Granger, four of the five city council members were Latino; and in Wapato, the mayor and four of the six city council members were Latino. Therefore, this study examines the following question: What are the explanations for the lack of political representation in Latino communities with a sizeable population? The following presentation explores the impact of electoral systems, rules of the game, and socio-economic variables in the weakening of the political potential of the demographic growth of the Latino communities in the Northwest, more specifically, the city of Sunnyside, Washington. The methodology of the project includes an examination of demographic data, government documents, voting records as well as newspaper and other media reports on the politics of the communities in the region.

Keywords: Politics, Latinos, Washington

The Effectiveness of Vienna's Heurigens as a Wine and Tourist Industry
Vamderpool, Kene; Dietrich, Brandon; Lindahl, Tamra
Faculty Mentor(s): John Hudelson, Global Wine Studies

Oral Presentation, Session #51
4:30-4:50 p.m. in Room 202

Vienna is a unique city that not only boasts picturesque cityscapes but also contains 1,530 acres of vineyards within the city limits. Associated with these vineyards are Heurigens, small winery/taverns that play a significant role in Vienna’s economics, contribute to its sustainable greenery, and form a basis for high quality Austrian wines. The vines are maintained as a tourist attraction but were historically planted as an economical decision for those in the wine business. The city government owns the most vineyard land in Vienna, protecting it from ever being developed for other uses. Among many varietals, the Gruner Veltliner variety accounts for 25 percent of grapes grown. There are 86 total wineries in Vienna that contribute to the economic wellbeing of their wine industry. This survey of Vienna’s Heurigen industry looks at its effectiveness as both a tourist industry and proud tradition that contributes to the city’s identity.

Keywords: Enotourism, Vienna, Wine
V-W

Trung Institute of English as a Second Language
Van Sickle, Tyler
Faculty Mentor(s): Bill Provaznik, Management

Oral Presentation, Session #7
12:00-12:30 p.m. in Room 301

Governmental and social pressures in Vietnam have increased the demand for English speakers within the workforce. With insufficient English programs in the public school system, many seek the education elsewhere. The Trung Institute will be a private school in Vietnam, specializing in teaching English as a second language (ESL). Currently ESL programs exist in Vietnam but most employ native English speakers with little teaching background as instructors. Teachers will be recruited from Teaching and ESL programs at Washington State University and Concordia for one-year stints in Vietnam. Teachers will be selected each year through an application process. The Institute is set apart through the use of certified teachers rather than untrained volunteers, and will be marketed as a higher level of education. The institute will prepare students for the Test of English as a Foreign Language, a requirement for citizens of Vietnam to receive their high school diploma. The curriculum will be designed to give students the edge in the workforce. The school will open in Ho Chi Minh. Due to the construction of the new international airport the surrounding area is going through significant development, and is expected to see a large economic boom. The initial investment is projected at $300,000. This will be used in the construction of the school, faculty residences and for operational funds, with high return in the long run from tuition and uniform sales. Once the first school is deemed a success, the model of this institute will be duplicated throughout Vietnam.

Variations in Vocalization Frequency of Chachalacas in Chamela, Jalisco, Mexico
VanDerslice, Julia; Reyer, Emily
Faculty Mentor(s): Dan Beck, Biological Sciences; Lisa Ely, Geological Sciences

Oral Presentation, Session #39
3:00-3:20 p.m. in Room 137B

The Western Mexico chachalaca (Ortalis poliocephala) is a large, frugivorous bird endemic to the tropical dry forest of western Mexico. They are very vocal, with a distinctive call that serves a variety of purposes, not all of which are understood, but can be used in territorial displays and as an alarm of danger. The call contains two motifs with the first consisting of two to four harsh notes gaining in volume and pitch. The second motif has considerable variation in the number of syllables (two to eight), but consists of three harsh notes increasing in pitch. Our objective was to investigate how the frequency of calling varied over the course of the day and habitat type. The research was conducted at the Estacion de Biologia Chamela in Jalisco, Mexico over four days in late March. We walked a 4.8 kilometer route through the forest in the morning and late afternoon and recorded each group we encountered for a ten minute period. Our route took us along the ridge and down in the arroyo. Meanwhile, we also recorded the number of calls heard from the field station itself. The data showed that O. poliocephala called almost exclusively between the times of 06:00 and 11:00. Habitat type did not seem crucial in determining location of groups. Understanding vocalization patterns helps give us an insight into the group dynamics of the birds and opens door for future research into the meaning behind the calls.

Keywords: Behavioral Patterns, Birds, Vocalizations
Learning at Home with Interactive Literacy Kits

Walker, Teri; Keller, Cassandra; Southern, Anndrea

Faculty Mentor(s): Teri Walker, TEACH

Oral Presentation, Session #31
1:10-1:30 p.m. in Room 201

How might homework be used to better promote family engagement in childhood learning? In EDEC 322 Parent Involvement, students explore this question, focused on reframing the concept of homework from a school-centered and family intrusive directive to a family friendly approach designed to enhance family engagement and promote childhood education through activity suggestions based on adult/child interaction. This project targets literacy and the integration of content learning through the design and development of learning at home kits. These kits are comprised of dollar store items with a $5 limit for materials. Students then create family friendly suggestions to promote learning targets. Attention to detail and marketing appeal is given prior to donating the kits to Head Start preschools as a service learning project.

Keywords: Family Engagement, Literacy, Homework

Investigating Rigidity Properties of Protein Cavities

Walling, Christian

Faculty Mentor(s): Filip Jagodzinski, Computer Science

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

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 scientists have not analyzed the properties of protein cavities in a large enough dataset, it is still unclear how, or to what extent, the geometric properties of a protein cavity play in helping to facilitate a protein’s function and interaction with other proteins. The ability to analyze the rigidity properties of cavities among a large database of proteins would allow a deeper understanding of how proteins interact with other molecules. As a first step, we want to try and determine if different molecules have distinct cavity properties that distinguish them from other proteins. We have developed a series of custom shell scripts that rely on protein structure data from the Protein Data Bank (PDB) and protein cavity data from our collaborators. To analyze the rigidity properties of our proteins, we use KINARI-Web, a freely-available on-line tool. Our scripts aggregate the cavity and rigidity data of a protein to provide rigidity information about the cavities. This permits us to look at the size, atomic content, and rigidity of many different protein cavities on a large scale to begin understanding their differences, and the properties of their flexibility.

Keywords: Proteins, Cavities, Rigidity
Middle School Field Investigations

Walter Strom Middle School Students; Griswold, Trish
Faculty Mentor(s): Trish Griswold, Walter Strom Middle School

Poster Presentation Session #2, Posters #13-21
11:30-2:00 p.m. in Ballroom 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 Effects of Light Environment and DNA Methylation on Phenotypic Plasticity in Arabidopsis thaliana

Walters, Rachel; Marrese, Anthony
Faculty Mentor(s): Jennifer Dechaine, Biological Sciences

Poster Presentation Session #1, Poster #28
8:30-11:00 a.m. in Ballroom C/D

Phenotypic plasticity is the ability of an organism to change its phenotype (expressed characteristics) in response to its environment. For example, plants with the same genotype may respond differently to shading stress due to variation in expression of shade tolerance genes among individuals. These variations in gene expression may be controlled by DNA methylation. The effect of DNA methylation on phenotypic plasticity is poorly understood. Understanding how DNA methylation affects plant response to the environment is important because it has far reaching consequences for plant adaptation to new environments and implications for crop improvement.

In this study, we examined how DNA methylation affects plant phenotypic plasticity to different shading environments. We treated lines of Arabidopsis thaliana plants with a de-methylating agent (5-azacytidine), and then grew treated and untreated (control) individuals under two light conditions: 1) simulated foliar shade (green lighting filters); and 2) neutral shade (white lighting filters). After flowering, DNA extractions were conducted to gather DNA in order to quantify the amount of methylation present in plants across light treatments and methylation groups.

Keywords: DNA Methylation, Phenotypic Plasticity, Arabidopsis thaliana
Building a History: Historical Context of Central Washington University Campus Architecture

Walton, Lauren
Faculty Mentor(s): Patrick Lubinski, Resource Management

Poster Presentation Session #2, Poster #33
11:30-2:00 p.m. in Ballroom C/D

To date, no effort has been made to understand the historical narrative presented by the architecture of the Central Washington University (CWU) campus. Such an investigation is important because the built environment provides meaningful information about our shared past by means of its association with particular events, people, and cultural trends that represent significant historical influences on the campus. With CWU’s most recent period of campus development underway, there is potential that the existing architecture will be permanently altered or destroyed and, with it, our ability to understand the history that it represents. Therefore, this study uses cultural resource management methods and architectural historian techniques to conduct architectural and historical analyses of several buildings on the CWU campus that represent distinct eras of campus development. Architectural elements of campus buildings will be linked to the changing needs of the school, as well as to cultural events and movements that transpired locally, regionally, and nationally between the inception of the school in 1891 and the present (2014). The significance of this study is multi-layered given that the practice of identifying (and protecting) cultural resources, like the buildings on CWU campus, stems from local, national, and global community interest in heritage.

Keywords: Architectural History, Historical Analysis, Built Environment

Student Government in the United States and China: Events Planning

Wang, Yuan
Faculty Mentor(s): Rex Wirth, Political Science

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

Built around a case study of the planning of Annual Gala: Our Xingjian People, a major event on the campus of Guangxi University XingJian College of Science and Liberal Arts in China, the poster shows the structure and operation of student government in China, illustrates important differences, particularly the role of Communist Youth League of China, with the United States and links these differences in student governance to the national and political cultures of the respective societies.

Keywords: Student Government, China, US
Geometry and Kinematics of Fault Slip Transfer from the Southern Walker Lane to the Mina Deflection

Warren, Rachelle

Faculty Mentor(s): Jeffrey Lee, Geological Sciences

Poster Presentation Session #1, Poster #44
8:30-11:00 a.m. in Ballroom C/D

The Mina deflection (MD) is structural step-over that transfers fault slip from the southern Walker Lane (WL) to the central WL by a combination of sinistral, dextral, and normal faults. Recent geologic studies in the southwestern MD provide insight into the kinematics of fault-slip transfer from the WL to the MD. The southwestern MD is a faulted volcanic field underlain by Miocene latite (~11.17 Ma), Pliocene hornblende dacite, tuffaceous sandstone, basalt flows (~3.13 to 3.43 Ma), andesite, and cinder cones, and Quaternary sedimentary deposits. Faults, which cut all but the Quaternary units, define three zones: NW-striking dextral faults in the south, NE-striking sinistral faults in the north, and the EW-striking sinistral Coaldale fault in the center. The NW-dextral and EW-sinistral Coaldale faults are mutually cross-cutting, illustrating the complex fault geometry that transfers fault slip from the dextral faults of the WL to the sinistral faults of the MD. Offset markers identified along the strike-slip faults include basalt ridge lines, faults, and unit contacts and yield a minimum dextral offset of 0.8-1.3 km and sinistral offset of 0.6 km. Combining magnitude of offset with age of offset units yields minimum dextral and sinistral slip rates of 0.2-0.4 mm/yr and 0.2 mm/yr, respectively. Published fault kinematic models predict Pliocene dextral slip rates of ~0.4-0.8 mm/yr, sinistral slip rates of ~0.1-0.2 mm/yr, and sinistral slip rates of ≥0.4 mm/yr along the Coaldale faults in the River Spring area. With the exception of the Coaldale fault, the slip rates are in agreement with the models.

Keywords: Fault Slip, Kinematics, Walker Lane

Programmable Logic Controller Automated System

Waytuck, Michael

Faculty Mentor(s): Nathan Davis, Engineering Technologies, Safety, and Construction

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

The purpose of this project was to create and control an automated system. The system which was controlled by a programmable logic controller (PLC) can be used as a demonstration piece for the Industrial Engineering Technology 373 class (IET 373). The project was created and designed to integrate a variety of different sensors and other physical components such as solenoids, conveyors, and pistons that would be found in the automation industry. The reason for this project was because the IET 373 class has very limited visual aids to help students understand what they can use the material in the class for after they leave the program. In order to create this project the process that my project would automate had to be chosen. The next step was to design a way in which my process can be automated while still incorporating the key components that would be needed for the system to act as a visual aid for the students of IET 373. Once my process was refined a design for the physical system had to be created using my knowledge and experience with modeling programs such as AutoCAD and Rhinoceros. After
the physical system was built the system was then programmed using Studio 5000, a PLC development software from Allen Bradley, to connect the various sensors to the PLC to control the automated system.

*Keywords: PLC, Automation, Process*

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**Quartet from Act III of La Boheme by Puccini**

Waywell, Brittany; Sacchi, Joe; Thornton, Joey; Gregor, Alyssa  
*Faculty Mentor(s): Gayla Blaisdell, Music*

Creative Expression Presentation, Session #52  
4:30-4:50 p.m. in Ballroom A

The opera, *La Boheme*, was written by Giacomo Puccini in the late 19th century along side of librettists Luigi Illica and Giuseppe Giacosa and was based on the “Scènes de la vie de bohème” by Henri Murger. The story portrays a group of young people living in the Latin quarter of Paris in the mid-19th century. Our scene tells the story of Mimi and Rodolfo, who despite almost separating from each other, vow to stay together until springtime. Meanwhile, Musetta and Marcello bicker about her flirtatiousness with other men. In a way, this quartet is two separate scenes happening at the same time where the beautiful, soaring lines of Mimi and Rodolfo are contrasted by the sharp, flitting lines of Musetta and Marcello. In the end, Mimi succumbs to tuberculosis and dies after she confesses to Rodolfo that she has loved him his whole life.

*Keywords: Opera, Music, Drama*

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**Fitness Assessment through Body Fat Prediction**

Weber, Madelyne  
*Faculty Mentor(s): Yvonne Chueh, Actuarial Science*

Poster Presentation Session #1, Poster #59  
8:30-11:00 a.m. in Ballroom C/D

Health and fitness are important to the students at CWU. Even while attending school, students can still maintain a healthy lifestyle. Fitness is known to be correlated with the amount of body fat a person has. With this as the underlying assumption, the data collected by A. Garth Fisher from Brigham Young University will be used to illustrate a way body fat can be predicted without the traditional visit to the personal trainer or doctor’s office. The data collected included over 250 men and took 18 different measurements of the body including two types of body fat measurement. This study will map the data and find any relationships between body measurements and body fat. By modeling on a small scale and building into a large overall predictive model, the correlations between physical measurements and percentage of body fat will be clear. From those findings, a simple to use equation can be derived to predict body fat based on the input measurements. Through regression analysis the assumptions made using statistical theories will be validated, showing that measuring body fat can be a simple at home process.

*Keywords: Fitness, Body Fat, Regression*
Wells, Mariah
Faculty Mentor(s): Pamela McMullin-Messier, Sociology
Oral Presentation, Session #2
9:10-9:30 a.m. in Room 137A

Capital punishment has left deep divisions in American society because of its moral, legal, and socioeconomic implications. After the US Supreme Court handed down the Gregg decision in 1976 citing that the issues of racism that plagued the system had been fixed and would be no longer a factor, the current system is a contradiction because of its tendency to sentence poor people and minorities as these people cannot afford the representation in court they truly need when ineffective representation can mean the difference between life and death. The systematic problems of the American death penalty include inequality encompassing racism, classism, and sexism; uninformed, guilt-prone juries; and underpaid and underprepared attorneys. These are the central issues which plague a system inflicting the ultimate punishment. Looking at existing research and data from various sources in the legal and social science fields, this report looks to address and examine possible solutions to a major problem: more poor, young men of minority groups are being sent to death row in staggering numbers when they may or may not be guilty. The ultimate mistake that can happen, when such systematic issues are ignored, is putting to death an innocent person, sometimes in a painful and inhumane way. While looking this troubling issue in depth, it is necessary to examine alternatives such as life without parole, how women factor into capital punishment, show patterns of arbitrariness in administration, and looking at what happens when execution day goes wrong must be included.

Keywords: Capital Punishment, Inequality, Alternatives

Liuzhou City: Traditional Wisdom and New Economics
Wen, Haocheng; Huang, Huadong; Qin, Jianfeng
Faculty Mentor(s): Rex Wirth, Political Science
Poster Presentation Session #2, Poster #3
11:30-2:00 p.m. in Ballroom C/D

If Liuzhou is to continue to grow, it will have to develop the intellectual capacity to create and support a new and different kind of economy. One that can protect and restore the environment while managing and promoting both urbanization and industrial productivity to meet the growing aspirations of the entire population of Guangxi. The core values of the Chinese nation are benevolence, righteousness, propriety, wisdom, and trust. These ideals define traditional virtue in China and they remain the basis of contemporary social morality. Many understandings have been distilled overtime into what are today the four principal building blocks of traditional Chinese people’s wisdom: (1) Dadaozhijian meaning to simplify complicated truths; (2) Dazhiruoyu meaning a man with great wisdom appears slow-witted; (3) Yourongnaiida meaning a wide heart embraces all; and (4) Shangshanruoshui meaning the highest level of good deeds that like water benefits to all things without struggle. Rapid economic development now forces Liuzhou to make a difficult economic transition from of the techniques and knowledge of past scientific and technical revolutions to what we refer as the wisdom-based economy. In order to move forward and avoid being marginalized, Liuzhou must find a new way. The poster builds off of the core values to illustrate how they might be used to create a better future by using traditional wisdom to redirect and invigorate scientific and cultural understandings and develop new educational and industrial models.

Keywords: Liuzhou, Economy, Traditional Wisdom
Designing a Trap to Attract and Capture Kissing Bugs in Jalisco, Mexico

Wenger, Analiese; Fergus, Craig

Faculty Mentor(s): Daniel Beck, Biological Sciences; Gabrielle Stryker, Biological Sciences; Lisa Ely, Geological Sciences

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

Our objective was to design a mechanism that effectively attracts and captures Triatominae species, also known as kissing bugs, in the field. These insects carry the protozoan parasite Trypanosoma cruzi and are the major vector for Chagas Disease throughout the Americas. By designing a dependable method of capturing these bugs, we hoped to aid in future efforts to study, and potentially prevent transmission of the disease. The study was performed at Estación de Biología Chamela in Jalisco, Mexico, where Triatoma pallidipennis had previously been recorded and several Triatoma individuals were found during our study. Each trap consisted of a 14-inch long plastic tube, covered at both ends with a cone of wire mesh that led to into the tube. At the end of the mesh cone was a bug-sized opening angled such that the insect would fall into the trap and not be able to climb out. Three attractant methods were used: light, a previously-captured live kissing bug, and a CO₂ emitter created by combining live yeast with sugar and flour. Over three nights, traps were placed in a variety of configurations centered around a set of pitfalls traps known to have successfully captured Triatoma in the past. Unfortunately, no Triatoma were captured in any of the traps despite continued captures in the pitfalls. We believe that this failure may be due to the CO₂ emissions being too low or the wire mesh being a deterrent to Triatoma movements. Future studies may look to rectify these concerns.

Keywords: Chagas Disease, Kissing Bugs, Trapping

Rebel Wentworth, Brittany

Faculty Mentor(s): Andrea Eklund, Apparel, Textiles and Merchandising

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

Purpose: The goal of this design was to create a sense of shock value through the textiles and silhouette. Teal has been forecasted as being a major textile theme this season in the apparel industry and I wanted to incorporate it in this rebellious design. The full tulle skirt was used to create volume and to integrate the sheer trend of 2014. Process: Extensive fabric and silhouette trend research was conducted to during the conception of this design. Teal satin was chosen as the primary color/textile to add a shocking pop. The short princess seam dress under the full sheer tulle skirt creates an extreme juxtaposition between the texture and sheet of the textiles and the silhouettes of each. Techniques: Draping was used to create this garment. Draping is covering the body in graceful folds to adorn the body for the correct fit. From the draping, a pattern was made and, from the pattern, a sample was made to fit on my model. From the fitting, changes to the pattern was made and the final garment was started. Princess seams were utilized in the dress to create a form fitting shape and to further flatter the wearer’s body. The tulle skirt was more challenging in construction. The many yards of tulle were tamed, pleated, and basted in place prior to it being sewn into the waistband. Materials: 100-percent polyester black tulle, teal crepe satin, polyester lining, two invisible zippers, thread.
Kinematic Analysis of Prey Capture in Coastal Giant Salamanders (Dicamptodon tenebrosus)
Westervelt, Laura; Reavill, David; Richbourg, Sara; Fessler, Brandon
Faculty Mentor(s): Steve Wagner, Biological Sciences; Robert Weaver, Biological Sciences

Oral Presentation, Session #29
2:10-2:30 p.m. in Room 137B

Salamanders use a variety of techniques to capture prey that involves a combination of lingual and jaw prehension. For example, some plethodontid salamanders often use ballistic tongue projection to capture prey. Salamanders of the family Dicamptodontidae, are the largest sized terrestrial salamanders in the world which feed on a diverse array of prey items (arthropods, annelids, small mammals, and reptiles). Objectives of our study were to describe and quantify the behavior of terrestrial adult coastal giant salamanders (D. tenebrosus). While there has been much research conducted on aquatic phase D. tenebrosus, little is known about their terrestrial counterparts. Feeding bouts of three distinct prey types (e.g., crickets, earthworms, and slugs) were recorded using high-speed video (420-1000 frames/second) recorded with a Casio Exlim EX-ZR100 digital camera. For a feeding trial, salamanders were offered a prey item with forceps. Trials were repeated on separated days with each salamander (N=12) being exposed to equal ratios of prey items. Videos were analyzed for velocity of initial strike, lingual projection, lower and upper jaw prehension, and feeding success. Non-metric multi-dimensional scaling analysis indicated significant differences in feeding patterns among prey types. Lingual prehension was the prominent method of ingestion when a small prey item was offered (crickets) and the use of upper and lower mandible were used in a snapping motion with larger prey items (earthworms). Future work will incorporate different prey items, as well as examine prey preference and foraging behaviors of D. tenebrosus. Additionally some comparative analysis will be conducted using the tiger salamander (Abystoma tigrinum) and the tailed frog (Ascaphus truei) on the mechanics of prey capture in amphibian taxa.

Keywords: Prey Capture, Behavioral Morphology, Dicamptodon tenebrosus

Speak of the Devil and He Will Appear: Why Macbeth Deserved his Fate.
White, Cassandra
Faculty Mentor(s): Jay Ball, Theatre

Oral Presentation, Session #36
1:10-1:30 p.m. in the SURC Theatre

“God will not permit [the devil] to deceive his own: but only such as first willfully deceive themselves, by running unto him, whom then God suffers to fall into their own snares, and justly permits them to be illuded with great efficiency of deceit, because they would not believe the truth”–King James Daemonolgy. “Stay you imperfect speakers, tell me more.”–Macbeth Act I Scene III Macbeth. “What can the Devil speak true?”–Banquo Act I Scene III Macbeth. Modern audiences are quick to assume that the ghosts and visions in Macbeth are the result of an inner madness. Macbeth sees floating daggers, hears voices, and sees visions that no one else can see. However, when Macbeth was first being performed these things would not automatically be assumed to be merely constructs of his guilty mind. This paper examines the supernatural elements of Macbeth through the eyes of the original audience especially King James whose treatise on witchcraft and spirits,Daemonology, gives valuable insights into the mindset of the time.

Keywords: Macbeth, Shakespeare, Witchcraft
**Parachute Mount for Mitsubishi Evolution**  
*Wilkinson, Kyle*  
*Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction*

Poster Presentation Session #3, Constructed Object #4  
2:30-5:00 p.m. in Ballroom C/D

The National Hot Rod Association requires any vehicle traveling faster than 150mph in the quarter-mile to be equipped with a parachute. Currently in industry there is not a parachute mount available for a Mitsubishi Evolution, that is both light weight and low cost. This paper contains an evaluation of strength versus weight for every component of the parachute mount. This was done by first determining the maximum force created by the parachute. Using this information, working from where the parachute anchors to where the mount connects to the vehicle, the minimum thickness and material were determined for the least amount of weight. The results will be determined by applying various loads to the prototype mount to measure the stresses and strains created by the parachute, then compare to the calculated predictions.

*Keywords: Stress, Weight, Parachute*

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**Implicit Racism Measures’ Continuity with Real World Behavior**  
*Williams, Kyle; Johnson, Nicholas; Mitchell, Renard; Periman, Douglas; Wulf, Lyndsay*  
*Faculty Mentor(s): Kara Gabriel, Psychology; Joseph Lorenz, Anthropology; Delores Cleary, Sociology*

Poster Presentation Session #3, Poster #52  
2:30-5:00 p.m. in Ballroom C/D

In the social sciences, implicit measures have been developed to detect individual biases toward groups or stereotyped members of a given society. Implicit measures are especially important when admitting to biases that may place the individual in a culturally poor light. However, debate is ongoing about the real-world application of implicit measures. Validating these measures is especially important given that overt racism has decreased dramatically in the United States over the last 100 years, but institutional and covert racism remain prevalent. The current study examined whether real-world (observable) behavioral differences occur when participants interact with white or African American experimenters and whether those real-world interactions correspond with behavior observed on implicit bias measures. Participants met with either a white or African American experimenter who instructed them to hand over their cell phone. This interaction was recorded and coded to determine individual time to hand over phone. Preliminary data analysis (n=8) indicated that the time to relinquish personal property (cell phone) to an African American experimenter (mean=8.499s) was almost double that of participants interacting with a white experimenter (mean=4.384s). This preliminary finding suggests that real-world behaviors may, in fact, reveal differences in how individuals respond to members of negative stereotyped groups. Processing of correspondence with implicit measures is ongoing and such results may be particularly important for further validating implicit measures.

*Keywords: Implicit-measure, Bias, Stereotype*
Imagine Tomorrowville
Wilson, Eric
Faculty Mentor(s): Jeff Hashimoto, Ellensburg High School

Poster Presentation Session #1, Poster #51
8:30-11:00 a.m. in Ballroom C/D

Initially, we researched current green technologies and technological concepts to work towards applying them to all aspects of small community life. The next step was collaborating with industry professionals to design a working concept for the community combined with the technologies that we learned about. The final step was modeling the community to represent the feasibility of the project and the costs, lifestyle and appearance of Tomorrowville.

Keywords: Sustainability

Analyzing Compositional Trends in Plagioclase Crystals Erupted from Mt. Etna
Wilson, Joshua
Faculty Mentor(s): Wendy Bohrson, Geological Sciences

Poster Presentation Session #1, Poster #43
8:30-11:00 a.m. in Ballroom C/D

Since 1971, Mt. Etna has experienced an increase in eruption frequency and explosivity, thereby posing a significant hazard to the nearby city of Catania. Coupled to these behavioral changes are changes in magma chemistry in post-1971 lavas. The two major contending hypotheses proposed to address the source and timing of these changes are: (1) new magma entering the Etna magma storage zone via magma recharge from below the crust, and (2) late stage assimilation of shallow crustal rock into the magma storage zone. The mineral plagioclase shows evidence of assimilation, and I will therefore focus on collecting core to rim element data from plagioclase crystals found in rocks that were erupted before and after 1971 using a laser mass spectrometer. Behavior of particular elements such as rubidium, magnesium and iron will allow me to distinguish which hypothesis is responsible for the chemical changes and increased activity at Mt. Etna. Analysis of these crystals has yet to be determined. If the cause for Mt. Etna’s change in magma chemistry is the result of crustal assimilation, then the expectation is that these plagioclase crystals will show in a core to rim transect a significant increase in rubidium while showing little to no change in iron or magnesium content. If the magma recharge hypothesis is the cause, then the expectation is that these plagioclase crystals will show little to no increase in rubidium while showing a significant increase in iron and magnesium.

Keywords: Plagioclase, Magma Recharge, Crustal Assimilation
Chromatographic Isolation and Characterization of Secondary Metabolites of Dalea ornata (Fabaceae)
Winterstein, Eric; Ray, Will; Koppinger, Kaitlin
Faculty Mentor(s): Gil Belofsky, Chemistry; Blaise Dondji, Biological Sciences

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

The process of isolating and characterizing natural products is a vital component of drug discovery, through which the pharmaceutical industry drives the creation of synthetic blockbuster drugs like Lipitor© and Paxil©. Advanced methods in column chromatography including polarity-based gradient elution, neutral size-exclusion polymers, and effective techniques in visualization using thin layer chromatography contribute to the successful purification of novel natural products. In our work to date, a number of phenolic compounds have been isolated from the shrub Dalea ornata (Fabaceae), and at cellular-level concentrations show efficacy eradicating the problematic parasite Ancylostema ceylanicum, or hookworm. Our research is toward the continued isolation of relatively abundant and chemically-viable target molecules, by various chromatographic methods. This approach frequently yields newly discovered compounds of many varieties, possibly including antibiotic tetracyclines and colorful flavonoids. Nuclear magnetic resonance spectroscopy, mass spectrometry, polarimetry, and other physicochemical methods of analysis are utilized to determine the compounds’ chemical characteristics in the Department of Chemistry, in conjunction with anthelmintic or anti-hookworm ex vivo testing, carried out in collaboration with Dr. Blaise Dondji’s group in the Department of Biological Sciences.

Keywords: Natural Products, Chromatography, Pharmaceuticals

Carbon Fiber External Hiking Pack Frame
Woodman, Robert
Faculty Mentor(s): Charles Pringle, Engineering Technologies, Safety, and Construction

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

The purpose of this project was to design and manufacture a carbon fiber pack frame that was at least 50 percent lighter than the original aluminum frame, was compatible with the existing hardware, and would stand on its own at a maximum load of 55 pounds. When it comes to hiking, the less weight you have to carry around, the easier and more enjoyable your adventure will be. Cutting down on initial weight of the carrying devise seemed like the most appropriate place to start. The first step was to determine what material would be most effective in achieving the desired results and be both feasible and cost effective for the scope of the project. The next step was to design and draw the new frame and all of its components and all of the necessary mounting locations for the existing cloth portion of the backpack and the addition of feet to make it stand. This was done on the CAD program, Solidworks, in a university computer lab. Next, analysis of the design and material was done to ensure failure would not occur under static and dynamic situations which the frame would be subject to. Lastly, the tubes that make up the framework were manufactured in a university lab, using wet-layup with a standard weave carbon fiber fabric and two part epoxy resin. Parts were cut to size and assembled with a high strength epoxy. The results will be measured against the frame’s abilities to conform to the criteria constraining the project.

Keywords: Engineering, Frame, Carbon-Fiber
Golden Glam  
Wright, Andrea  
Faculty Mentor(s): Andrea Eklund, Apparel, Textiles and Merchandising

Poster Presentation Session #2, Creative Work #54  
11:30-2:00 p.m. in Ballroom C/D

Purpose: This garment was designed to be worn at a red carpet or black tie event. While designing, I wanted to make sure the dress would show off a woman’s figure and make her feel beautiful. The cut of the bodice along with the beading on the sides is meant to emphasize a woman’s curves, whether she has them or not it creates an illusion of curves. Process: I researched past and present trends to predict future trends for Fall 2014. This garment is on trend, but also has design and aesthetic elements that make it elegant and timeless. I decided to use black and gold as my colors because I feel like those colors are flattering and bold. The gold beading added to the waist will sparkle under the lights of the runway and add textural interest to the garment. Techniques: This dress was created through draping. Draping is the smoothing, contouring, and manipulation of fabric on a dress form to create a garment or pattern. From the draping, a pattern was created and, from the pattern, a sample was made. The sample was fit on my model and alterations were made to the pattern. From this point, I started to construct the final garment which features a crew neck, darts for body contouring, and is fully lined. The last step was hand sewing the hundreds of beads on the waistline. Materials: 100-percent black polyester exterior fabric, 100-percent black polyester lining fabric, invisible zipper, thread, beads.

Keywords: Draping, Beading, Form Fitting

An Analysis of Generational Cooperation in the Workplace  
Wyatt, Barbara  
Faculty Mentor(s): Anne Cubilie, Douglas Honors College

Oral Presentation, Session #44  
3:00-3:20 p.m. in Room 301

Through my recent managerial internship and upper division business courses at Central Washington University, I am witnessing first-hand the effects of miscommunication among different generations. As three generations are now participating in the workforce—Baby Boomers, Generation X and Generation Y (otherwise known as the Millennials)—competition has heightened, while the need for collaboration is becoming more essential for companies to succeed in an oversaturated marketplace. I seek to explore the fundamental differences in characteristics among the three generations and how these affect how each generation performs in the workplace. In this talk, I will describe generational theory and evaluate misconceptions about the various groups in order to suggest tactics to combat misapprehensions in corporations. Understanding the various perspectives is necessary to develop strategies and techniques to create a cohesive camaraderie among the three current generations, and prepare for the entrance of Generation Z into the workplace.

Keywords: Workplace, Generations, Perception
Determining the Factors Leading to Graduation Rates
Wyler, Robert
Faculty Mentor(s): Charles Wassell, Jr., Economics
Poster Presentation Session #3, Poster #55
2:30-5:00 p.m. in Ballroom C/D

This project is to determine the factors which influence on-time high school graduation rates. The primary relationship to be investigated is the effect of an area’s median household income on said area’s on-time graduation rate, and determining, through regression analysis, if there is a causal effect. Other explanatory variables for this analysis include: an area’s population, student population, employment rate, amount of individuals with a bachelor’s degree or higher, and a measure for class sizes. The response variable is the amount of students (as either a percentage or a number) who graduate high school on time.

Keywords: Graduation rates, Regression analysis, Education

Parent-Teen Communication and Sexual Behavior in Emerging Adulthood
Xagoraris, Ashley
Faculty Mentor(s): Sarah Feeney, Family Studies
Poster Presentation Session #3, Poster #37
2:30-5:00 p.m. in Ballroom C/D

This study examined the association between conversations about specific sex-related topics between teens and parents and sexual risk behaviors in emerging adulthood. Participants included young adults (18-30) who completed an online survey (N = 257). Discussions of topics focused on sexual safety were positively associated with frequency of protection behaviors in sexual relationships. Discussing specific sexual behaviors was associated with reported likelihood of engaging in casual sex. Results suggest that the content of conversations parents have with their children have a significant influence on behavior, and continuing this research might inform efforts to prepare parents for these discussions.

Keywords: Sexual Risk Behaviors, Emerging Adulthood
The Vision for Liuzhou’s New Town: Motor City

Xu, Hui; Chen, Rongrong; Zhang, Lijun

Faculty Mentor(s): Rex Wirth, Political Science; Joshua Zender, Political Science

Poster Presentation Session #2, Poster #1
11:30-2:00 p.m. in Ballroom C/D

To systematically explore four dimensions of the Liuzhou City’s vision for a new and sustainable “Detroit” in southern China we conducted a SWOT (Strength, Weakness, Opportunity, Threat) analysis of Liuzhou City’s “New Town-Motor City” plan for taking advantage of the city’s location and access to the sea to grow automobile production as the central element (pillar) in establishing the city as a major Association of Southeast Asian Nations (ASEAN) industrial center. The plan envisions the creation of a new town in an undeveloped section of the city that will fall under the government’s classification of a Motor City. The Motor City, when completed, will become a new district of Liuzhou City. Out of a total area of 203 square kilometers, 138 square kilometers are the targeted for intensive development and it is expected that by 2030, a million people will be living there. Elements incorporated into the presentation include prospects for meeting the core objectives of internationalization, industrialization, informationization in the following areas: preserving the natural landscape to create livable city, making Guangxi province a driving force in international high-end automobile production, innovation and new energy vehicle development; and becoming a center for expositions, trade, and tourism. The poster lays out Liuzhou’s vision of a harmonious world-class Motor City that remains livable while producing 3.5 million vehicles a year.

Keywords: Motor City, History, Background, Policy, Future

Wheelchair Curb Stepper

Yoder, Joshua

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

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

One of the major difficulties for disabled persons who use a wheelchair is that there are very limited ways to get a wheelchair over a curb or small ledge. This hindrance makes the disabled person have to rely on outside aid for everyday tasks. A device that would help a disabled person to navigate up curbs or small steps would greatly help their personal independence. A problem when trying to design a device for this purpose is that the wheelchair will tip when only three inches above the ground. It is reasonable to assume that with a simple wheel truss set up placed behind the wheelchair to keep it from tipping a disabled person would be able to get over a ledge or curb. The results of the testing will show that the device is capable of keeping the wheelchair from tipping in order to successfully get over curbs or small steps and will be able to support an adequate load to keep it from failing.

Keywords: Wheelchair, Curb, Disabled
Modeling Elk Habitat Suitability in the North Cascades
Yost, Anna
Faculty Mentor(s): Bob Hickey, Geography; Tom Cottrell, Biological Sciences

Oral Presentation, Session #3
8:50-9:10 a.m. in Room 137B

The Washington State Department of Fish and Wildlife (WDFW) would like to adjust the distribution of elk on the landscape in the North Cascades to reduce negative impacts to private property while maintaining a healthy population of elk. Elk management goals can be achieved through a combination of practices, such as forage enhancement that encourage elk in tolerated areas, and fencing, hazing, and/or hunting of elk in areas of low tolerance. This project focused on mapping elk habitat suitability across the 8,000 km$^2$ North Cascades elk management area and then identifying potential areas of high elk tolerance which would be suitable for forage enhancement. GIS tools were leveraged to evaluate elk home ranges using Kernel Density Estimation, classify key landscape vegetation parameters using satellite imagery, calibrate a custom elk habitat suitability model, and evaluate the landscape for potential elk forage enhancement locations. Outputs from the GIS analysis were communicated to WDFW and the Elk Forage Enhancement Working Group, a collaborative multiple stakeholder committee who evaluates the predicted elk habitat suitability within the context of various resource management constraints. Landscape scale elk resource management issues were quantified using GIS tools, and the realities of land ownership, land use limitations, seasonal variability, and the dynamic nature of elk herds were all considered in order to produce final recommendations for elk forage enhancement in the North Cascades.

Keywords: GIS, Habitat Suitability Model, Elk Management

Confucian Role Ethics: Reflections From A Global Perspective
Zemanek, Zoey
Faculty Mentor(s): Jeffrey Dippmann, Philosophy and Religious Studies

Oral Presentation, Session #24
12:40-1:00 p.m. in Room 271

The purpose of this presentation is to critique Ames’ book *Confucian Role Ethics: A Vocabulary* in two categories: the global applicability of his role ethics method in presenting Confucianism to the western world, and the viability for students when studying Confucianism from a modern, western standpoint. Role ethics can be defined as a relationship-based system of ethics in which moral action is based off of community roles and person-to-person association. The issue with explaining Confucianism through this lens is that it relies heavily on cultural relativism. Several aspects of Confucianism are based upon ancient Chinese tradition—that is to say, foundational Chinese culture and Confucianism are intertwined in such a way separating the two can leave holes in understanding the religion. In this way, I will propose that Ames falls close to approaching the hermeneutical circle problem: he uses parts to explain the whole, and yet in order to truly understand the parts, one must grasp the whole. I believe a less romanticized, more in-depth view of the cultural background associated with Confucianism would help students overcome this issue. Because role ethics plays such a specific role in eastern culture, versus a more individualistic western style ethics, Ames’ method for demonstrating Confucianism runs the risk of simplifying the practice and cultural importance of the religion. The presentation will draw on other examples of the complexity of this religion, including sociologist Fe Xiaotong’s *From The Soil*, to further exemplify the deep-rooted foundation of Confucian ethics in the east.

Keywords: Globalization, Intercultural, Understanding
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Special thanks to Donna Longwell, CCEP, Kirsten Brunker, Sarah Wood, and students in the Event Planning specialization in the Recreation and Tourism Program for assisting with planning and running SOURCE. 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.
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