SOURCE 2013
Symposium On University Research and Creative Expression

Program and Proceedings
Thursday, May 16, 2013
Scholarship for Learning. Scholarship for Life.
PROGRAM AND PROCEEDINGS

SOURCE

SYMPOSIUM ON UNIVERSITY RESEARCH and CREATIVE EXPRESSION

18TH ANNUAL CONFERENCE

CENTRAL WASHINGTON UNIVERSITY
ELLENSBURG, WASHINGTON

MAY 16, 2013

STUDENT UNION AND RECREATION CENTER

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Kirk and Cheri Johnson
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SOURCE 2013

This year, SOURCE celebrates the 18th 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 2013 celebrates 353 presentations by 510 individuals. Of the listed first authors on SOURCE presentations, 257 are undergraduate students, 56 are graduate students, 20 are faculty/staff, and 20 are local K-12 students.

Many distinct types of presentations are supported by SOURCE, including approximately 156 oral presentations, 20 creative expression presentations, 134 poster presentations including 11 at satellite campuses, as well as 22 creative objects, and a fashion show with 10 designs.
HISTORY OF SOURCE

In 1996, CWU sponsored the first Undergraduate Research Symposium, a showcase of faculty-mentored undergraduate student research. This event was an innovative forum for developing student scholarship that gained attention far beyond CWU. Since 1996, the undergraduate symposium expanded to include other student scholarly activity, and the broader scope was reflected in a new name in 1998, the Symposium On Undergraduate Research and Creative Expression, commonly referred to as SOURCE.

Building on the success of SOURCE, a new conference was initiated in 2002 to provide a forum for graduate students and faculty to share their scholarly work with the campus community. Originally named the First Conference of Faculty and Graduate Students Research and Scholarly Achievements, the new conference was renamed the Conference of Graduate Student and Faculty Scholarship.

In 2005, the conferences combined to initiate the Symposium On University Research and Creative Expression, aiming to include an even wider community. The intent was to provide a forum to celebrate and share scholarship at CWU with all of the university, as well as the outside community. SOURCE continues to encourage students, faculty, and staff from all departments and units to participate. Contributions can be collaborative or solo works involving any CWU student, faculty, or staff member. All forms of presentation of scholarly work are welcome, including oral presentations, posters, artwork, performances, and other forms of presentations.

Participation in the CWU conferences on scholarship has been growing. In 1996, the original Undergraduate Research Symposium had twenty-three presentations. This year, 39 academic units are participating: Actuarial Science; Anthropology; Art; Biological Sciences; Chemistry; Communication; Computer Science; Douglas Honors College; Economics; Education; English; Environmental Studies; Family and Consumer Sciences; Film and Video Studies; Finance and Operations and Supply Chain Management; Foreign Languages, Geography; Geological Sciences; History; Industrial and Engineering Technology; Information Technology and Administrative Management; Interdisciplinary Studies; Law and Justice; Management; Mathematics; Music; Nutrition, Exercise and Health Services; Philosophy and Religious Studies; Physical Education, School & Public Health; Physics; Political Science; Primate Behavior; Psychology; Recreation & Tourism; Resource Management; Science Education; and Sociology.

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.
PRESIDENT’S WELCOME

May 16, 2013

I would like to extend my personal welcome, and that of everyone at Central Washington University, to the university’s eighteenth annual Symposium on University Research and Creative Expression. SOURCE is the university’s largest, multi-disciplinary 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 university community.

Back in 1996, the first SOURCE was held. It recognized the work of twenty-three undergraduate students, along with their faculty mentors. By way of comparison, last year’s SOURCE was the largest ever with 338 presentations by 702 individuals. It also showed the greatest diversity of scholarly achievement yet, representing the intellectual and creative activities of forty-three different academic programs.

Today, you are participating in the next chapter in the growth and evolution of SOURCE, which is expected to again set records for the numbers and types of presentations.

While SOURCE highlights the university’s incredible academic vitality, it would not be possible without a team of dedicated university personnel who, beginning fall quarter each year, work behind the scenes, putting the pieces in place for the spring symposium. SOURCE is also dependent upon the faculty and staff who mentor students throughout the year in the research, scholarship, and creative projects that are presented at SOURCE.

It is through the work of this year’s SOURCE Committee, chaired by Dr. 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 of 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
Every year, Manastash showcases creative work from the entire university student body. The magazine is housed in the English Department and has been published annually for more than 40 years.

Manastash provides a forum for dialogue among students, the academic community, alumni, prospective students, and the town of Ellensburg. The advisors and structural support for this activity function within the Writing Specialization program in the English Department. Katharine Whitcomb is the current coordinator for this program. Joseph Johnson is the advisor this year for both editing and production.

The goal of Manastash is to recognize the diverse student university community and to celebrate the achievements of that community through a quality publication. Manastash is distributed across campus and to the Centers, and is a source of pride to a wide variety of CWU students.

Please join us at SOURCE from 9:30 to 10:50 a.m. for the Manastash Showcase, featuring students whose works are published in this year’s issue.
STUDENT FASHION SHOW

The CWU Apparel, Textiles and Merchandising program is proud to present the 17th annual spring fashion show, *Wanderlust*. Come see the latest trends featured in our ready-to-wear categories: American Spirit, Urban Renegade, and Tribal Essence. Ten student designers will be presenting their original lines that feature an array of styles from menswear to streetwear to eveningwear. 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 1, 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.

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. Six 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 22 at noon in the SURC Pit.

PROGRAM COVER DESIGN

Senior graphic design student, Megan Woodruff, 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. Prof. Bach states, “Megan is one of the most talented students who I’ve had in my 25 years of teaching. She comes to class prepared and always goes beyond what is asked for.” Megan’s design uses bright colors and an invigorating brush stroke approach to reinterpret *The Thinker*, a bronze sculpture by Auguste Rodin.

WELCOME CEREMONY: STUDENT CONTRIBUTORS

With the mentorship of Professor Bret Smith in the Music Department, Yuki Almahmoud created the music for the SOURCE 2013 Welcome Ceremony, entitled “Fanfare”, and performed by members of the Brass Choir. “Fanfare” is accompanied by a choreographed performance of the CWU Flag Team under the mentorship of Professor Therese Young in the Department of Physical Education School and Public Health.

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 2nd 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, for those students interested in a career in medicine, we welcome Pacific Northwest University of Health Sciences in Yakima, WA.
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<tr>
<th>Time</th>
<th>Session #1</th>
<th>Session #2</th>
<th>Session #3</th>
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<tr>
<td>8:00-9:20</td>
<td>1 CREATIVE WRITING ABOUT WIND, WATER &amp; FIRE L &amp; J BIO COMP SCI CONSUMER</td>
<td>26 PORTRAITS OF THE TAYLOR BRIDGE FIRE I L &amp; J BIO PHYSICS SOCIOLOGY</td>
<td>43 ENGLISH ART, ENGLISH, FILM CHEM IET PESP, NEHS</td>
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<td>8 WELCOME CEREMONY (10:50-11:10) &amp; FASHION SHOW (11:15-11:30)</td>
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### POSTER SESSION #1 - TOPICS
- ANTHROPOLOGY
- BIOLOGY
- CHEMISTRY
- COMPUTER SCIENCES
- GEOLOGICAL SCIENCES
- PHYSICS
- PRIMATE BEHAVIOR/CHCI

### POSTER SESSION #2 - TOPICS
- ECONOMICS
- EDUCATION
- FAMILY AND CONSUMER SCIENCES
- IET
- MATH (ACTUARIAL SCIENCES)
- NEHS
- PESP
- POLITICAL SCIENCE
- STEP, SCIENCE EDUCATION
- WALTER STROM MIDDLE SCHOOL
- ELLENSBURGH HIGH SCHOOL
- CREATIVE WORKS: ART, PESP, FASHION MERCHANDISING, IET

### POSTER SESSION #3 - TOPICS
- COMMUNICATIONS
- ENVIRONMENTAL STUDIES
- IET
- FAMILY AND CONSUMER SCIENCES
- GEOGRAPHY
- MARKETING MANAGEMENT
- POLITICAL SCIENCE
- PSYCHOLOGY
- REC & TOURISM
- RESOURCE MANAGEMENT
- SOCIOLOGY
- CREATIVE WORKS: IET
ORAL PRESENTATION SCHEDULE

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

SESSION 1  Room 135
Session Chair: Lisa Norris
8:00-9:20  Creative Writing About Wind, Water and Fire
Klouse, Jamie; Hanberg, Claire; Tranchell, TJ; Epperson, Megan; Degon, Ashley

SESSION 2  Room 137A
Session Chair: Charles Reasons
8:00-8:20  Open Governance: Trends From Cutting Edge Governments in the United States and Abroad
Schacht, Sarah
8:20-8:40  Sex Trafficking in the Middle East: An Untold Story
Awad, Salam
8:40-9:00  Social Science and the Law: The Influence of Social Science on the Eighth Amendment Jurisprudence of the Supreme Court
Schmidt, Alec
9:00-9:20  College Students’ Underage Drinking, the Law, and the Police: A Survey Study
Mohamed, Saeed

SESSION 3  Room 137B
Session Chair: Daniel Beck
8:40-9:00  Ontogenetic Variation in the Thermal Biology of Northern Pacific Rattlesnakes
Loughran, Caleb
9:00-9:20  Evidence of Self Recognition Using Olfactory Cues in the Coastal Giant Salamander (Dicamptodon tenebrosus)
Reavill, David; Wagner, Steven; Fessler, Brandon; Weaver, Robert
SESSION 4  Room 140
Session Chair: Razvan Andonie
8:00-8:20  Messier Marathon Scheduler: A Software Tool for Novice Star-Gazers and Experienced Astronomers
Moore, Katherine
8:20-8:40  Creation Assistant for Easy Assignment
Burton, Hank; Brooks, Marshall; Canada, Justin
8:40-9:00  Preventing Student Drop Out at CWU
Arakh, Suvarna
9:00-9:20  Massively Parallel K-NN Using CUDA and MARS
Smithrud, Joshua; McElroy, Patrick

SESSION 5  Room 201
Session Chair: Rebecca Pearson
8:00-8:20  Women and Roller Derby
Eklund, Andrea; Masberg, Barbara
8:20-8:40  Food Security in the Aftermath of Relocation: Community Adaptations and Resilience in Kivalina, Alaska
Chishom, Markus
8:40-9:00  Examining the Relationship Between Farmers’ Markets and Obesity Rates in Washington State
Steele, Taylor
9:00-9:20  Barriers Student Face When Cooking in the Dorms
Shepler, Catherine

SESSION 6  Room 202
Session Chair: Gary Bartlett
8:00-8:20  Psychological Studies on “Molyneux’s Question” Do Not See All the Points
Davis, Maxwell
8:20-8:40  The Epistemic Value of Live Theatre: A Dramatic Response to the Question of Knowledge
Hicks, Hannah
8:40-9:00  An Essay on the Natural Law and Republican Form of Government
Taylor, Robert
9:00-9:20  The Role of Socially Engaged Monks in Burma
Matson, Hillary
SESSION 7  
Session Chair: Roxanne Easley

8:00-8:20  
**Russian Revolutionary in London: S.M. Stepniak and the Appeal to Foreign Sympathizers**  
*Owens, Kristopher*

8:20-8:40  
**Komsomol Participation in the Soviet Antireligious Campaign, 1918-1932**  
*Hastings, Rebecca*

8:40-9:00  
“My Dear White Sisters...I Want My Agency Moved Back”: Female Moral Authority in the Service of Reservation Reform, 1920s-1930s  
*Anderson, Talea*

9:00-9:20  
**Robert E. Lee and Southern Memory**  
*Hedgers, Kellie*

SESSION 8  
Session Chair: Roy Savion

9:30-10:00  
**Active Autocare: Mobile Auto Shop**  
*Bruno, Gabriel*

10:00-10:30  
**Sushi on the Roll**  
*Clausen, Dan*

10:30-11:00  
**Expansion of a Non-Profit Organization for the Creation and Dissemination of Physics Curricular Activities**  
*Corbin, Ryan; Society of Physics Students*

11:00-11:30  
**Waterfowl Estate**  
*Dietrich, Brandon*

11:30-12:00  
**Colockum Craft Brewing**  
*Reichlin, William*

12:00-12:30  
**Vinegearz: Software as a Service**  
*Senekhamphone, Nakhonngeun*

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

SESSION 9  
Session Chair: Katharine Whitcomb

9:30-10:50  
**Manastash Showcase**  
*Whitcomb, Katharine; Herrera, Santos; Hasseries, Patrick; Epperson, Megan; Degon, Ashley*
### SESSION 10
Room 137A
Session Chair: Cody Stoddard

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<th>Time</th>
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<td>Jardines v. Florida</td>
<td>Davis, Caless</td>
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<td>Florence v. Board of Chosen Freeholders of County of Burlington et al.</td>
<td>Mohamed, Saeed; Wassell, Alison</td>
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<td>Lies, Valor Lies, and the First Amendment</td>
<td>Umana, Jonathan; Smith, Nicole</td>
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<td>Miller v. Alabama: Juveniles and Eighth Amendment</td>
<td>Welch, Edward</td>
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### SESSION 11
Room 137B
Session Chair: Paul James

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<th>Time</th>
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<tr>
<td>9:30-9:50</td>
<td>One Fin, Two Fin, Red Fin, Eroded Fin: Fin Erosion and Its Relationship to Juvenile Chinook Salmon Health</td>
<td>Martin, Kelsey; Wagner, Katie; Woodley, Christa</td>
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<td>9:50-10:10</td>
<td>Evaluating Dispersal and Culvert Passage Performance of Juvenile Coho Salmon (Oncorhynchus kisutch) in Urban Streams</td>
<td>Green, Ethan</td>
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<td>10:10-10:30</td>
<td>Pika (O. princeps) Home Range Use and Habitat Preference Outside Talus Rock Patches in Relation to Potential Dispersal Corridors</td>
<td>Hooghkirk, Jill</td>
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<td>10:30-10:50</td>
<td>The Elevational Limits of the American Pika (Ochotona princeps) in the Eastern Cascades of Central Washington</td>
<td>Sawada, Bryant</td>
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### SESSION 12
Room 140
Session Chair: Elizabeth Kerns

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<td>9:30-9:50</td>
<td>Creating a CWU Institutional Repository (IR) to Showcase Students’ Research and Scholarly Work</td>
<td>Fu, Ping</td>
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<td>9:50-10:10</td>
<td>Status Update: A Theoretical Look at Social Media</td>
<td>Miracle, Melinda</td>
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<td>10:10-10:30</td>
<td>Respondus Lockdown Browser Revisited: Disclosure</td>
<td>Moncrief, Donald</td>
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<td>10:30-10:50</td>
<td>The Trans-Pacific Partnerships Impact on America</td>
<td>Swenson, Matthew; Takei, Hideki</td>
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<td>SESSION 13</td>
<td>Room 201</td>
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<td>Session Chair:</td>
<td>Nelson Pichardo</td>
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| 9:30-9:50 | Inside the Fish Bowl: Application of Sociological Theory to Observations of State Government  
  *Sebastian, Aleisha* |
| 9:50-10:10 | Gender Representations and Stereotypes on Gamers and Games  
  *Phillips, Neko* |
| 10:10-10:30 | Tanned and Ripped: The Growth of Male Objectification  
  *Pucci, Nicholas* |
| 10:30-10:50 | A Comparative Study of Urban and Rural Cannabis Politics  
  *Grimmer, Brian* |

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<th>SESSION 14</th>
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<tr>
<td>Session Chair:</td>
<td>Yvonne Chueh</td>
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| 9:30-9:50 | Insurance Premium Comparison Among Different Countries  
  *Dyer, Vicky* |
| 9:50-10:10 | Life Insurance Pricing  
  *Heber, Drew; Conaway, Andy; Nakamichi, Dustin; Cheng, Jinlong* |
| 10:10-10:30 | Expressions for Life Insurance and Life Annuities and How They Are Related  
  *Rindlisbacher, Nathan* |
| 10:30-10:50 | Is Deferment Period Protection Necessary?  
  *Guiles, Samuel* |

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<th>SESSION 15</th>
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<td>Session Chair:</td>
<td>Daniel Herman</td>
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| 9:30-9:50 | Songs of Manifest Destiny: A Cultural Reflection  
  *Wolitarsky, Brock* |
| 9:50-10:10 | Medieval Folklore: A Representation of the Cultural Shift and Development of the “Hero” in Medieval Society  
  *Harvey, Renae* |
| 10:10-10:30 | Economics of Ellensburg and Washington State Normal School  
  *Davis, Brian* |
| 10:30-10:50 | Martial Arts in the Pacific Northwest After World War II: How Martial Arts Instruction Changed, and How Communities Benefitted  
  *Pelley, Carlos* |
SESSION 16  Ballroom A  
Session Chair: Gayla Blaisdell  

9:30-9:50  Demonstration of Style Variations Within French-Canadian Fiddling  
Koran, Laurel  

9:50-10:10  Sonatine for Flute and Piano by Henri Dutilleux: History, Influences, and Analysis  
Webster, Megan  

10:10-10:30  “The Stuttering Duet” from the Bartered Bride  
Hemenway, Sarah  

SESSION 17  Room 135  
Session Co-chairs: Lene Pedersen and Katharine Whitcomb  

11:40-1:00  Portraits of the Taylor Bridge Fire: Part I  
Professional Writing & Visual Anthropology, Group Projects  

Safe House: The Halperins and the Taylor Bridge Fire  
Monterrey, Samantha; Silverman, Mitchell  

I’m Gonna Build It Myself: B. Robert Keeney Emerges From Wreckage  
Epperson, Megan; Jones, Courtney  

Joseph Powell: Loss Upon Loss With Unexpected Blessing  
Welch, Alyssa; Westove, Preston  

Protecting a Sanctuary: The Cle Elum Seven  
Woodhouse, Brea; Newbury, Nichole  

SESSION 18  Room 137A  
Session Chair: Cody Stoddard  

11:40-12:00  Student Attitudes Toward Police: The Importance of Perceived Fairness and Procedural Justice  
Shafer, Jillian  

12:00-12:20  Sexual Victimization Among College Students in a Rural Setting  
Ashford, Jordyn; Shafer, Jillian  

12:20-12:40  Ecology of Crime in Seattle, WA: Drug Market Intervention Assessment  
Shafer, Jillian  

12:40-1:00  The Effectiveness of Reintegrative Shaming Theory Within the Mechanisms of Secondary Deviance  
Perkins, Scott
SESSION 19  Room 137B  Session Chair: Blaise Dondji

11:40-12:00  Environmental Gradients as Drivers of Virus-Mediated Microbial Evolution
Adams, Laura

12:00-12:20  Does Previous Exposure to Leishmania major Affect the Outcome of Infection With Leishmania infantum?
Anderson, Heidi

12:20-12:40  Regulation of the Host Immune System by the Hookworm Ancylostoma ceylanicum
Diliani, Nicholas

12:40-1:00  Assessment of Anthelmintic Activity of Plant Extracts on the Hookworm Ancylostoma ceylanicum
Koppinger, Kaitlin

SESSION 20  Room 140  Session Chair: Mike Jackson

11:40-12:00  New Far-Infrared Laser Emissions From Optically Pumped Formic Acid and Several of Its Isotopic Forms
Olivier, Kerry; Deshano, Brad; Cain, Breanna

12:00-12:20  Characterizing a 474 Nm Laser as a Source for Spontaneous Parametric Down Conversion
Balmer, Joshua; Howard, Lex

12:20-12:40  Design and Implementation of an Optical Spectrum Analyzer
Powell, Adam

12:40-1:00  Development of a Nuclear Lifetime Measurement Apparatus
Bianco, Brian; Kilts, Deeanna

SESSION 21  Room 201  Session Chair: Eric Cheney

11:40-12:00  Network Analysis
Wentworth, Travis

12:00-12:20  Global Trade Patterns of Trafficking in Persons
Buchanan, Diane

12:20-12:40  The Relationship Between Artificial Social Environments and Deviance
Cummings, Tyler

12:40-1:00  The Relationship Between Homeschooling and Child Abuse
Webster, Rebecca
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<th>SESSION 22</th>
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<td>Session Chair:</td>
<td>Yvonne Chueh</td>
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</table>
| 11:40-12:00 | A Fresh Look at Washington State’s Guaranteed Education Tuition Program  
Blanar-Oviatt, Adam; Albrecht, Stacy |
| 12:00-12:20 | Net Level Premium Application: A Look at Smokers Vs. Nonsmokers  
Flatebo, Sarah |
| 12:20-12:40 | What Can Be a Good Predictor of a Higher ADR in GI Practices?  
Huang, Rui; Cheng, Jinlong |
| 12:40-1:00 | Guns and Crime: An Analysis of the Effects of Firearms Associated With Criminal Activity  
Heber, Drew; Darnall, Micah |

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<td>Session Chair:</td>
<td>Jason Knirck</td>
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| 11:40-12:00 | Cuchulain: A Literary Instrument of the Gaelic Revival  
Steeves, Aaron |
| 12:00-12:20 | The IRA: Portrayal, Perception, and Reality, 1916-1921  
Hoolbrook-Bruns, Elise |
| 12:20-12:40 | Gaelicizing Ireland’s Youth: The Creation of St. Enda’s School for Boys  
Bartholet, Christina |
| 12:40-1:00 | The Japanese Bushido of the Era of Civil War  
Takei, Hideki |

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<tr>
<th>SESSION 24</th>
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<td>Session Chair:</td>
<td>John Harbaugh</td>
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| 11:40-12:00 | National Trumpet Competition: Solo Divisions  
Hurd, Tristan |
| 12:00-12:20 | Ensemble Competition at the Semifinal Round of the 2013 National Trumpet Competition  
Rutherford, Robert |

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<th>SESSION 25</th>
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<td>Session Chair:</td>
<td>Michael Ogden</td>
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</table>
| 11:40-12:00 | Corporate Media Biology Video  
Scarlett, Carlen; Kim, Jay |
| 12:00-12:20 | Mirage of Love Screenplay  
Mosier, Wesley |
12:20-12:40  *Fallen: A 48-Hour Test of Endurance*
Clements Jr., Matt

12:40-1:00  *Torch*
McGehee, Sean; Gahley, Skyler

**SESSION 26**  Room 135
Session Co-chairs: Lene Pedersen and Katharine Whitcomb

1:10-2:10  **Portraits of the Taylor Bridge Fire: Part II**
*Professional Writing & Visual Anthropology, Group Projects*
Deborah Schriber-Barkley and the Animal Rescue Effort in the Taylor Bridge Fire.
Houser, Veronica; Borodey, Camille

Barb Owens: Fire Hits Home for Daily Record Reporter
Johnson, Collin; McNealley, Megan

Margaret Sahlstrand: Out of Destruction Emerges Something New
Hanson, Hannah; Khan, Yuri

**SESSION 27**  Room 137A
Session Chair: Rex Wirth

1:10-1:30  *Trichloroethylene: The Silent Massacre*
Pace, Terri

1:30-1:50  *Pollution Control in the Puyallup Floodplain: The Problem of Urban Sprawl*
Kajca, Spencer

1:50-2:10  *Residential Stormwater and the Contamination of Puget Sound*
McLeod, Kirsten

2:10-2:30  *Cherry Point Coal Transfer Station: To Build or Not to Build*
Rakes, Keith

**SESSION 28**  Room 137B
Session Chair: Jennifer Dechanie

1:10-1:30  *Read Trimming of Chloroplast Genome Sequences May Lead to Better Quality Assemblies*
McFadden, Angela

1:30-1:50  *Selection on Domestication Traits and QTL in Water-Stressed Sunflower Crop-Wild Hybrids*
Owart, Birkin

1:50-2:10  *Experimental Alteration of DNA Methylation Affects the Phenotypic Plasticity of Ecologically Relevant Traits in* *Arabidopsis thaliana*
Marrese, Anthony
Populations of *Daphnia melanica* Vary in Their Behavioral Response to Visible and UV Light  
*Tompkins, Amanda*

**SESSION 29**  
Room 140  
Session Chair: Michael Braunstein

1:10-1:30  
**Variable Temperature Virtual Star**  
*Skousen, Ernest*

1:30-1:50  
**Initial Results of Modeling Winds in the Kittitas Valley With the Weather Research and Forecasting Model**  
*Wenger, David*

1:50-2:10  
**Investigating Bell's Theorem on Correlated Systems Utilizing Monte Carlo Methods**  
*Corbin, Ryan*

**SESSION 30**  
Room 201  
Session Chair: Robyn Brammer

1:10-1:30  
**Mindfulness As an Attenuating Factor in the Relationship Between Sexual Orientation and Levels of Stress, Depression, and Self-Esteem**  
*Faust, Emily*

1:30-1:50  
**Liar, Liar, Memory On Fire**  
*Polage, Danielle*

1:50-2:10  
**Error Detection**  
*Prather, Christopher*

2:10-2:30  
**Magic, Zeitgeists, and Cognitive Dissonance**  
*Miracle, Melinda*

**SESSION 31**  
Room 202  
Session Chair: Dominic Klyve

1:10-1:30  
**Ecstatic Happy Numbers**  
*Chappelle, Candace*

1:30-1:50  
**An Estimation of the Proportion of Abundant Numbers**  
*Pidde, Melissa*

1:50-2:10  
**What Wins Basketball Games?**  
*Ordonez, Christina; Bowe, Jamie*

2:10-2:30  
**Current Reading Habit Trends**  
*Bostwick, Laura*
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<th>SESSION 32</th>
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<td>Session Chair:</td>
<td>E. Rick Hutchins</td>
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</table>
| 1:10-1:30 | **Truth Over Time: The Evolution of Hollywood’s Thinking on the Vietnam War**  
Hedgers, Kellie |
| 1:30-1:50 | **History of Mental Disorders As Portrayed in Film**  
Riggs, Meagan |
| 1:50-2:10 | **Doctored, Strange Love: Or How We Learned to Stop Worrying and Love the Zomb**  
Hopkins, Cyphar |
| 2:10-2:30 | **Weak Domestic or Fighting Female: Anime and the Portrayal of Women**  
Kobashigawa, Amy |

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<tbody>
<tr>
<td>Session Chair:</td>
<td>NaomiJeffery Petersen</td>
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</table>
| 1:10-1:30 | **Revolution and Education in Iran**  
Kaviani, Khodadad |
| 1:30-1:50 | **Castle City, Carcassonne: The Education of Its Youth**  
Donahoe, Susan |
| 1:50-2:10 | **Multicultural Education: A Solution to Meeting the Needs of Today’s Underserved Students**  
Anderson, Julia |
| 2:10-2:30 | **The Value of Anthropomorphic Literature**  
Nielson, Stephanie |

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<th>SESSION 34</th>
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<tbody>
<tr>
<td>Session Co-chairs:</td>
<td>Therese Young and Alison Scoville</td>
</tr>
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</table>
| 1:10-1:30 | **“I’m Ready Now”**  
Young, Therese |
| 1:30-1:50 | **Tension**  
Zelenak, Megan |
| 1:50-2:10 | **Variation in Expression of Duplicated Insulin-like Receptor Genes in *Daphnia pulex***  
Wooller, Ian |

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<tr>
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<tr>
<td>Session Chair:</td>
<td>Christopher Schedler</td>
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| 2:40-3:00 | **The Illusion of Power: An Analysis of Magical Realism and Religion in *Bless Me, Ultima***  
Thomas, James |
### SESSION 35  Room 135 (continued)

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<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>3:00-3:20</td>
<td>Haunting History in Toni Morrison's <em>Beloved</em></td>
<td>Ryker, Hannah</td>
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<tr>
<td>3:20-3:40</td>
<td>Negotiating the Conflict Between Gender Roles on the Spectrum of Reality and Fantasy in <em>The House of the Spirits</em></td>
<td>Flerchinger, Nick</td>
</tr>
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### SESSION 36  Room 137A

Session Chair: Gilberto Garcia

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<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter(s)</th>
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</thead>
<tbody>
<tr>
<td>2:40-3:00</td>
<td>The Politics of the Mexican State: Informal Power and Failed State Politics in the Struggle Against the Cartels</td>
<td>Shearer, Brendan</td>
</tr>
<tr>
<td>3:00-3:20</td>
<td>Latinos and the United States Political System: A Case Study of Latino Political Participation and Representation in the City of Sunnyside, Washington</td>
<td>Purkey, Krystelle; Pray, Steven; Shearer, Brendan; Shearer; Cohen, Levi</td>
</tr>
<tr>
<td>3:20-3:40</td>
<td>21 &amp; Running</td>
<td>Gonzalez, Pablo</td>
</tr>
<tr>
<td>3:40-4:00</td>
<td>Being Mexican-American: A Literary Analysis of the Life of Mexican Immigrants in the United States</td>
<td>Stratton, Markie</td>
</tr>
</tbody>
</table>

### SESSION 37  Room 137B

Session Chair: Todd Kroll

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>2:40-3:00</td>
<td>Protein-Protein Interactions in the Embryonic Mouse Neocortex: Emx2 and Binding Partners</td>
<td>Miller, Cierra</td>
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<tr>
<td>3:00-3:20</td>
<td>Identification of Proteins That Interact With Lhx2 in the Embryonic Neocortex</td>
<td>Jackson, William</td>
</tr>
<tr>
<td>3:20-3:40</td>
<td>Flavonoid Effects on Breast Cancer Cells</td>
<td>Shindruk, Averyl</td>
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### SESSION 38  Room 140

Session Chair: Chris Mattinson

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<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>2:40-3:00</td>
<td>Tracing Atmospheric Nitrates in the Lower Yakima Valley Basin, Washington</td>
<td>Cavanaugh, Gabrielle</td>
</tr>
<tr>
<td>3:00-3:20</td>
<td>Modeling Metamorphic History of High Pressure Rocks From Western China</td>
<td>Walters, Jesse</td>
</tr>
<tr>
<td>3:20-3:40</td>
<td>Using GIS to Assess the Post-Fire Table Mountain Environment for Mass Wasting Susceptibility</td>
<td>Takagi, Owen</td>
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</table>
3:40-4:00  Grissom Site (45KT301) Inter- and Intra-Site Comparisons of Stone Tool Technology and Function Through Time  
Vassar, Anne

SESSION 39  Room 201  
Session Chair:  Lori Sheeran

2:40-3:00  Sign Dialects in Chimpanzees  
Keenan, Susan Ann; Jensvold, Mary Lee

3:00-3:20  Maternal Investment in Free-Ranging Tibetan Macaques (Macaca Thibetana)  
Murphy, Ashley; Link, Jessa

3:20-3:40  A Methodology for Nominating Behaviors to Measure Personality Traits in Nonhuman Primates  
Pritchard, Alexander; Sheeran, Lori; Gabriel, Kara; Li, Jinhua; Wagner, Steve

3:40-4:00  Impact of Park Ranger Quality on Tibetan Macaques (Macaca thibetana) at Mt. Huangshan, China  
Usui, Rie; Li, Jin-Hua; Duvall-Lash, Alexander; Pritchard, Alexander

SESSION 40  Room 202  
Session Chair:  Dominic Klyve

2:40-3:00  A Fresh Look at National Dental Data  
Tokarczyk, Russa; Blanar-Oviatt, Adam

3:00-3:20  Occupational Employment Analysis for 2012  
Rindlisbacher, Nathan

3:20-3:40  Gone With The Wind: Supplementing Diesel With Wind Energy at a Remote Iron Ore Mine  
Hadfield, Michael; Sivich, Jason

3:40-4:00  Compact Rio: Analyzing Acceleration and Strain  
Palencia, Louie

SESSION 41  Room 271  
Session Chair:  Toni Sipic

2:40-3:00  How America’s Drug War Affects Mexico’s Tourism  
James, Carley

3:00-3:20  International Tourist Flows and Natural Disasters  
Clement, Jacob

3:20-3:40  Food, Music, and Language: The Power of Folklore  
Rodriguez, Sara

3:40-4:00  2013 Cross Cultural Leadership Program Spring Immersion Project  
Gregson, Ryan
SESSION 42  Room 301  
Session Chair: Shu Fei Tsai

2:40-3:00  Decreasing a College Student’s Disorganization  
*Heberling, James*

3:00-3:20  Increasing Making the Bed for a 23-Year-Old Male  
*Piper, Brooke*

3:20-3:40  Increasing Putting Dishes in the Dishwasher Using Prompting and Positive Reinforcement  
*Smith, Nadine*

SESSION 43  Room 135  
Session Chair: Melissa Johnson

4:10-4:30  Bondage: How the James Bond Films Effect the Female Gender  
*Murillo-Rosales, Jessica*

4:30-4:50  James Bond and All His Women  
*Moffat, Jannicke*

4:50-5:10  Gender Norms: The Negative Impact of Pop Culture on the Advancement of Gender Roles  
*Pizano, Nancy*

5:10-5:30  The Negative Effects of Discrimination  
*Elliot, Riley*

SESSION 44  Room 137A  
Session Chair: Toni Culjak

4:10-4:30  Creating an Arts Parade for the Ellensburg Downtown Association’s Event, Buskers in the Burg  
*Kooser, Brian*

4:30-4:50  “Confessions of a Coalminer’s Granddaughter”  
*Rutland, Amelia Kate*

4:50-5:10  The Creative Process and Screenplay Development for an Original Post-Apocalyptic Film  
*Commins, Mary*

5:10-5:30  “Open Your Ears, You Fool!”  
*Hoff, Jonathan*

SESSION 45  Room 137B  
Session Chair: Anthony Diaz

4:10-4:30  Redox Reactions of Iron and Carbon in Soot Samples  
*Straub-Walden, Andrew; Casique, Hector*
4:30-4:50  Investigation of the Role of Polyelectrolytes in the Stabilization of Reactive Redox Species  
Siegenthaler, James

4:50-5:10  New Synthesis of Novel Phosphor for LED Technology: Sr₃Y₂(BO₃)₄·Eu Using Sr₄B₂O₆:Eu and SrB₄O₇:Eu Precursors  
Kilburn, Troy; Way, Zachary

SESSION 46  Room 202  
Session Chair:  Michael Whelan

4:10-4:30  Effectiveness of Stretch and Flex Programs in Preventing Work-Related Musculoskeletal Disorders in Construction  
Rajendran, Sathyanarayanan

4:30-4:50  Making, Curing, and Testing Concrete Cylinders in a Senior Level Construction Management Course  
Plugge, P. Warren

4:50-5:10  Creating and Utilizing a Working Refrigeration Model to Enhance Student Learning in a Construction Management Program  
Plugge, P. Warren

5:10-5:30  Using Game Theory Pedagogy in Construction Management: Prisoner’s Dilemma and the 20-Dollar Game  
Plugge, P. Warren

SESSION 47  Room 271  
Session Chair:  Stefan Ward

4:10-4:30  Perceptions of Drug Users and Drug Use Within Rural Communities  
Seitz, Eric

4:30-4:50  Alcohol Consumption and Intercollegiate Athletes  
Prigge, Nicole

4:50-5:10  Utilizing Summer Programs to Promote Wellness Knowledge Through Physical Education and Health Classes in Micronesia  
McFadden, Kevin; Johnson, Evan; Avila, Joe
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 May 14, 2:00-6:00 p.m. in the Higher Education Center, Bldg 29

1. Local-level Analysis of Multinational Corporations in Less Developed Countries
   Tafere, Danait

2. Saudi Arabian Women: Hijab Covering
   Kovalevich, Kristina

CWU-LYNNWOOD
Posters on display May 15, 5:00-8:00 p.m. in Snoqualmie Hall

1. Easy to Use Supply Chain Software Applications for Small Businesses
   Clark, Eric; Darboe, Joko Fatou; Doucet, Brandon

2. Scaling Up
   Eaton, Lindsey; Douge, Rikayla; Fletcher, Arlen

3. Rocky Brand Supply Chain Improvement
   Iem, Sochetra; Logan, Nicole; Nazarali, Rizwan

4. Preliminary Supplier Risk Evaluation
   Loyles, Jason; Lopez, Edward

5. Willis Enterprises Faces a Supply Dilemma
   Ngo, Anthony; Pham, Cuong; Olson, Leslie

6. Supply Chain Optimization at Evergreen Hospital
   Shoubridge, David; Tsukamoto, Shota; Suzuki, Komei

7. Store Brands: Friend or Foe?
   Meberg, Kari; McLeod, Mark; May, Patrick

8. Constructing a Successful Sustainable Supply Chain
   Arnold, Jonathan; Carroll, Alexander; Cao, Quang

9. Gender Roles of Indigenous People
   Paco, Ermana
POSTER PRESENTATIONS AND CREATIVE WORKS SCHEDULE

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

POSTER SESSION 1: BALLROOM C/D
Posters on display from 8:20-10:50 a.m.
Presenters must be by posters during judging from 9:10-10:40 a.m.

ANTHROPOLOGY

1. Rendering and Articulation of a Bobcat
   Sweepe, Kyleen

2. Species Differences in Artiodactyl Hyoid Bones
   Huilca, Jenny

3. Analysis of Archaeological Faunas From Three Mesa Sites in Grant County, Washington
   Oliver, Bethany; Frederickson, Victoria; Kassa, Sonja; Moose, Christopher; Stcherbinine, Sean; Taylor, Allie

4. Macro-Botanical Recovery Rates Using Flotation of Sediments From the Sunrise Ridge Borrow Pit Site
   Rennaker, Patrick

5. Evaluating Lithic Technology and Function Over the Last 5,000 Years at the Sunrise Ridge Borrow Pit Site, Mount Rainier, Washington
   Hansen, Heather

6. Cordage from the Rosa Rockshelter, Yakima River Canyon, Washington State
   Matthes, Whitney

7. Mapping and Radiocarbon Dating Archaic Period Monuments: La Alberca Structure Complex, Highland Michoacán, Mexico
   Steinkraus, Mark; DeLeon, Ansel

8. Radiocarbon Dating of Bioapatite from Calcine Bone: Western Washington
   Brown, James

   Ferri, Serafina

10. *Pediocactus nigrispinus* discovered in the Tekison Rockshelter Site
    Blanchard, Christian; Wooller, Ian
PRIMATE BEHAVIOR/CHCI

11. DNA From Chewed Vegetation: A Non-Invasive Collection Strategy for Arboreal Primates
    Humphreys, Jennifer

    Schulze, Savannah; Mas, Jessica; Stafford, RyAnn; Jensvold, Mary Lee

13. Exploring Visitor Behavior at a Florida Zoo
    Mas, Jessica; Carner, Amanda; Sullins, Kaeley; Jensvold, Mary Lee; Zager, Lindsay

14. Nighttime Enrichment Preferences of Three Captive Chimpanzees (Pan troglodytes)
    Carner, Amanda; Sullins, Kaeley; Wilding, Lisa; Hendrickson, Bonita; Jensvold, Mary Lee

15. Variability of Locomotion in Mantled Howling Monkeys (Alouatta palliata) in Costa Rica and Nicaragua
    Price, Erika

BIOLOGY

16. Effect of Seasonality on Activity In the Mexican Beaded Lizard in a Tropical Dry Forest In Jalisco, Mexico
    Butterfield, Taggert

17. Thermoregulation Patterns of the Northern Pacific Rattlesnake in a Shrub-Steppe Habitat
    Schroeder-LaPlatney, Evin

18. The Habitat Selection and Movement Patterns of Crotalus oreganus by Radio Telemetry Tracking
    Andrews, Brian

19. Kinematic Analysis of Prey Capture in Coastal Giant Salamanders (Dicamptodon tenebrosus)
    Westervelt, Laura; Weaver, Robert; Reavill, D.; Richbourg, Sara; Fessler, Brandon

20. Phenotypic Differences of Red-backed Vole (Myodes gapperi) Populations North and South of I-90
    Brimm, Erin

21. Plant Anatomical Structures and Art
    Towner, Corrine

22. A Comparison of Plant Growth in Soils from Burned and Unburned Sites
    Towner, Corrine

23. Differences in the Growth of Offspring From Sunflowers of Different Water Treatments
    Croshaw, Casey; Sunwar, Terisa

24. Diversity of Mycena Species in the Eastern Cascades
    Goldberg, Christina
| 25. | Plant Flavanoid Isolate F4 Affects MCF-7 Human Breast Cancer Proliferation and Metabolism  
     Goldberg, Christina; Vosteen, Gabrielle; Sortor, Leyna |
| 26. | Effects of Cannabidiol on MCF-7 Human Breast Cancer Cell Proliferation, Metabolism, and Morphology  
     Gerrit, vanKommer; Michael, Kyle; Winterstein, Eric |
| 27. | Effect of *Heloderma suspectum* venom on MCF-7 Breast Cancer Cell Proliferation, Metabolism, and Morphology  
     Nichols, Thomas; Tucker, Dana; Ronk, Seth |
| 28. | Bacteriological Testing of Novel Flavonoids Against Antibiotic Resistant *Staphylococcus aureus*  
     Santana, Felipe; Darley, Jacob; Foss, Eric |
| 29. | Antimicrobial Effects of Hops  
     Lopez, Wendy; Foss, Eric |
| 30. | Toxic Effects of Common Pharmaceutical Contaminants on *Daphnia pulex*  
     Okere, Al |
| 31. | Effects of the Antibiotic Sulfamethazine on DNA Damage in *Daphnia pulex* Embryos  
     Awan, Samara |
| 32. | Maternal and Paternal Epigenetic Inheritance of Trichome Densities in *Mimulus guttatus*  
     Akkerman, Kayla |
| 33. | Response to Artificial Selection on a Heritable, Environmentally Induced Defense in *Mimulus guttatus* (Yellow Monkeyflower)  
     Neuffer, Sam |
| 34. | Recombinant PFR-like Proteins Cloned From *Trypanosoma cruzi*  
     McDonald, Jay |
| 35. | Using *Caenorhabditis elegans* to Understand the Cellular Mechanisms of Serotonin-dependent Behavioral Adaptation  
     Ronk, Seth |
| 36. | Development of an Assay to Detect Degenerative Dopaminergic Neurons in *Caenorhabditis elegans*  
     Darley, Jacob; Niemuth, Maria |

**CHEMISTRY**

| 37. | The Effects of 2-Deoxy-D-Glucose and Different *E. coli* Diets on *C. elegans* Mitochondrial Metabolism  
     Messerman, Hayden |
| 38. | Effect of Fat Supplemented Diets on the Physiology of *C. elegans*  
     Carter, John |
39. Optimizing a Method for Determining the Mitochondrial Membrane Potential of C. elegans
   Gaudette, Samantha

40. The Effect of the Fullerene Nanoparticle on Mitochondrial Respiration
   Miller, Zachary

41. Expression and Purification of Neocortical Arealization Factors
   Miller, Alonna; Meyers, Nick

42. New Molecular Scaffolds for Frustrated Lewis Pair Systems
   Marrese, Anthony; Maverick, Rebecca

43. Synthesis of Phidianidines A and B
   Petersen, Brandon; Buchanan, Jacob

44. Towards the Total Synthesis of 5-Bromo-8-Methoxy-1-Methyl-β-Carboline as a Potential Anti-leukemic Agent
   Frazier, Katie; Creasy, Rane

45. Investigation of the Effect Gd$^{3+}$ on Nanoparticle Host-to-Europium Transfer Efficiency in YBO$_3$: Gd$^{3+}$, Eu$^{3+}$ Under VUV Excitation
   Harrietha, Benjamin

46. Synthesis Towards Straight Chain Borinic Acids as Potential HIV-1 Protease Inhibitors
   Contreras, Erik

47. Synthesis Towards Several Potential Inhibitors of Anthrax Lethal Factor Through Organoboron Chemistry
   Frank, Michael

48. Towards the Synthesis of Novel 1,3-Azaborines As Potential HIV-1 Protease Inhibitors
   Sigurjonsson, Kristin

49. A B3LYP Study on the C–H Activation in Propane by Neutral and +1 Charged Platinum Clusters With 2–6 Atoms
   Mith, Drake

50. Carbonaceous Nanoparticle Toxicity As a Function of Ferrous Iron Content
   Hinz, Daniel; Teng, Hsiang; Ting, Hoi

51. Ferrous Iron and Hydrogen Peroxide Produced by Marine Aerosols Deposited in Ocean Water of the Equatorial Pacific Ocean
   Teng, Hsiang; Ting, Hoi

52. Iron in Soot: Reactions in the Tail Pipe
   Casique, Hector; Straub-Walden, Andrew

53. Glutathione As an Assay for Determining the Oxidative Ability of Ultrafine Particles
   Peters, Joshua

54. Central Washington University SAACS 2012-2013: Passing on the Torch
   Wilson, Amber
COMPUTER SCIENCE

55. Rigidity Analysis of Protein-Ligand Conformations Generated by Molecular Dynamics
    Orndorff, Brian

56. A Mathematica Approach for Locating Mountain Pass Points on High Dimensional Surfaces
    Bolton, Garret

PHYSICS

57. Development of an Apparatus for Measuring Laser Coherence Length
    Yang, William

GEOLOGICAL SCIENCES

58. Quantifying Channel Responses to the Removal of the Glines Canyon Dam in the Middle Reach of the Elwha River, Washington
    Free, Byron

59. Stalking Water: Using Water Geochemistry to Track Groundwater History
    Patterson, James

60. Analysis of Surface Water-groundwater Interaction in North Kittitas County, WA
    Hartman, Trent

61. Low-temperature Thermal History Along the Zanskar Normal Fault, Greater Himalayan Range, NW, India
    Shurtleff, Brett

62. Uncovering the Tectonic Relationship Between Eclogites and Granulites in the Dulan UHP Belt, North Qaidam Mountains, China
    Regel, Megan; Mattinson, Chris

63. Golden Horn Batholith, Washington: Determining Why Sodic Amphiboles Occur in a Peraluminous Composition
    Lochridge, William
CREATIVE WORKS AND POSTER SESSION 2: BALLROOM C/D

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

CREATIVE WORKS

ART

1. It’s a Dog’s Life
   Pierson, Tanya

PHYSICAL EDUCATION, SCHOOL AND PUBLIC HEALTH

2. How to Make Homemade Creative Teaching Aides for Health Lessons
   Diimmel, Amber

3. How to Make Homemade Creative Teaching Aides for Health Lessons
   Alvestad, Jessica

4. How to Make Homemade Creative Teaching Aides for Health Lessons
   Johnson, Mary

INDUSTRIAL ENGINEERING TECHNOLOGY

5. Cargo Rack with Removable Folding Ramp
   Hoksbergen, Brandon

6. RC Baja: The WildCat
   Dahlgren, Jacob; Litsheim, Seth; Quinn, Sean; Battles, Andrea

7. Water Filtration System
   Wartella, Christopher

8. Metal Castings
   Dickson, Michael

9. Model-T Planetary Transmission Fixture
   McConkey, Scott

10. Wireless Examples and Demonstrations for Practical Learning
    Wilcox, Jeff

POSTER PRESENTATIONS

NUTRITION, EXERCISE AND HEALTH SCIENCE

11. The Role of Globalization in Changing Nutrition and Health Patterns in Central America and Mexico
    Havens, Sarah
12. National School Lunch Program Lunches Are Healthier Than Lunches Brought From Home  
   Macklin, Atlanta; Schroder, Garen; McCulley, Megan

13. Increasing Average Fasting Insulin Among Adolescents Age 12-19, NHANES 2003-2010  
   Davis, Erika

14. Incorporation of Garbanzo Bean Flour As a Fiber Enhancer in Chocolate Cake  
   Romero, Griselda; Johnson, Whitney; Femrite, Heather

15. Investigating the Addition of Fibersol®-2 to Produce Cookies That Are a Good Source of Fiber  
   Hartford, Kaitlyn; Israel, Happy; Orr, Carly

FAMILY AND CONSUMER SCIENCES

16. Family Dinners, Eating Regulation, and Dietary Intake  
   Marquardt, Katrina

PHYSICAL EDUCATION, SCHOOL AND PUBLIC HEALTH

17. The Emphasis of Social Justice in Undergraduate Public Health Programs  
   Marks, Jaron

EDUCATIONAL FOUNDATIONS AND CURRICULUM

18. Tools for Coaching Successful Student Teachers: An edTPA Orientation Activity  
   Petersen, Naomi Jeffrey

PUBLIC POLICY

19. Educational Innovation to Support Industrial Revitalization: From “Made in Liuzhou” to “Created in Liuzhou”  
   Dong, Yuelin; Li, Wei; Yu, Zhongling

SCIENCE EDUCATION

20. Noyce Scholars Explore the Potential of Word Walls for ELL Students  
   Rustad, Rebecca; Le Beau, Joey; Ledbetter, Shawnee; Moreno, Omar; Ray, Megan

21. The Science Talent Expansion Program (STEP) at CWU: A Model for Improving Recruitment and Retention of College Students in STEM  
   Nye, Jessica; Bohrson, Wendy; Braunstein, Michael; Ely, Lisa; Piacsek, Andy; Kurtz, Martha
ACTUARIAL SCIENCE

22. Understanding the Breadth of Life Contingent Insurance Options
   Nesbitt, Alex

23. Excel Application for Insurance Reserves
   Robertson, Brian

ECONOMICS

24. The Determinants of Educational Attainment: A Regression Analysis
   Clement, Jacob

25. Does Pell Eligibility Affect Inclinations of Potential Study Abroad Students?
   Blair, Logan

WALTER STROM MIDDLE SCHOOL

26-27. Water Quality in Crystal Creek and How It Relates to Salmon Viability
   Walter Strom Middle School Students

28-33. Field Investigations by 7th Grade Students at Walter Strom Middle School
   Walter Strom Middle School, 7th Grade Students

28. Creepy Crawlies: Where Are They?
   Montgomery, Mikaila; Proux, Zora

29. Soil: You’re Hot and You’re Cold
   Campbell, Jamie; Morales, Emma

30. How Dense Can You Get?
   Otto, Michael; Wooldridge, Anthony

31. CSI-Critter Scene Investigation
   Dupleich, Amber; Stewart, Marshall

32. How Far Does Sound Travel?
   Slade, Noah; Wyborski, Ian

33. Blusterin’ Breezes and Wind, Oh My!
   White, Kyla; Lussier, Emily

34-36. Upper Kittitas County Landscape Investigation by 8th Grade Students at Walter Strom Middle School
   Walter Strom Middle School, 8th Grade Students

ELLENSBURG HIGH SCHOOL

37. The Solar Solution
   Merrill-Steskal, Gabe; Bottcher, Ben; Alkire, Trevor; Whitaker, Scott; Stockdale, Benjamin
38. **Biofuel of Atlantis**  
*Sumner, Sasha; Mauney, Nate; Wilson, Eric*

39. **A Greener School**  
*Cutlip, Caralyn; Streepy, Westley; Douglas, Abby; Higdon, Ryland*

40. **Testing Correlations Between Understanding and Attitude Towards Climate Change**  
*Bruya, Bob; Parrish, Lannon; Ferris, Matt; Johnson, Bradley*

41. **Greener Lunches for a Greener Future**  
*Jackson, Jennifer; Summer, Star*

42. **Closed System Cogeneration**  
*Verhey, Molly; Koch, Ceona.*

43-45. **Field Studies of the Reecer Creek Flood Plain Restoration Project, Ellensburg**  
*Koch, Ceona; Strom, Ceanu; Hale, Brinn; Jackson, Jennifer; Bottcher, Ben; Wood, Ben; Hurson, Eric; Stockdale, Benjamin; Merrill-Steskal, Gabe; Nickerson, Amber; Swan, Charlie; Orcutt, Alexa; Synder, Brittney*

**CREATIVE WORKS**

**APPAREL, TEXTILES AND MERCHANDISING**

46. **Walkin' on Edge**  
*Ambrose, Annette*

47. **Carmen**  
*Bartley, Denise*

48. **Cheetah Girl**  
*Lewis, Cassie*

49. **1990**  
*Spriggs, Jordan*

50. **Sweet Betrayal**  
*West, Megan*

51. **Two-Toned Madness**  
*Jakubal, Reale*

52. **Vin Rosé**  
*Reinke, Kathryn*

53. **Rebellious Elegance**  
*Knutz, Krissy*

54. **Northern Lights**  
*Martin, Caitlin*

55. **No Place Like Home**  
*Eklund, Andrea*
CREATIVE WORKS AND POSTER SESSION 3: BALLROOM

Posters on display from 2:15-4:45 p.m.
Presenters must be by posters during judging from 3:00-4:30 p.m.

CREATIVE WORKS

INDUSTRIAL ENGINEERING TECHNOLOGY

1. The Catmobile Electric Drive System
   Lee, Thomas; Padilla Jr., Jorge

2. ASME Design Competition
   Hadenfeld, Lauren; Smithlin, Mark

3. Hogue Hall Material Science Water Distiller
   Kuhlmann, Torrey

4. Solar Water Heater
   Judy, Michael

5. Portable Hydro Power
   Wrest, Teagan

6. Vortex Tube
   Lizotte, Noah

7. Regenerative Brake System
   Vu, Tan

8. Tesla Turbine
   Murray, Michael

9. Exercise Bike Charging Station
   Goheen, Marie

10. Liquid Fuel Rocket Engine
    Gilje, Alan

11. Alternative Drive Socket Wrench
    Quintana, Jesse

12. Performance Analysis of a Gamma Type Stirling Cycle Engine
    LaPointe, Charlie

13. Mountain Bike Rack
    Case, Jonathan

14. Solar Data Monitoring, Logging, and Analysis
    Olin, Jacob
POSTER PRESENTATIONS

INDUSTRIAL ENGINEERING TECHNOLOGY

15. Hogue Technology Building Solar Photovoltaic System
   *Bender, Bill*

ENVIRONMENTAL STUDIES

    *Waymire, Matthew*

17. Influence of Stream Channel Form on Leaf Decomposition Rates
    *Mulliken, Mika; Caris, Daniel*

18. Decrease in Acid Rain Over 23 Year Study at Paradise, Mt. Rainier National Park
    *Agren, James*

19. Does Western Spruce Budworm Frass Directly Affect Stream Food Webs?
    *Matthew, Brianna*

20. Does Spruce Budworm Herbivory Alter Nitrogen Cycling In Forest Soils?
    *Wells, Katarina*

GEOGRAPHY

    *Noble, Nicholas*

22. Analysis of Cascadian Forest Resilience Following Volcanic Ash Fall
    *Mockel, Karen; Walsh, Megan*

    *Luk, Yan Yee Lillian; Walsh, Megan*

24. Reconstructing the Fire History of the Last 6000 Years of Mt. Rainier National Park
    *Bommarito, Savannah*

25. The Role of Fire in the Persistence of Montane Meadow Environments in the
    *Willamette National Forest, Oregon*
    *Cox, Tamara; Walsh, Megan*

    *McCoy, Amy*

27. Preserving Natural Resources and the Rock Climbing Experience at Frenchman Coulee
    *Through Cooperative Management Planning*
    *Wright, Micah*

28. Only a Facade? Managing Northern Rocky Mountain Ghost Towns
    *Evans, Krista*
29. Cell Phone Use by Drivers in Ellensburg
   Skyllingstad, Reed; Nelson, Sean

30. Land Management and the Kittitas Valley Event Center: A Historical View
   Steele, Taylor

**RESOURCE MANAGEMENT**

   Yost, Anna

**POLITICAL SCIENCE**

32. Dealing With Agricultural Runoff in Washington State
   Hinkins, Case

33. Water Quality Versus Energy Supply: The Dilemma of Hydraulic Fracturing
   Weigel, Landon

34. Population Growth in Urban King County, Washington: Planning for a Sustainable Future
   Allen, Elliot

35. Delivery of Community Services in Ellensburg
   Berry, Jonathan

**RECREATION AND TOURISM**

36. Hospitality Resources in Kittitas County
   Newbury, Nicole; Crawley, Veronica

37. Events and Attractions in Kittitas County
   Tate, Jessica; Mushlitz, Lindsey

**MARKETING MANAGEMENT**

38. Wild Horse Wind Farm Visitors: An In-depth Phone Survey
   Daily, Jaime; Keenholts, Jimmie; Foltz, Sadi; Tate, Tyler

39. A Comment Book Analysis of Wind Farm Visitors
   Santos, Araceli; Moreno, Ricky; Purcell, Sam; Softli, Jordan

**COMMUNICATIONS**

40. Nonverbal Communication
   Hudson, Emily; Dearinger, Logan; Williams, LeAnn
FAMILY AND CONSUMER SCIENCES

41. Defining Hooking-Up: Anything From Kissing to Sex?
   Stuhlsatz, Greta

42. Parental Perceptions of the Barriers to Continued Participation in Extracurricular Activities for Adolescents with Asperger’s Syndrome
   Gilbert, Jamie

43. Self Esteem and Depressive Symptoms: Perceptions of Negative Outcomes of Hooking Up
   Enders, Sabrina

PSYCHOLOGY

44. Reaction Times and Decision Making in Video Gamers Versus Non-gamers
   Chaffee, Rosalind; Ellis, Derek; Ackley, Daniel; McGuirk, William; Tosland, Cody

45. Undergraduate Students’ Self-Assessment of Study Skills: A Preliminary Analysis
   Little, Suzanne; Petersen, Carolyn

46. Gender Differences in Impacts of Peer Networks on Academic Engagement
   Foutz Jr., Donald; Lacey, Alex; Lindahl, Kevin; Perez, Carolina; Woodman, Toni

47. Are the Eyes (and the Face) Truly the Windows to the Soul?
   Galatis, Donald

48. The Effects of Virtual Actions on Real World Behaviors
   Miller, Brian; Boozer, Kelly

49. The Effects of Message Framing and Emotional Context on Health Behavior
   Osterdahl, Stephanie; McLaughlin, Trese

50. Needs Assessment in Individuals With Asperger’s in a Post-secondary Environment
   Enselman, Daniel; Bistricean, Cristina

51. Evaluating the Environment on a University Campus Toward Students With Learning Disabilities
   Jackle, Samantha; Bistricean, Cristina

SOCIOLOGY

52. Evaluating the Perceptions of Psychology and Sociology Majors by University Undergraduates
   Jackle, Samantha

53. Conducting Social Research on the Occupy Movement
   Lee, Michael

54. A Study of Gender Within the Cannabis Market
   Grimmer, Brian
Environmental Gradients as Drivers of Virus-Mediated Microbial Evolution
Adams, Laura
Faculty Mentor(s): Holly Pinkart, Biological Sciences
Oral Presentation, Session #19
11:40 a.m.-12:00 p.m. in Room 137B

Bacterial viruses (phage) influence microbial community structure and genetic diversity through selective pressure resulting from viral parasitism, but also more directly by horizontal transfer of DNA between bacteria in a process called transduction. Environmental stress can induce and accelerate transduction, a situation often made obvious in extreme environments. Soap Lake is an alkaline, permanently stratified lake that has maintained its meromixis for over 2,000 years. Its deep monimolimnion layer provides an environment of great physical and chemical stability. The half meter chemocline zone that separates the lower and upper lake layers bridges temperature differentials, is an oxic/anoxic interface, and transitions a hypersaline zone (141 gL-1 TDS) to a brackish one (12-16 gL-1 TDS). Since rapid changes in environmental conditions can induce viral transduction events, these areas should have larger populations of phage, and the prokaryotes inhabiting these areas will experience greater rates of viral infection (and subsequent gene transfers) than more stable environments. This project measured viral abundance and host infection rates along these gradients, and compared those data to the viral populations and host infection rates in the highly stable zones. Two-way analysis of variance (ANOVA) was used to test for differences in host populations and phage infection rates between sampling dates and collection sites.

Decrease in Acid Rain Over 23 Year Study at Paradise, Mt. Rainier National Park
Agren, James
Faculty Mentor(s): Anne Johansen, Chemistry
Poster Presentation Session #3, Poster #18
2:15-4:45 p.m. in Ballroom C/D

Weekly wet precipitation samples from Paradise in Mt. Rainier National Park, Washington, spanning the period 1988 to the present, have been 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 and compared with analogous data collected at established National Atmospheric Deposition Program sites throughout the state. Over the last 23 years of the study, proton concentrations decreased by 59 percent resulting in a pH increase of wet precipitation that has increased from 5.1 to 5.5 (P=0.001). 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 no apparent trans-Pacific transport of pollution is detected from Asia.
Maternal and Paternal Epigenetic Inheritance of Trichome Densities in *Mimulus guttatus*

Akkerman, Kayla

Faculty Mentor(s): Alison Scoville, Biological Sciences

Poster Presentation Session #1, Poster #32
8:20-10:50 a.m. in Ballroom C/D

Leaf damage induces increased production of trichomes, hair-like structures that can deter insect herbivores, in *Mimulus guttatus* (the yellow monkeyflower). This induced state is inherited by offspring even though it does not involve changes in DNA sequence, producing one of the only known examples of epigenetic inheritance of an environmentally induced, ecologically relevant trait. The first objective of this project was to determine whether epigenetic inheritance of increased trichome production occurs via the maternal gametes, paternal gametes, or both. The second objective of this project was to determine whether epigenetic inheritance is accomplished by methylation of the maternal and/or paternal DNA. Plants from a single recombinant inbred line were assigned to damage or control treatments and randomly crossed to create a full factorial experiment involving maternal and paternal damage. Each combination of parental damage was represented by four independent parent pairs. Half of the seeds from each parent pair were treated with 5-azacytidine, a chemical that results in genome-wide demethylation. Progeny were raised together in standard greenhouse conditions and assessed for density of trichomes on the 5th leaf pair. Analysis via general linear mixed-model showed that the response to damage is inherited through both the maternal and paternal gametes, and that the maternal and paternal contributions to this response are additive. Demethylation erased the paternal contribution but not the maternal contribution to epigenetic inheritance of increased trichome density. These results suggest that the mechanism for epigenetic inheritance differs between maternal and paternal gametes, and paternal inheritance likely involves DNA methylation.

Population Growth in Urban King County, Washington: Planning for a Sustainable Future

Allen, Elliot

Faculty Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #3, Poster #34
2:15-4:45 p.m. in Ballroom C/D

Rationale: Regulations governing population density are producing patterns that cannot accommodate projected growth. This project—a policy analysis—examines policy options to maximize the effectiveness of urban development strategies with regard to environmental and human well-being as population increases. The importance of this analysis lies in Seattle’s Comprehensive Plan, an urban development strategy with a long-term environmental perspective, keeping in mind the ultimate goal of maximizing material resource efficiency within neighborhoods. Findings: By making established neighborhood cores more all-encompassing with regard to meeting the daily needs of residents, fewer resources will be ultimately be used in daily life. By zoning urban cores to allow for affordable housing, easy access to public transportation, and a thriving business environment, people’s need to stray far from their homes drops off dramatically. When residents can find employment, purchase food and other essentials, and also enjoy recreation and other kinds of entertainment near their home, their need to venture further than their neighborhood all but disappears. Through zoning and other policy options, energy and resource efficiency increases will be an important step as our society uses more and more energy and also puts great population stresses on the land. Methods: The project’s design consists primarily of online information provided on relevant topics by state and local government entities.
How to Make Homemade Creative Teaching Aides for Health Lessons

Alvestad, Jessica

Faculty Mentor(s): Mark Perez, Physical Education, School & Public Health

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

Creating homemade Outrageous Teaching Aids can add powerful teaching moments to any lesson. To help make meaningful connections to audience members during a two-day Environmental Health unit, a creative teaching aid was made specifically to liven up the lesson on composting. Composting is a biological process of breaking down organic elements found in the environment and the typical household. Although composting is a simple process, a balance between carbon and nitrogen must be present. In order to communicate the aforementioned key processes, a teaching aid was created to add an interactive element as well as to inform students of the types of items that can be composted. Various items from around the house were used to create a model of a compost bin. Homemade bean bags were then created from pieces of material and sewn together. Pictures of various items and materials were ironed onto the bean bags. In the classroom setting, participants in two lines were tasked to select specific bean bags and to toss them into the correct composting bins. The activity was used to review and assess student knowledge and skills of the key concepts of composting taught in the lesson.

Walkin’ on Edge

Ambrose, Annette

Faculty Mentor(s): Andrea Eklund, Family and Consumer Sciences

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

Purpose: My goal was to create a garment that was edgy with a bit of class. The target market for this design is a woman in her late 20s who wants to feel dominant on a night out. The garment combines black leather and snake-skin materials to make a women feel and look sexy and sleek. Process: Through research, I gained my inspiration for this garment. Exploration was directed through reviewing the history of fashion, today's latest trends, Pinterest, and various apparel design websites. I especially drew inspiration from 1950s-1970s when greasers, rockers, and bikers incorporated leather with their attire. I wanted to bring back a little bit of rocker style into my line with a sense of today's fashion trends. The form fitting style of the garment was drawn upon a California style. Techniques: I created my garments through the draping technique using a size 10 dress form. After draping the pieces they were trued and pattern pieces were made. A simple sheet from the Goodwill was used to create a sample that was fit to my model. Modifications from the fitting sample were made to the paper pattern, which was made up of nine pattern pieces. For the final garment the lining and exterior were constructed separately and attached at the upper edges. Materials: 100 percent jersey knit, 100 percent polyester pleather, 100 percent acetate plain weave lining, thread, zipper.
Does Previous Exposure to *Leishmania major* Affect the Outcome of Infection With *Leishmania infantum*?

**Anderson, Heidi**

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

Oral Presentation, Session #19  
12:00-12:20 p.m. in Room 137B

Leishmaniasis is a disease caused by a single-celled parasite which is spread by the bite of the sandfly in many tropical and subtropical countries throughout the world. Cutaneous leishmaniasis due to *Leishmania major* is characterized by an open sore appearing at the bite-site, which will eventually self-heal. In visceral leishmaniasis caused by *Leishmania infantum*, the parasites travel to internal organs, and if the infection is left untreated, it can be fatal. These two species of *Leishmania* often overlap in geographic location making co-infections possible. There is a large body of scholarly work on the immune response to *Leishmania* infection. While the immune response to *Leishmania* has been investigated in great detail, few studies have examined whether exposure to one species of *Leishmania* has any protective, or deleterious effects when a person is later exposed to a different species of *Leishmania*. My research aims to further investigate the immune response to co-infection of *Leishmania major* and *Leishmania infantum*.

Multicultural Education: A Solution to Meeting the Needs of Today’s Underserved Students

**Anderson, Julia**

*Faculty Mentor(s): Naomi Petersen, Education*

Oral Presentation, Session #33  
1:50-2:10 p.m. in Room 301

In its current state, the United States’ Education system is failing to meet all students’ needs, shown by the inconsistencies of success between minority group members and their Caucasian peers. Studies done by the Achievement Gap Oversight and Accountability Committee in 2010 and the Pew Hispanic Center in 2008 confirm that Hispanic-Latinos and African-Americans are scoring lower on standardized tests, are more likely to drop out, and are less likely pursue post-secondary education than their Caucasian peers. More disturbingly, according to the US Census released in 2012, these groups, and many others that are receiving second-rate educations, are some of the most rapidly increasing in total United States’ population. A possible solution to the given problems is the adoption of multicultural education to reform current practices. According to James A. Banks, a professor in education at the University of Washington, the integration of the five dimensions of multicultural education will help create an equal opportunity classroom and school for all students. The first dimension, content integration, brings authentic multicultural curriculum into the classroom. The second, the knowledge construction process, asks students to examine different perspectives and frames of reference. The third, prejudice reduction, will create an environment that encourages positive attitudes toward different cultures. The fourth, equity pedagogy, differentiates teaching to meet individual needs. The last dimension, empowering school culture and social structure, promotes all the aspects beyond the classroom into the real world.
“My Dear White Sisters . . . I Want My Agency Moved Back”: Female Moral Authority in the Service of Reservation Reform, 1920s-1930s

Anderson, Talea

Faculty Mentor(s): Daniel Herman, History

Oral Presentation, Session #7
8:40-9:00 a.m. in Room 271

From the nineteenth to twentieth centuries, the United States government shifted its policies regarding Native Americans, moving from assimilationism to recognition of tribal sovereignty. In the 1920s-1930s, a new generation of white reformers helped secure these changes by criticizing assimilationist policies initiated by the Bureau of Indian Affairs (BIA). Although nominally more culturally sensitive, these twentieth-century reformers have been accused of forcing their agendas onto Native-American communities without regard for their perspectives. This paper complicates such assumptions by demonstrating how Yakama Indians shaped reform efforts in central Washington state. In the 1920s, Yakama Indians turned to local women’s clubs for support in their protests against policies of the Yakama Indian Agency. They won the women’s support by appealing to their sense of moral authority in society. As a result, the two groups worked together to oppose particular policies of the BIA. Drawing on this history of cooperative protest, this paper contends that BIA officials and white male reformers cannot be credited with the totality of Indian policy reform. Rather, Native Americans and women—groups frequently overlooked in histories on this subject—played an important role in guiding local and national policy changes.

The Habitat Selection and Movement Patterns of Crotalus oreganus by Radio Telemetry Tracking

Andrews, Brian

Faculty Mentor(s): Dan Beck, Biological Sciences

Poster Presentation Session #1, Poster #18
8:20-10:50 a.m. in Ballroom C/D

Crotalus oreganus, the Northern Pacific Rattlesnake, is the only species of rattlesnake that inhabits the Pacific Northwest. These snakes can be found in a variety of microhabitats, from rocky slopes to sagebrush flats. I sought to test whether rattlesnakes show a preference for a particular microhabitat type and if that preference varied seasonally. To investigate whether or not Northern Pacific Rattlesnakes choose habitats at random, we implanted radio transmitters into seven rattlesnakes at the beginning of June 2012 and tracked them through their habitats over the course of a year. Four individuals were tracked in the shrub-steppe outside of Ellensburg, WA, and the remaining three were tracked in the shrub-steppe and dry coniferous forest of the Methow valley in northern Washington. I recorded percent cover of forest, sage, grass, bare soil, and rocky habitats for each location where snakes moved within their home ranges. In addition, temperature loggers were placed at each site to record air temperatures through the summer, and placed at their hibernacula sites to record overwintering temperatures. Snakes chose certain microhabitats over others, and spent the winter in communal hibernacula under rock outcrops. One snake at the site outside of Ellensburg spent the majority of the time under rock outcrops or along the margins of a dense wetland. The knowledge obtained by this study will help us better understand what microhabitats rattlesnakes prefer, and their important role in the shrub-steppe ecosystem.
Preventing Student Drop Out at CWU

_Arakh, Suvarna_

_Faculty Mentor(s): Razvan Andonie, Computer Science_

Oral Presentation, Session #4
8:40-9:00 a.m. in Room 140

This data-mining project aims to assess the risk of CWU undergraduate students’ attrition. We choose a moment at the end of a student’s first year of study to predict the risk of evasion and decide if counseling should recommended. Once the at-risk students are detected, many actions may be taken (such as psychological and educational support, registering orientation, shift change, etc.) to reduce drop-out risk. As input data, we use the student’s profile, extracted from the university's database, including the student’s academic results. We use the Google Prediction API, which is Google’s collection of cloud-based machine learning tools for prediction.

Constructing a Successful Sustainable Supply Chain

_Arnold, Jonathan; Carroll, Alexander; Cao, Quang_

_Faculty Mentor(s): Kun Liao, Operations & Supply Chain Management_

Lynnwood Center - Poster Presentation, Poster #8

A sustainable or green supply chain commits to green practices and environmental responsibility. When a sustainable supply chain is used, it can benefit an organization in such ways as increased revenue, cost reduction, risk management, and building intangible assets. Starbucks Coffee Company demonstrated this practice and benefitted from the sustainable supply chain when it overcame challenges in 2008. This research is conducted to help businesses, particularly in the food and beverage industry, build a successful sustainable supply chain that maximizes benefits.

Sexual Victimization Among College Students in a Rural Setting

_Ashford, Jordyn; Shafer, Jillian_

_Faculty Mentor(s): Cody Stoddard, Law & Justice_

Oral Presentation, Session #18
12:00-12:20 p.m. in Room 137A

With victimization reporting rates being vastly under-representative (as low as five percent), criminal justice scholars have begun to measure and examine sexual victimization of women across the country. It’s been found that peak ages of both offenders and victims range between 16-24 years old, putting youth at the highest risk for being both victims and offenders. Scholars have focused on university students as a unique subset of youth culture, typically finding it has increased rates of risky behavior, such as binge-drinking and drug use, and exposure to potential offenders. The current study examines student behavior, looking for certain factors that may increase a student’s likelihood of being a victim of sexual offenses. The presentation can give students and victim resources a picture of what victimization looks like on campus and ways of avoiding high risk situations. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)
United States v. Windsor: Should Federal Law Define Marriage?
Ashford, Jordyn
Faculty Mentor(s): Sue Armstrong, Law & Justice

Oral Presentation, Session #10
9:30-10:50 a.m. in Room 137A

The case of United States v. Edith Windsor presents the issue of a potential violation of the Fifth Amendment, which provides for equal legal protection to all citizens of the United States. Section 3 of the federal Defense of Marriage Act (DOMA) defines marriage as a “legal union between one man and one woman as husband and wife.” This excludes homosexual couples from being considered legally married in the eyes of the federal government. After 40 years together Edith Windsor and her partner Thea Spyer, residents of New York, married in Canada. Upon Spyer’s death Windsor was required to pay $363,000 in estate taxes in order to receive Spyer’s property. Had federal law recognized their marriage, like a heterosexual married couple, Windsor would have been refunded the estate tax. Windsor filed a complaint in the United States District Court for the Southern District of New York. She requested a refund of the estate taxes, claiming DOMA violated the Fifth Amendment of the U.S. Constitution. Though President Obama agrees the law is unconstitutional, Senate Republicans elected to defend the law in court. The outcome of this case could result in the federal re-definition of marriage to include same-sex marriages. This could afford same sex couples the federal benefits that heterosexual couples receive such as health insurance, federal pensions and Social Security benefits. Although the Court’s decision is not expected until the end of June this presentation will predict the possible direct and indirect implications of the two most likely outcomes.

Sex Trafficking In the Middle East: An Untold Story
Awad, Salam
Faculty Mentor(s): Bang-Soon Yoon, Political Science

Oral Presentation, Session #2
8:20-8:40 a.m. in Room 137A

Sex trafficking as defined by the Palermo Protocol adopted by the United Nations in 2000, as the recruitment, transportation, transfer, harboring, or receipt of persons, by means of the threat or use of force or other forms of coercion, of abduction of fraud of deception, of the abuse of power of a position of vulnerability, or of the giving and receiving of payments or benefits to achieve the consent of a person having control over another person, for purpose of exploitation. Sex trafficking is a horrendous crime and has taken rise in places all over the world. This research focuses on sex trafficking in one of the most controversial and heated regions, the Middle East. Thousands of women throughout the Middle East are being forced into prostitution and other means of coercion for sexual exploitation each day. Gender-based discrimination has been a tool, especially in the Middle East, for sex trafficking to prosper. Despite the horrific measures of this crime, it remains a hushed taboo. Focusing primarily on Iraq, and particularly the wave of Iraqi refugees following the U.S. led invasion, this study provides analysis on the factors constituting the rise of sex trafficking in Iraq and other regions of the Middle East. By highlighting the neglect of governmental authorities, religious tradition, and cultural taboos to effectively combat the problem, this research paints a picture of a dark reality existing in the Middle East. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)
Effects of the Antibiotic Sulfamethazine on DNA damage in *Daphnia pulex* Embryos

**Awan, Samara**

*Faculty Mentor(s): Allison Scoville, Biological Sciences*

Poster Presentation Session #1, Poster #31  
8:20-10:50 a.m. in Ballroom C/D

Farmers commonly use an inexpensive veterinary drug with a high percentage sulfamethazine to prevent an array of bacterial infections and diseases in cattle, sheep, pigs, and chickens. Residue of sulfamethazine is usually passed through an animal’s system and excreted with the animal’s waste material. When cattle and sheep are free-ranged, they may release their waste in or near natural water sources, introducing sulfamethazine residue into fresh water ecosystems. *Daphnia pulex*, a local keystone plankton species, is a model organism for evaluating ecotoxicity. In this study, I have assessed toxicity of sulfamethazine residue by measuring its effect on levels of DNA damage in *Daphnia pulex* embryos using a Comet Assay. *Daphnia* were exposed to three different concentrations of sulfamethazine, spanning concentrations of the drug found in fresh water exposed to free-range livestock. The *Daphnia* were exposed to the drug for 30 minutes. *Daphnia* embryos were then extracted, lysed, electrophoresed, and analyzed under a fluorescent microscope. The results show a positive correlation between DNA damage and concentration of sulfamethazine, indicating genotoxicity of this compound at ecologically relevant doses.

Characterizing a 474 nm Laser As a Source for Spontaneous Parametric Down Conversion

**Balmer, Joshua; Howard, Lex**

*Faculty Mentor(s): Michael Braunstein, Physics*

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

There is an important class of experiments that characterize the properties of quantum mechanical systems using correlated photons, and a typical source for correlated photons is the process of Spontaneous Parametric Down Conversion (SPDC). SPDC is a quantum mechanical process in which a single “pump” photon is converted into two photons that have half the frequency and double the wavelength of the original photon. This process takes place inside a crystal with particular optical properties that allow for SPDC, and we used a uniaxial Beta Barium Borate crystal. A single photon counting module (SPCM) was used as a detector for the photons. Our goal was to characterize a 474 nanometer (nm) Diode Pumped Solid State (DPSS) laser as a possible source for SPDC correlated photons. Measurements of the DPSS laser radiation showed that it emitted photons with a wavelength of both 474 nm and 948 nm, which was expected. The SPDC photons produced by our apparatus would also have a wavelength of 948 nm, so we tested whether the down converted photons could be detected without the 948 nm signal from the DPSS laser overwhelming the SPCM. Software for determining the parameters of SPDC in a given system is available from the National Institute of Standards and Technology, and we used it to determine where we could expect to see SPDC photons. Initial measurements suggest that the system can produce SPDC photons, and we will continue to characterize the apparatus.
Gaelicizing Ireland’s Youth: The Creation of St. Enda’s School for Boys

Bartholet, Christina

Faculty Mentor(s): Jason Knirck, History

Oral Presentation, Session #23
12:20-12:40 p.m. in Room 271

Patrick Pearse, famed leader of the 1916 Easter Rising, was an influential educationalist in Ireland in the early twentieth century. He believed that the British-run school system was harmful to Irish children and that Ireland’s youth needed a more Gaelic education. After writing on education for numerous years, Pearse decided to open up a secondary school for boys in 1908. He asked for support from other Gaelic revivalists, many of whom sent their children to St. Enda’s. Pearse focused his school on the idea of a child-centered curriculum and allowed the students freedom to choose their own activities and classes. If desired by the parents, Pearse and the other teachers would prepare a student for the examinations, but he claimed that this was not the focus of the school. Instead he focused the school on Irish culture, infusing the school with Irish mythology and history. Students were encouraged to speak as much Irish as possible in their free time and many of the classes, when possible, were taught in Irish. Pearse wanted his students to become bilingual, using English for official business, and Irish in their private lives. Overall, he created an innovative Irish school that successfully imparted on the students a love of Ireland and its culture.

Carmen

Bartley, Denise

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

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

Purpose: “Carmen,” is inspired by the contradicting aesthetics of leather and lace. Like my personality, this dress is feminine-meets-edgy, and a little rock ‘n’ roll. I believe our body is a canvas and the clothing which we choose to drape ourselves in paints the story of who we are and how we feel inside. I wanted to create a modest dress that captivated its audience and portrayed its wearer in a strong, confident manner. Process: During the design development stage and execution of this project I was inspired by photos of women wearing contrasting neutral colors, sharp geometric lines, exposed hardware, and conservative mini-dresses. The garment name was inspired by the song, “Carmen” by Lana Del Rey. The stories within DelRey’s songs are an exemplary example of a beautiful, kind woman battling those demons that persistently push her to the wild freedom of the dark side. Throughout this creative process, I listened to many songs by Lana; her music spoke to me and it was as if Lana knew and understood my heart and soul. Her sound was fresh, invigorating, and dangerously rebellious. Every aspect of this design is representational of human emotion, heart, and soul. Techniques: The dress was created using the fashion draping technique, which is the process of manipulating fabric over a dress form to create a desired fit and structure, while the sleeves were flat patterned. A pattern was created from the draping, a sample was created and fitted and the final product was constructed. The fully lined garment is finished with an element of edginess by inserting a 20” exposed, gold metal zipper extending down the back of the dress, over both the beige and black fabric, unifying the two ideas of goodness and evil. Materials: Black and beige 97 percent cotton and 3 percent spandex fabric, 100 percent polyester lining, 20” metal zipper, thread.
Hogue Technology Building Solar Photovoltaic System

_Bender, Bill_

*Faculty Mentor(s): Bill Bender, Industrial & Engineering Technology*

Poster Presentation Session #3, Poster #15
2:15-4:45 p.m. in Ballroom C/D

A solar PhotoVoltaic (PV) system was installed on the roof of the Hogue Technology Building at Central Washington University (CWU). This system provides 28 kilowatts of energy into the buildings’ electricity distribution system to reduce the electrical demand of the building. More importantly it provides a platform for renewable energy education and research. It also earned points towards a Leadership in Energy and Environmental Design (LEED) rating. This research project set out to discover the possible research topics that could be explored using this PV system as a test bed. Currently the author is working on a project to determine the wind forces on the solar panels to help develop future design guidelines for PV panel support structures. A recent project developed learner outcomes and assessed these learner outcomes when using the PV system as a visual learning tool. Possible research opportunities for using the system as a test bed were explored; cleaning the panels to determine if improving efficiency of the panels was worth the labor cost of cleaning panels and comparing the tilt angle of the panels to a different tilt angle at the city of Ellensburg PV site to determine differences in efficiencies.

Delivery of Community Services in Ellensburg

_Berry, Jonathan_

*Faculty Mentor(s): Rex Wirth, Political Science*

Poster Presentation Session #3, Poster #35
2:15-4:45 p.m. in Ballroom C/D

The goal of this research was to assess the current methods used by the City of Ellensburg to meet the needs of the community it serves. In Ellensburg Washington, the local city council oversees the development and management of resources used by the community. The research was done to specifically address the issues regarding the building of a new community center and ways in which to receive appropriate input from stakeholders and resource managers to ensure the viability of the efforts for the foreseeable future thereby ensuring the best use of current and future resources to satisfy the needs of a growing community. This research illustrates the methods used by the city council to manage resources with multiple recommendations for improvement to increase stakeholder satisfaction as well as increase efficient use of government resources for present and future use. By combining research from surveys of the ways in which other communities, with similar needs and resources, across the nation and state met the needs of their respective communities it is possible to propose three options available to Ellensburg with regard to improving the services currently offered. Positive future results are dependent upon the process of improving the effectiveness of local governments in the delivery and management of services that the community requires.
Development of a Nuclear Lifetime Measurement Apparatus

Bianco, Brian; Kilts, Deeanna

Faculty Mentor(s): Michael Braunstein, Physics

Oral Presentation, Session #20
12:40-1:00 p.m. in Room 140

Just how long does a nucleus stay in an excited nuclear state? The purpose of this project conducted at CWU was to construct an apparatus capable of measuring the time it takes for a $^{237}$Np nucleus in an excited nuclear energy level to decay to its ground level; that is to measure the lifetime for an excited nuclear state. We used a $^{241}$Am source which alpha ($\alpha$) decays to $^{237}$Np by emitting $\alpha$ particles at 5.486 MeV. In the majority of these decays, the daughter $^{237}$Np nucleus is in an excited nuclear energy level of 59.54 keV before eventually undergoing gamma ($\gamma$) decay to the ground state. Using a silver-activated zinc sulfide (ZnS[Ag]) scintillation detector and a thallium-activated sodium iodide (NaI[Tl]) scintillation detector, along with a range of standard nuclear spectroscopy electronic equipment, we constructed an apparatus capable of measuring the time interval between $^{241}$Am–$^{237}$Np $\alpha$–$\gamma$ coincidences from an $^{241}$Am source. A preliminary analysis suggests that the data gathered thus far is consistent with other published literature values for the lifetime of $^{237}$Np at the 59.54 keV excited state.

Does Pell Eligibility Affect Inclinations of Potential Study Abroad Students?

Blair, Logan

Faculty Mentor(s): Charles Wassell, Economics

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

Most would agree that the decision to study abroad in a foreign country is an unquantifiable decision based solely on the individual’s independence, their ability to adapt, and self-reliance. I argue that quantitative predictors, primarily student family wealth represented by Pell grant eligibility, are real determining factors. Other factors such as grade point average (GPA), major, class standing, and gender are also considered. Ultimately, a statistical profile of CWU students and their likelihood to study abroad is created. Employing a database retrieved from CWU institutional research, causal relationships are shown using various regression models that yield probability of several significant characteristics and their magnitudes. Low income students are discouraged to study abroad by their economic setbacks when in fact the less wealthy show more characteristics of independence. I reinforce this notion empirically by clearly showing Pell eligibility does not change the statistical probability of studying abroad. Because few econometric studies in the field of international education profiling have been done, this research could be used by educators and program providers alike to efficiently reach receptive student cohorts.
A Fresh Look at Washington State’s Guaranteed Education Tuition Program
Blanar-Oviatt, Adam; Albrecht, Stacy
Faculty Mentor(s): Yvonne Chueh, Actuarial Science
Oral Presentation, Session #22
11:40 a.m.-12:00 p.m. in Room 202

Washington State’s Guaranteed Education Tuition (GET) program helps parents in planning for their child’s future education. Parents may purchase “units” with 100 units representing the cost of future tuition for one year of college. This is a great program that gives many people the opportunity to attend college, however it is currently underfunded. Our spreadsheet application improves the sustainability of the GET program by allowing increased flexibility for both the state and the user. To use this application one must simply enter the age of their child at the time of first contribution, the anticipated age their child will start college, their anticipated tuition inflation rate, and their desired interest rate. The user can then choose from three funding plans; monthly, yearly, or lump-sum premiums. GET is a self-sustaining program with the Custom Monthly Plan containing a 7.5 percent finance charge based on the total cost of contracted units and is compounded annually over the life of the contract. This spreadsheet application would charge a variable rate tied to prevailing interest rates. GET guarantees that 100 units will fully cover a year of tuition, while our spreadsheet allows the user to choose their desired rate of return thus allowing for a shortfall (to be paid by the user) or an excess (refunded to the user upon graduation). Our application allows users to choose from three payment plans. Lastly our changes neither handicap the state by paying excessive rates nor handicap the user by charging higher premiums.

Pediocactus nigrispinus Discovered in the Tekison Rockshelter Site
Blanchard, Christian; Wooller, Ian
Faculty Mentor(s): Joseph Lorenz, Anthropology
Poster Presentation Session #1, Poster #10
8:20-10:50 a.m. in Ballroom C/D

The Tekison Rockshelter, located between Ellensburg and Wenatchee, was partially excavated in 1970 by “amateur” archaeologists. By August 1972, a grid was laid out, and the digging of Test Pit A had begun. Within Test Pit A from the surface down to the 59 inch level of the excavation, unique cactus spines were recovered each time in large amounts and appearing as if they had been cut from their bases and possibly scorched. The Sanpoil & Nespelem and the Thompson peoples burned and removed the spines of the cactus Opuntia polyacantha to aid acquisition of the flesh inside which was consumed. The Thompson were also known to steam cook Opuntia fragilis in pit ovens afterwards peeling the skin and eating the exposed flesh. The cactus spines recovered from Tekison resemble those of Pediocactus nigrispinus. Identification, using morphology and DNA, will shed light on uses of cactus plants.

A Mathematica Approach for Locating Mountain Pass Points on High Dimensional Surfaces
Bolton, Garret
Faculty Mentor(s): James Bisgard, Mathematics; Filip Jagodzinski, Computer Science
Poster Presentation Session #1, Poster #56
8:20-10:50 a.m. in Ballroom C/D

Many equations in the applied sciences can be realized as critical points of a function. For example, one goal in computational chemistry is to determine the amount of energy necessary to transition a molecule from one stable state to another. Determining the amount of energy
necessary to transition between stable states is analogous to finding a mountain pass connecting two valleys. Finding mountain passes is also of interest for other fields. In economics, a mountain pass may arise as an equilibrium in a game with multiple players. In physics, a mountain pass may arise as an unstable motion of a mechanical system. In this research, we look at finding these mountain passes using a computer algorithm implemented in Mathematica. The algorithm begins by designating a discrete path that connects the two states, and then iteratively deforms the path. We are further refining this algorithm, and discretizing the method, which is a challenge because the path lies on a continuous landscape. The purpose of this research project is to find mountain passes using Mathematica which could have numerous applications in other fields.

**Reconstructing the Fire History of the Last 6,000 Years of Mt. Rainier National Park**  
*Bommarito, Savannah*  
*Faculty Mentor(s): Megan Walsh, Geography*

Poster Presentation Session #3, Poster #24  
2:15-4:45 p.m. in Ballroom C/D  

Fire management is a significant concern in national parks and is often implemented incorrectly due to lack of information on past fire activity. The purpose of this study is to better understand the changes in fire history during the past 6,000 years in Mt. Rainier National Park in order to better inform fire management planners. Reflection Lake is located on the southwest face of Mt. Rainier at an altitude of 1,481 meters, and is surrounded by a mid- to high-elevation forest consisting mainly of sub alpine fir, mountain hemlock, Pacific silver fir, and noble fir. In summer 2012, a 2.6-meter long sediment core was recovered from the lake representing approximately the last 6,000 years (the lake sits on a lahar of known age). Loss-on-ignition, magnetic-susceptibility, high resolution macroscopic charcoal, and pollen analysis will be used to reconstruct the paleoecological record from Reflection Lake. The frequency and intensity of fire events is currently being determined using macroscopic charcoal analysis. Preliminary results show a significant change in fire regimes during the last 6,000 years due to both climatic and human influences. Several tephra layers from eruptions of Mt. Rainier and Mt. Saint Helens also precede shifts in fire activity. This core is one of seven from Mt. Rainier National Park and is part of a larger effort to determine shifts in past fire regimes and reconstruct the paleoecological record of the Park.

**Current Reading Habit Trends**  
*Bostwick, Laura*  
*Faculty Mentor(s): Dominic Klyve, Actuarial Science*

Oral Presentation, Session #31  
2:10-2:30 p.m. in Room 202  

This project will analyze the relationships between the different options an individual currently has available in the realm of reading materials today. Interactions between cell phones, computers, e-readers, tablets, newspapers, libraries, and additional variables will be compared with each other in regard to gender, age, ethnicity, language, and the state in which individuals live. This analysis will show the recent trends on how individuals are currently choosing to engage in the activity of reading and how likely it is for one group to choose one type of reading over another. The data in this analysis was collected through a survey collected through the Pew Internet & American Life Project in December 2011 which contained questions on reading habits, library use, and e-reader ownership. The software SPSS will be used to test the data for significance, correlation, and relationships between several variables.
Phenotypic Differences of Red-backed Vole (*Myodes gapperi*) Populations North and South of I-90

*Brimm, Erin*  
*Faculty Mentor(s): Kristina Ernest, Biological Sciences*

Poster Presentation Session #1, Poster #20  
8:20-10:50 a.m. in Ballroom C/D

For more than 100 years, some form of road has cut through the forest east of Snoqualmie Pass. This has presumably separated the red-backed vole (*Myodes gapperi*) into two populations north and south of the current I-90. With the long-term separation of populations, phenotypic divergence can occur. I tested for differences in size between these populations using specimens that had previously been collected from pitfall traps on either side of I-90 near Keechelus Dam. I measured total body length, tail length, hind foot length, ear length, and weight for both sexes. Preliminary data summary shows a slight difference in average length of 4.5 millimeters, and a weight difference of 1.6 grams with current sample sizes of 11 and 17 for the south and north populations, respectively. I will continue to collect data and analyze the measurements taken from both populations to determine if any of their characteristics have diverged significantly. Any differences in the populations now can be compared with differences in the future after wildlife crossing structures have reconnected these populations.

Radiocarbon Dating of Bioapatite From Calcine Bone: Western Washington

*Brown, James*  
*Faculty Mentor(s): Steve Hackenberger, Anthropology*

Poster Presentation Session #1, Poster #8  
8:20-10:50 a.m. in Ballroom C/D

Only highly burned (calcine) bone survives well in archaeological sites with acidic soils (pH 4.5 to 5.5). Calcine bone may provide accurate radiocarbon age estimates, if intact bio-apatite can be extracted, processed, and assayed. Samples of calcine bone need to be thin sectioned before and after acetic acid baths. A petrographic microscope (w/polarized light) will be used in a pilot study of samples from the Bray Archaeological Site (Pierce County, Washington) to compare amounts of intact bioapatite and intrusive calcite before and after acid treatment. A general radiocarbon database is constructed for shell, charcoal and bone samples for sites in western Washington. This database shows the need for improving radiocarbon dating in western Washington and the significance of these data for building an understanding of the ecological and economic factors that drive the development of the Pacific Northwest village pattern. Along the northwest coast, mass food processing and storage were well established by 2,500 Radiocarbon Years Before Present (RCYBP), especially where marine resources were abundant. Radiocarbon dating of features at the Bray Site may provide the earliest evidence for intensification of plant resource use along the White River (3,000 RCYBP). Charcoal already dated from the ovens can be contaminated by humic acids leached from topsoil. Burned (calcine) bone may provide more accurate age estimates, if intact bio-apatite can be extracted, processed, and accelerator mass spectrometry dated.
Active AutoCare: Mobile Auto Shop
Bruno, Gabriel
Faculty Mentor(s): Dwayne Douglas, ITAM
Oral Presentation, Session #8
8:00-8:30 a.m. in Room 301

Active AutoCare is the auto maintenance company of the future. We are a mobile auto service for small businesses and car owners in Seattle and the surrounding areas. We bring auto service to you, saving time, money, and hassle. We pride ourselves on our quality workmanship and professionalism that delivers peace of mind to our clientele. “We keep your vehicle on the road, so you stay on the move.” Active AutoCare uses the latest advances in technology to bring the auto shop to our clients’ homes and businesses. We provide simple automotive diagnostics and maintenance services that help extend the life of the vehicle, while insuring passenger safety. We value our clients and establish a relationship with them. Active AutoCare will propel itself into the future by offering a flat rate monthly payment plan per vehicle. We have pre-established plans built to fit individual needs of each client. Each of our custom AutoCare Vans will be fitted to provide basic services on vehicles of all makes and models. We provide services from which the average auto shop makes 80 percent of its income. Service to the battery, tires, glass, and fluids will be offered as well as basic electrical troubleshooting and basic diagnostics. Our target market is initially small business owners who have multiple company vehicles. However, our market will span to personal vehicle owners in need of auto servicing convenience. Active AutoCare is built on the ideology that, “Our business is to make your business more efficient.”

Testing Correlations Between Understanding and Attitude Towards Climate Change
Bruya, Bob; Parrish, Lannon; Ferris, Matt; Johnson, Bradley
Mentor(s): Jeff Hashimoto, Ellensburg High School
Poster Presentation Session #2, Poster #40
11:30 a.m.-2:00 p.m. in Ballroom C/D

We will design a survey about the topic of climate change. The survey will obtain data about peoples’ understanding of climate change and their attitudes regarding climate change. The survey will be given to people of differing levels of education, ages, and cultural backgrounds. The results of this survey will show us what correlation, if any, there is between the amount of understanding of climate change and attitudes towards it. From this, we can identify interventions that would make people more amenable to adopting alternative sources of energy.

Global Trade Patterns of Trafficking in Persons
Buchanan, Diane
Faculty Mentor(s): Eric Cheney, Sociology
Oral Presentation, Session #21
12:00-12:20 p.m. in Room 201

This research will identify patterns of trafficking in humans. This will be an inclusive study of all forms of buying and selling human beings as commodities. The patterns will be formulated through a social network analysis, which represents a number of ways of quantifying social relations (buying and selling) within a finite set of social actors. The social actors in a social network analysis are not limited to individuals; they may be organizations, social institutions, nation states, corporations, or any definable social system. For this study the actors will be the nation states. Findings will allow for a clear, visible pattern of where individuals are purchased from and their destination. Findings conclude the notion that the poorer countries supply the wealthy countries is not shown, but the patterns of trade are based on geographical location of nations.
Software development projects receive many bug reports each day. Each of these reports needs to be examined and decisions made about how to handle the report. This process is called bug report triage. One decision that is frequently made is to which software developer to assign the bug report. There have been many efforts toward automating this decision, with the most promising approaches using machine learning algorithms. However, creating a bug report assignment recommender using machine learning is a complex process that must be tailored to each software development project. This project presents a tool, called the Creation Assistant for Easy Assignment (CASEA), which assists in creating a bug report assignment recommender for a software development project. CASEA uses data mining to pull reports from a Bugzilla bug repository via XML-RPC, assists in creating heuristics to know who fixed a bug, helps filter the data to recommend only current project developers, and creates a bug report assignment recommender using the SVM machine learning algorithm. Feedback on the effectiveness of the created recommender is provided using precision and recall metrics. The user can then adjust the filtering and heuristics until they are satisfied with the recommender performance. We evaluated CASEA by creating a recommender for the Eclipse IDE project and found that we could create an assignment recommender within 10 percent of the precision and recall of a hand tailored recommender. This software makes using a bug report assignment recommenders practical, potentially saving software development companies both time and money.

Effect of Seasonality on Activity in the Mexican Beaded Lizard in a Tropical Dry Forest in Jalisco, Mexico
Butterfield, Taggert
Faculty Mentor(s): Daniel Beck, Biological Sciences

Poster Presentation Session #1, Poster #16
8:20-10:50 a.m. in Ballroom C/D

Tropical deciduous forests are characterized by drastic seasonal changes in precipitation. At our study site in Jalisco, Mexico, 80 percent of annual precipitation of 748 millimeters falls within a 4-month wet season from July through October. We investigated the effect of this extreme seasonality on activity patterns in the Mexican Beaded Lizard (*Heloderma horridum*) within its tropical deciduous forest habitat. Seven *H. horridum* equipped with radiotransmitters and ibutton dataloggers were monitored periodically from May 2011 to July 2012 using radiotelemetry. Location of lizards were recorded using a GPS, coordinates were put into ArcGIS, which was used to calculate minimum distance traveled between relocations and minimum home range sizes of beaded lizards. Greater time spent on the surface during the wet season corresponded to higher average distance between relocations. For example, one individual traveled a total distance of 263.8 meters (home range: 1.4 hectares; 4 relocations) in a one-month period during the dry season compared to 2,442.6 meters (home range: 21.4 hectares; 10 relocations) traveled during the wet season. These results underscore the significance of seasonal effects on activity of the Mexican Beaded Lizard, and, potentially, for many other species that inhabit tropical dry forests.
Nighttime Enrichment Preferences of Three Captive Chimpanzees (Pan troglodytes)
Carner, Amanda; Sullins, Kaeley; Wilding, Lisa; Hendrickson, Bonita; Jensovold, Mary Lee
Faculty Mentor(s): Mary Lee Jensvold, Primate Behavior

Poster Presentation Session #1, Poster #14
8:20-10:50 a.m. in Ballroom C/D

Enrichment plays a key role in the psychological well-being of captive non-human primates (Buchanan-Smith, 2011). Institutions that house captive apes are required to provide individuals with enrichment items. However, many institutions do not provide enrichment during the evening hours, when it is presumed apes are sleeping. Though captive chimpanzees rest between 8 to 12 hours each night this is not a continuous, unencumbered slumber (Videan, 2005). The aim of this study was to determine if enrichment items, such as blankets, toys, magazines, and containers, were being used by the 3 chimpanzee residing at the Chimpanzee Human Communication Institute. During the summer of 2012, the chimpanzees were recorded during evening hours. Using 80 hours of data, the chimpanzees used variety of enrichment items. They used blankets significantly more (p<.05) than other items. These data provide preferred types of enrichment items for primates housed in similar captive situations.

Effect of Fat Supplemented Diets on the Physiology of C. elegans
Carter, John
Faculty Mentor(s): Carin Thomas, Chemistry; Lucinda Carnell, Biological Sciences

Poster Presentation Session #1, Poster #38
8:20-10:50 a.m. in Ballroom C/D

Obesity is a serious medical issue as it is linked to conditions such as heart disease, stroke, and type 2 diabetes. In the United States, more than one-third of adults are obese and the medical cost related to obesity in 2008 was estimated to be $147 billion. Our previous work has shown that fat supplementation of C. elegans diet with either stearic or oleic acid leads to mitochondrial changes such as an increase in ATP production. The aim of this study was to investigate how the fat supplementation of the C. elegans diet causes physiological changes within the organism. First, it was verified that the fat supplementation was integrated into the C. elegans diet and into the subsequently into the worms themselves. Next, due to the possibility that the worms may simply be metabolizing the supplemented fats, the lipid storage of the worms was measured to see if the worms were storing any of the fats from their supplemented diet. To see if fat supplemented worms exhibit a change in size, the volume of the worms was calculated. Lastly, worm locomotion was measured because it is indicative of changes in neurological behavior and muscle function. Our data demonstrate that the fat supplementation does lead to increased fatty acid content well as elevated lipid storage in C. elegans.

Mountain Bike Rack
Case, Jonathan
Faculty Mentor(s): Charles Pringle, Industrial & Engineering Technology

Poster Presentation Session #3, Creative Works, #13
11:30 a.m.-2:00 p.m. in Ballroom C/D

This project was motivated by a need for a device that would carry mountain bikes to and from a trailhead, using a vehicle’s hitch receiver. It will need to carry four bikes safely and make it be easy to load and unload each bike. First, an idea will be used as a starting point for simple drawings on paper. Then, after a preliminary design is concluded, a computer-based three-dimensional design will be made. After that, all of the required materials will be purchased and gathered. Then the construction of the project will take place. Once the bike rack is completed,
the testing will begin. First tests will need to take place with sand bags to simulate the weight of each bike. Also, since the rack will be used in a hitch receiver to transport the mountain bikes; it will need to be driven down the road with only sand bags on it for weight. A non-populated road will be needed for this test, due to the possibility of failure. If the bike rack passes the tests, it will result in a device that is able to transport four mountain bikes safely to and from a trailhead.

Iron in Soot: Reactions in the Tail Pipe
Casique, Hector; Straub-Walden, Andrew
Faculty Mentor(s): Anne Johansen, Chemistry
Poster Presentation Session #1, Poster #52
8:20-10:50 a.m. in Ballroom C/D

The automobile is the single greatest polluter, as emissions from a billion vehicles in use add up to a planet-wide problem. During fossil fuel combustion, carbon-containing particles, also called soot, are formed along with other byproducts. These particles contain organic molecules, such as Polycyclic Aromatic Hydrocarbons (PAHs) and trace metals, the most predominant of which is iron. Despite indications that oxidized PAH derivatives and reduced iron species are known to contribute to soot toxicity, much is known about how these compounds are produced during combustion and after emission into the atmosphere. The purpose of this research is to study model iron-soot systems under conditions encountered in the tail pipe and in sunlight to increase our understanding of the iron redox processes that control iron speciation and surface functional groups of the soot. Iron is analyzed spectrophotometrically and soot surfaces will be investigated with an X-Ray Photoelectron Spectrometer at the Pacific Northwest National Laboratory. Results have shown that under reducing environments as well as in sunlight, iron is effectively reduced in the presence of soot. These results indicate that the toxicity of soot depends on tailpipe conditions and on the aging that aerosol particles undergo before inhalation.

Tracing Atmospheric Nitrates in the Lower Yakima Valley Basin, Washington
Cavanaugh, Gabrielle
Faculty Mentor(s): Audrey Huerta, Geological Sciences
Oral Presentation, Session #38
2:40-3:00 p.m. in Room 140

A number of past studies have shown that many groundwaters in the lower Yakima Valley are contaminated with high concentrations of nitrate. Recently, the Environmental Protection Agency (EPA) conducted a study to trace the sources of these high nitrate levels and found that some display isotope ratios indicative of an atmospheric source. It is hypothesized that these signatures are a result of leaching from caliche, a calcium carbonate residue in soils. This source was proposed because of the abundance of caliche in the basin and few alternatives that might impart atmospheric isotope signatures on ground water. Other known sources of nitrate include fertilizer, dairy lagoons, combustion, and lightning. This study uses stable isotopes of nitrogen and oxygen to search for these atmospheric sources of nitrates in water and soil samples. Soil, surface water, and groundwater samples were collected from the Lower Yakima Basin, Washington, in the summer of 2012 and analyzed with two methods: major-ion chromatography for nitrate concentrations, and a bacterial denitrification technique for analyzing stable isotopes in nitrate. The results indicate that two of the five caliche samples have atmospheric $^{15}$N/$^{14}$N and $^{18}$O/$^{16}$O signatures while the remaining three have much lower $^{18}$O/$^{16}$O ratios than atmospheric nitrate. Waters leached from the soil samples had isotope ratios indicative of manure and soil nitrogen sources, but not atmospheric. Further testing of the soils should be done to determine the extent of the caliche nitrate and to examine how denitrification or other biological processes affect its isotopic composition.
Reaction Times and Decision Making in Video Gamers Versus Non-gamers
Chaffee, Rosalind; Ellis, Derek; Ackley, Daniel; McGuirk, William; Tosland, Cody
Faculty Mentor(s): Ralf Greenwald, Psychology
Poster Presentation Session #3, Poster #44
2:15-4:45 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 odd-ball paradigm in which participants had to 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 for correct decisions while not decreasing the level of accuracy in any way. Findings have implications for possible neural processing differences in individuals who regularly play action video games.

Ecstatic Happy Numbers
Chappelle, Candace
Faculty Mentor(s): Jane Whitmire, Mathematics
Oral Presentation, Session #31
1:10-1:30 in Room 202

The focus of the project is to determine the density of Happy Numbers in bases 2 ≤ b ≤ 10 based on what we know about happy numbers in general. A natural number n is called happy if the sequence n, f(n), f(f(n)), f(f(f(n))),..., eventually reaches 1, where f(n) denotes the sum of the squared digits of n. A natural number in base 2 ≤ b ≤ 9 is happy if we sum the squares of the digits and convert the number back to base b prior to the next iteration. Repeated iterations were performed using PARI-GP developed source code. For integer bases 2 ≤ b ≤ 10, there exist infinite sequences of numbers that are happy in all subsequent bases from 2 to b. Generalizations of happy numbers in consecutive ordinal bases are formalized. The set of ecstatic numbers in base b ≥ 2 is a subset of the set of happy numbers. More than half of all natural numbers are ecstatic base 2. This is evident from the observation that all even natural numbers are ecstatic base 2 as well as some odd numbers. All numbers that are ecstatic in bases b ≥ 4 are base 10 odd. Since all numbers are base 4 happy, there are no base 3 ecstatic numbers. This result follows from the definition of an ecstatic number as being the largest base for which a number is happy in all preceding bases.
Food Security in the Aftermath of Relocation: Community Adaptations and Resilience in Kivalina, Alaska

Chishom, Markus

Faculty Mentor(s): Jennifer Lipton, Resource Management

Oral Presentation, Session #5
8:20-8:40 a.m. in Room 201

Weakening development of coastal sea ice, record-breaking super-storms from the Bering Sea, and permafrost beaches that crumble into the sea are a few reasons why Kivalina has emerged as the world’s canary in the coalmine for communities dealing with the severe environmental impacts of climate change. Scientists, authors, and film crews alike have crowded the ever-shrinking field that is Kivalina—a tiny whaling community situated on a barrier island 80 miles above the Arctic Circle along Alaska’s northwest coast. Recent publications focused on Kivalina only seem to address climate change and climate change-induced relocation, called climigration. As Kivalina prepares to relocate several miles inland, food security must come into focus for the village as well as for resource managers at various levels. Baseline studies recently performed by the subsistence division of Alaska’s Department of Fish and Game that assessed food security in Kivalina have revealed per capita food harvests have steadily decreased in recent years. As this whaling community prepares to abandon the coast for higher ground, food security must be reassessed. This case-study takes a holistic approach by exploring how environmental, cultural, social, political, and economic issues shape food security for Kivalina as it prepares for its new chapter. In this study, food security will be a measure of resource access, distribution, community resilience, and vulnerability. Based on ethnographic research, this case study explores the current status of food security in Kivalina as well as future food security in the eventuality of inland community relocation.

Easy to Use Supply Chain Software Applications for Small Businesses

Clark, Eric; Darboe, Joko Fatou; Doucet, Brandon

Faculty Mentor(s): Kun Liao, Operations & Supply Chain Management

Lynnwood Center - Poster Presentation, Poster #1

Many sole proprietorships that contain few employees, defined for purposes of this project as boutique businesses, are run by individuals who do not care to involve themselves in the administrative end of the business. Instead, such individuals would rather spend their time on core business activities, such as servicing customers or manufacturing the items themselves. These individuals can benefit financially from some of the business tools provided in business school, including supply chain tools, except such tools that are too complex for many sole proprietors, who have little-to-no training in business methods. These tools will enable these proprietors to run their business more efficiently and create higher profit margins. The project will involve identifying the suppliers of business software to find out if they have applications that permit supply chain capacities, including Quickbooks, Quickbase, Lightspeed, Oracle and SAP. Concurrently, we will discern through research a supply chain framework that is appropriate for small businesses to determine which tools are most important. Finally, the project would involve creating and inputting these tools on a database such a Quickbase, and testing the program for functionality.
Sushi on the Roll
Clausen, Dan
Faculty Mentor(s): Karen Martinis, Accounting

Oral Presentation, Session #8
10:00-10:30 a.m. in Room 301

The purpose of this abstract is to summarize my business plan for Sushi on the Roll, a Japanese-American Fusion food truck. The business will be established in Bellingham, Washington with plans to move to a larger market upon expansion. Bellingham is an ideal location because of its proximity to the coast (fresh seafood), relaxed food truck regulations and a liberal social climate. Mobile food has been called the lean production version of the restaurant industry. This relatively low cost business model provides a competitive advantage over brick-and-mortar establishments. Another advantage is the ability to travel in order to find high concentrations of hungry customers. The business will be set up as a partnership with my executive chef, Casey Lafkas. Casey has been working at an extremely popular, Western-Washington sushi chain for the last six years and currently manages one of their branches. This chain, which has been the winner of Evening Magazine’s best sushi award, serves a very unique brand of sushi, which combines traditional Japanese sushi with American flavors. Casey’s extensive restaurant experience, as well as the high-quality, high-demand product, which he is skilled in producing make him an ideal business partner. Aside from general sale of our product, services we plan to provide include party platters and catering. These services target social events, which will promote word-of-mouth marketing and the acquisition of new customers. Our market niche will include but is not limited to Western Washington University students, working class individuals, and patrons of late-night establishments.

International Tourist Flows and Natural Disasters
Clement, Jacob
Faculty Mentor(s): Toni Sipic, Economics

Oral Presentation, Session #41
3:00-3:20 p.m. in Room 271

Uncertainties in forecasting international tourist flows present a significant challenge for both the tourism industry and for researchers. According to the World Tourism Organization (WTO) international tourist arrivals surpassed 1 billion of the first time in 2012, despite the global economic downturn. Empirical studies have shown than economic factors (i.e., Gross Domestic Product per capita, trade openness) have a large and significant impact on tourist arrivals. In this paper, we will investigate the impact of natural disasters and extreme weather events on tourist flows. We specify a fixed-effects econometric model in order to estimate the magnitude of disaster impacts on tourism flows. We find that earthquakes and floods have a negative and significant impact on tourist arrivals while other disasters such as fires and floods appear to have little effect. These results should be valuable for forecasters and policy analysts attempting to make reliable predictions about this important industry.
The Determinants of Educational Attainment: A Regression Analysis

Clement, Jacob

Faculty Mentor(s): Timothy Dittmer, Economics

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

The level of education an individual completes is likely determined by many variables including, drive or determination, parents’ education, family income, quality of education, innate intelligence, neighborhood demographics, and other factors. In this paper, I will investigate the impact of student determination on years of education. This analysis is based on data from the National Center for Education Statistics (NCES). The NCES national longitudinal study (NLS) of 1988 provides a detailed dataset with appropriate variables and proxies. As a proxy for student determination, I will examine the impact of the survey question, “How far do you think you will make it in school?” on years of education. This question was asked in 1988 to eighth grade students. The response variable, years of education, was obtained from a follow-up study in 2000. I find that student determination is a statistically significant variable but that other factors are more practically significant.

Fallen: A 48-hour Test of Endurance

Clements Jr., Matt

Faculty Mentor(s): Michael Ogden, Film and Video Studies

Creative Expression Presentation, Session #25
12:20-12:40 p.m. in Theatre

In February of 2013, my crew and I came together for 48 hours straight to produce a short film that we are all quite proud of. When shown at the 48-hour Film Slam festival, Fallen took Best Technical Merit (judge’s vote) and Best of Festival (popular vote). Brief Synopsis: Once a hero, Allen attempts to reestablish his life after 10 years in prison for manslaughter. A lot changes in a decade. In Fallen, we wanted to make a solid short that showed our experience working with the Nikon D800 camera and also give ourselves an opportunity to try out new gear that team members had recently acquired. We shot with the mindset that all indoor scenes would be very warm, as they were often in Allen’s personal hot-headed bubble, and outdoor very cool, in a way describing how the rest of the world viewed and treated him after assuming him a murderer. We are big fans of long sweeping shots and tried to fit them in where we saw fit. That being said, a lot of chaos can happen in the editing room and a fairly tame scene on set can very easily turn into a spine-tingling super(anti)hero moment. Forty-eight hours is hardly enough time to make a compelling piece, yet in the end, Fallen happens to stand on its own.
The Creative Process and Screenplay Development for an Original Post-apocalyptic Film

Commins, Mary

Faculty Mentor(s): Toni Culjak, English

Oral Presentation, Session #44
4:50-5:10 p.m. in Room 137A

Post-apocalyptic film is and has been a popular subgenre of science fiction in American film since early in the twentieth century. The intent of this presentation is to discuss the study of the subgenre leading to the process of creating a film screenplay. Divided into three parts, this includes: the study and analysis of post-apocalyptic films, steps in script development, and an overview of the final product. Study included screening historical examples, reviewing the film genre progression, analyzing by type of apocalypse and discussing the relationship between how people’s fears at the time in which the film was created influenced the source and nature of apocalypse featured. A film idea grows out of a deepened understanding of the genre and what motivates viewers’ fascination. Project steps were established, reviewed, and modified while working with the instructor on the process. The final product included: a script sample, an outline, and a “pitch” to the class. Envisioned in the steampunk aesthetic, my screenplay tells the story of a couple who accidently time travel into a future in which they find the Earth and all her inhabitants threatened by catastrophic solar flare activity which is burning off the planet’s atmosphere. They discover that the key scientist working to remedy this crisis is their 27th great-granddaughter, and must return to the past and have children (and thus insure that the woman who could save the earth is born). The pitch includes a slideshow covering the story, crisis, characters, and aesthetic.

Synthesis Towards Straight Chain Borinic Acids As Potential HIV-1 Protease Inhibitors

Contreras, Erik,

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

Poster Presentation Session #1, Poster #46
8:20-10:50 a.m. in Ballroom C/D

There are 34 million people currently infected with HIV. The only treatment available involves merely slowing the development of HIV into AIDS. This is done with a cocktail of antiretroviral drugs. A drug of this type is a protease inhibitor. HIV-1 protease is an enzyme responsible for the release of mature HIV viral particles into the body. A cocktail of drugs is necessary because the virus will continually mutate and develop resistance to the antiretroviral drug. HIV-1 protease eventually becomes resistant to the inhibitors and new inhibitors are needed. The goal of this research is to develop a synthesis for a potential HIV-1 protease inhibitor which mimics the transition state analog of the natural substrate, and in turn interferes with the viral life cycle. These boronated compounds should provide better HIV treatment that has fewer side effects, increased affinity for the enzyme, and demonstrates greater affinity for the mutated forms of the enzyme as well.
Expansion of a Non-Profit Organization for the Creation and Dissemination of Physics Curricular Activities

Corbin, Ryan; Society of Physics Students
Faculty Mentor(s): Michael Jackson, Physics; Sharon Rosell, Physics; Greg Lyman, Physics; Bruce Palmquist, Physics

Oral Presentation, Session #8
10:30-11:00 in Room 301

The Society of Physics Students chapter at Central Washington University (CWU-SPS) strives to be the first nonprofit organization in central Washington to offer a diverse array of educational physics products and services. Based on the demonstrated need from regional educators, CWU-SPS proposes to design and construct inquiry-based physics activities and demonstrations. These products can be used by educators and citizen scientists for the classroom and programs for the general public. CWU-SPS products can be incorporated into a variety of educational settings, whether as prescribed experiments or open-ended activities. Along with the design, development, and construction of activities and demonstrations, CWU-SPS offers a variety of services that include the development of curricular and assessment materials. The depth and breadth of our science specialists also provide us the ability to design and perform topical science programs for schools and the general public. A competitor analysis shows there are no other businesses or nonprofits in the area that offer these services. CWU-SPS’s mission will be to provide high-quality, pedagogically effective and affordable educational products and services for schools and the general public of central Washington.

Investigating Bell’s Theorem on Correlated Systems Utilizing Monte Carlo Methods

Corbin, Ryan
Faculty Mentor(s): Michael Braunstein, Physics

Oral Presentation, Session #29
1:50-2:10 p.m. in Room 140

Bell’s inequality is an expression which can be employed in order to test for the existence of hidden variables in a correlated system. The idea of hidden variables was introduced as a potential explanation for the quantum mechanical phenomenon of non-deterministic results of measurements. The existence of hidden variables can be tested experimentally. First, a particular measurement of one component of a correlated system must be associated with a positive or negative integer value. There must be an equal probability density of obtaining either measurement. Following this, an ensemble average of these measurements must be performed and Bell’s inequality must subsequently be employed. This theorem was essential in settling the EPR argument against quantum mechanical indeterminism, experimentally showing through violation of the inequality that there are indeed no hidden variables in a quantum system. For a system exhibiting classical behavior, Bell’s inequality should not be violated, provided the correlated system meets criteria appropriate to the assumptions underlying Bell’s theorem. A Mathematica model of Bell’s inequality was developed utilizing a Monte Carlo approach of randomizing parameters in order to test models of correlated systems. The model appears to agree with classical determinism within one standard deviation. It is possible to test both classical and quantum mechanical systems if properly correlated, and it is of future interest to test whether this extends to chaotic systems.
The Role of Fire in the Persistence of Montane Meadow Environments in the Willamette National Forest, Oregon

Cox, Tamara; Walsh, Megan

Faculty Mentor(s): Megan Walsh, Geography

Poster Presentation Session #3, Poster #25
2:15-4:45 p.m. in Ballroom C/D

Historical records document the use of fire by Native Americans to maintain low-elevation fire-adapted ecosystems in the western United States prior to Euro-American settlement, but little is known about prehistoric burning patterns in mid-elevation forest/meadow environments. Resources such as beargrass (*Xerophyllum tenax*) and huckleberries (*Vaccinium spp.*) which are known to have been economically and culturally significant to Native Americans are found in these environments, and both species benefit from low-severity fire regimes. Today montane meadows are disappearing, presumably due to the lack of Native American-set fires combined with fire suppression policies of the twentieth century, although climatic changes over the last century also remain a possible cause. The purpose of this study is to reconstruct the fire and vegetation history of mid-elevation forest/meadow ecotonal environments in the western Cascades of Oregon. In 2012, lake sediment cores were extracted from Blair Lake (1,451 meter elevation) near the town of Oakridge, Oregon. This lake is surrounded by forests dominated by Pacific silver fir (*Abies amabilis*) and mountain hemlock (*Tsuga mertensiana*) and meadows containing beargrass and huckleberries. Charcoal and pollen are currently being analyzed from these sediments in order to establish shifts in the fire and vegetation regimes. Preliminary results show a relatively high amount of fire activity at Blair Lake during the late Holocene. These reconstructions will be compared to regional climatic records, Forest Service fire data, historical accounts, and archaeological records in order to determine their respective influences on montane meadows.

Differences in the Growth of Offspring from Sunflowers of Different Water Treatments

Croshaw, Casey; Sunwar, Terisa

Faculty Mentor(s): Jennifer Dechaine, Biological Sciences

Poster Presentation Session #1, Poster #23
8:20-10:50 a.m. in Ballroom C/D

Plants may respond to environmental stress through epigenetic modification, which is altering gene expression without a change in DNA sequence. Epigenetic effects may be adaptive if they are heritable and preadapt future generations to the environment. This research tested for adaptive epigenetic effects of drought by growing four inbred lines of sunflower (*Helianthus annuus*) under high water and low water (drought) treatments for two generations. Survivorship and several morphological traits were measured weekly in seedlings of the offspring generation. Preliminary results suggest that the parental water treatment strongly affects plant height. Offspring from the high water environment were taller on average than offspring from the drought treatment, indicating that the parental water treatment can alter offspring phenotype. Interestingly, if offspring and parents experienced the same low water treatment, the plants were taller than if they had experienced low water in the parental generation and high water in the offspring generation. These results suggest that sunflower may be able to preadapt offspring in response to drought conditions through epigenetic modification. The agricultural implications of this study are that sunflower farmers need to know the environment that the parental plants were grown in to get the best crop yield for their seeds.
The Relationship Between Artificial Social Environments and Deviance

Cummings, Tyler

Faculty Mentor(s): Michael Harrod, Sociology

Oral Presentation, Session #21
12:20-12:40 p.m. in Room 201

The purpose of the current study is to investigate the relationship between artificial social environments and an individual’s likelihood to engage in deviant or criminal behaviors and actions. The need for this study was highlighted by research findings that suggest that individuals who play video games often play them to experience deviant behavior and actions that they don’t consider socially viable otherwise. The sample consisted of seven students from Central Gaming Initiative, the Central Washington University video gaming club. Qualitative data was gathered through individual face-to-face interviews. The students were asked questions pertaining to the nature of their media consumption, with the topics ranging from social media consumption to film consumption to video game consumption, and whether or not their behaviors and actions differ between social environments. Participants were also asked if the perceived gender of the video game, tabletop role-playing game, or virtual community character they are playing as influences the behavior and actions they engage in within that environment. Preliminary analysis demonstrates slight differences between participants’ perceived behavior in the real world compared to their perceived behavior in artificial environments. Preliminary analysis also suggests that participants were more likely to engage in deviant and criminal behavior and actions within a video game or tabletop role-playing game settings because they interpret those actions as being without consequences within those particular environments. It is anticipated that further analysis will reveal additional relationships between the relationships between artificial social environments and deviance.

A Greener School

Cutlip, Caralyn; Streepy, Westley; Douglas, Abby; Higdon, Ryland

Mentor(s): Jeff Hashimoto, Ellensburg High School

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

Our goal is to design a realistic model for our district’s proposed middle school that is energy efficient while allowing for future advancements and adaptations as they become feasible. We will incorporate active and passive solar energy, optimally effective heating and cooling systems, and natural and alternative lighting. To elevate our design further, we will stay in communication with the committee working to get the middle school bond passed to ensure that we fulfill the needs of students, faculty, and the community as a whole. And to communicate with the community, we’ll present our design to the school board and remain in contact with the board.
RC Baja: The WildCat
Dahlgren, Jacob; Litsheim, Seth; Quinn, Sean; Battles, Andrea
Faculty Mentor(s): Charles Pringle, Mechanical Engineering Technology

Poster Presentation Session #2, Creative Works, #6
11:30 a.m.-2:00 p.m. in Ballroom C/D

The objective of the RC Baja project was to build an RC car in compliance with the rules of the American Society of Mechanical Engineers’ Student Professional Development Conference. This is important because it allows CWU to compete against other schools in the region in the Baja race. The methods employed to complete the objective were that each system (drive train, frame, steering, and suspension) would be designed, analyzed, manufactured, and tested by a principal engineer. The four systems were then integrated into the final assembly by all team members, according to the computer aided-design drawings created. Through project management and teamwork, it was found that an RC Baja car could be built from our initial ideas, with many changes along the way to counter the problems that we discovered. Complete testing and data collection has yet to be performed due to the scheduling of the project. The Baja race will be held on April 19th, 2013, with additional testing and data collection beyond that date. At this point in the project, the conclusion is that a working prototype has been created from initial ideas at the beginning of the school year.

Wild Horse Wind Farm Visitors: An In-depth Phone Survey
Daily, Jaime; Keenholts, Jimmie; Foltz, Sadi; Tate, Tyler
Faculty Mentor(s): Mark Pritchard, Management

Poster Presentation Session #3, Poster #38
2:15-4:45 p.m. in Ballroom C/D

An in-depth phone interview was conducted to gain insights on visitor satisfaction and likelihood of recommending Wild Horse Wind Farm. Our interviews with 20 visitors (n=20) from 2011 and 2012 covered 18 questions. Respondent feedback noted that for the most part people were very satisfied with their visit and that the Wind Farm had many things they are doing very well. But that some things could be changed to increase visitor satisfaction. Recommendations include expanding on and off-site data collection methods to improve evaluation (e.g., modes of response, visitor follow-up) and further developing social media connections with visitors.

Development of an Assay to Detect Degenerative Dopaminergic Neurons in Caenorhabditis elegans
Darley, Jacob; Niemuth, Maria
Faculty Mentor(s): Lucinda Carnell, Biological Sciences; Eric Foss, Biological Sciences

Poster Presentation Session #1, Poster #36
8:20-10:50 a.m. in Ballroom C/D

Parkinson’s disease (PK) is a disruption of motor function caused by loss of dopamine neurons. PK can be caused by environmental and genetic factors. One protein known to contribute to PK is the protein α-synuclein found in dopamine neurons. Over expression or mutations in α-synuclein can lead to PK. The soil nematode, Caenorhabditis elegans (C. elegans), has been developed as a model for PK by using a transgenically modified strain, which overexpresses the human α-synuclein protein. In this strain, the dopamine neurons, which have been labeled with a green fluorescent protein, were observed by fluorescent microscopy to degenerate after nine
days of development. We have discovered that the transgenic strain expresses a locomotory behavioral defect that is indicative of deficient dopamine signaling at day three of development. When wild-type (normal) nematodes encounter their food, which is a bacterial lawn, they slow their locomotory speed. However, the transgenic strain does not exhibit the prototypical slowing behavior that stems from the excitation of the dopamine neurons. This defect was determined by utilizing an automated tracking system to quantify speed of locomotion on and off food. We can extrapolate that this behavior is correlated to nematodes that exhibit degenerative dopamine neurons, as this same behavioral defect is observed in cat-2 mutants that do not generate dopamine. In future studies, we will utilize this assay to examine the effects of environmental stressors on these neurons and their relation to PK.

**Economics of Ellensburg and Washington State Normal School**

*Davis, Brian*

*Faculty Mentor(s): Brian Carroll, History*

**Oral Presentation, Session #15**
10:10-10:30 a.m. in Room 271

I will submit a paper analyzing the economic effects of the Washington State Normal School on Ellensburg, Washington. The paper will focus on the founding of the school in 1891 and how it bolstered Ellensburg’s economy. I will begin the paper with an analysis of Ellensburg’s major industries in the years preceding the establishment of the school. The major industries included farming, mining, and brick manufacturing. I will then show how the economy went into a recession putting Ellensburg on the brink of collapse. During the recession, farming decreased due to the low pricing of wheat, mining was riddled with strikes, and brick manufacturing disappeared. The building of Washington State Normal School added much needed stimulus to the economy. The construction supplied jobs and stimulated the local businesses by buying materials from local businesses. This supported the economy until the recession ended. Without the founding of the Washington State Normal School, Ellensburg may have become another ghost town of the west.

**Jardines v. Florida**

*Davis, Caless*

*Faculty Mentor(s): Teresa Francis, Law and Justice*

**Oral Presentation, Session #10**
9:30-10:50 a.m. in Room 137A

*Jardines v. Florida* deals with the issue of using dogs in the collection of evidence and whether it constitutes a search. This argument is whether a dog’s detection ability presents an unreasonable search that violates individual rights protected by the Fourth Amendment. Dogs have been used in the area of law enforcement; legal precedents of past cases such as *Illinois v. Caballes, United States v. Place, City of Indianapolis v. Edmund* have established that dog sniffs are not searches under the Fourth Amendment. *Jardines v. Florida* is the first case of its kind to deal with canine detection at a residence. The two conflicting issues at stake are privacy rights versus dog sniffs able to occur at a place of residence without a need for a warrant or probable cause. My presentation will show how the lower courts presided over *Jardines v. Florida*, and how the Supreme Court ruling will affect the public. I will also discuss how the Supreme Court has dealt with dog sniffs in the past and how those decisions may have shaped the ruling in *Jardines v. Florida*. 
Increasing Average Fasting Insulin Among Adolescents Age 12-19, NHANES 2003-2010
Davis, Erika
Faculty Mentor(s): David Gee, Nutrition, Exercise & Health Science

Poster Presentation Session #2, Poster #13
11:30 a.m.-2:00 p.m. in Ballroom C/D

Type 2 diabetes mellitus is increasingly becoming a public concern for the youth population. The aim of this study was to utilize the National Health and Examination Survey (NHANES) to assess the most recent trend of the risk factors for diabetes mellitus of adolescents fasting plasma glucose, glycohemoglobin (HbA1c) and fasting insulin. NHANES is a survey research program by Centers for Disease Control and Prevention that assesses health and nutritional status of the U.S. population. This study observed 2,716 adolescents from age 12 to 19 in the NHANES survey years 2003 to 2010. No significant difference in prevalence of diabetes and pre-diabetes was observed based on average fasting glucose values. However, HbA1c values showed a significant (p<0.05) shift towards higher HbA1c categories (three categories: 1) less than 5.7 percent; 2) 5.7 percent to 6.5 percent; 3) greater than 6.5 percent). In addition, there was a significant increase in average fasting insulin from 11.1 uU/mL in NHANES 03-06 to 12.6 uU/mL in NHANES 07-10. Higher average HbA1c suggests higher average blood sugar while higher fasting insulin suggests developing insulin resistance, which both are characteristics of type 2 diabetes mellitus. However, fasting glucose values did not significantly increase, possibly due to elevated production of insulin temporarily preventing fasting hyperglycemia. Despite a lack of significant difference in fasting glucose, the trend of increasing fasting insulin is a concern for future diabetes risk.

Psychological Studies on “Molyneux’s Question” Do Not See All the Points
Davis, Maxwell
Faculty Mentor(s): Gary Bartlett, Philosophy & Religious Studies

Oral Presentation, Session #6
8:00-8:20 a.m. in Room 202

In the 1700s, William Molyneux asked John Locke to consider if a man who was blind at birth, without any experience of vision, would, if given vision, be able to differentiate a sphere from a cube using his newly-acquired vision alone. “Molyneux’s Question” asks if one sense-modality, or single distinct sense, can be translated to another sense-modality without experience of both senses. Empiricists like Molyneux and Locke believe that knowledge is based in experience. Therefore, an empiricist answer to “Molyneux’s Question” is that such a man could not differentiate a sphere from a cube using vision alone, as the man has no prior visual experience, and sense-modalities cannot be innately translated. Psychological case studies fail to answer “Molyneux’s Question” due to limited sample sizes, lack of experimental control, and other practical and ethical considerations. This paper explores the shortcomings of the best available psychological case study on sense-modality translation in the newly sighted, and makes an attempt to improve the success of a case study’s findings by creating the “perfect study” by using a philosophical thought experiment. Even a perfect psychological study cannot prove empiricists’ answer to “Molyneux’s Question,” though psychological studies claim to do so. If the perfect study were conducted, the study could only provide limited support to empiricism, as explained in the paper, though it could reliably reject empiricism.
Metal Castings
Dickson, Michael
Faculty Mentor(s): Charles Pringle, Mechanical Engineering Technology

Poster Presentation Session #2, Creative Works, #8
11:30 a.m.-2:00 p.m. in Ballroom C/D

The primary point of contention is to convert an injection mold design into a gravity fed green sand mold through the utilization of varied analysis and procedural methods. First, to access the feasibility of converting a highly detailed pattern, one must first engage in material flow analysis. Using basic material properties and SolidCast simulations, there was first the process to create a useable model upon which to base the experiment and testing. Secondly, after the models have been successfully compiled, the pattern itself needed to be augmented to allow for the material flow. Finally, the last stage was to cast the models themselves. After the castings were completed, there was a high amount of flashing that occurred as well as damage to the molds as the patterns were removed. After a number of revisions and alterations, the pattern was improved to allow for the quality/type of material available and a few highly detailed parts were successfully produced.

Waterfowl Estate
Dietrich, Brandon
Faculty Mentor(s): Amy Mumma, Family and Consumer Sciences

Oral Presentation, Session #8
11:00-11:30 a.m. in Room 301

Waterfowl Estate is different from other wineries in the greater Spokane area because of agrotourism at the estate. Through competitor analysis of the areas wineries there are no other wineries that promote agrotourism in the area. Waterfowl Estates contracts the majority of its grapes from vineyards across the state. One benefit to having few acres of vineyard under management is the ability to acquire different varieties of grapes in a relatively short amount of time and to reduce initial capital required. The proposed site for the estate is already owned by the founders and is a ten-acre parcel of land with a pole building currently onsite to house the tasting room, and production facilities. The maximum production out of this facility is 6,000 cases annually, with an adjacent site that has room to meet growing demands for the products. The location has several agricultural products that will draw the consumer to the estate. Featuring activities such as Christmas tree cutting, raspberry, blackberries, and pumpkin-picking will draw consumers to the estate during a variety of seasons. With agrotourism activities on-site, Waterfowl Estate will be environmentally conscious and strive to meet top standards in eco-friendly practices. With use of these practices, Waterfowl Estates can help with wetland conservation. Waterfowl Estates plans to produce wines that meet targeted market consumer demands and to use agrotourism to be a success in the industry.
How to Make Homemade Creative Teaching Aides for Health Lessons

Diimmel, Amber

Faculty Mentor(s): Mark Perez, Physical Education, School & Public Health

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

Creating homemade Outrageous Teaching Aids can add powerful teaching moments to any lesson. To help make meaningful connections to junior high students at Morgan Middle School during a 3-day Nutrition/Body Image unit, two aides were created. The first is a Sugar Board that helps students put into perspective the amount of sugar that is found in typical beverages they consume. The visual of mounds of sugar next to each beverage helps individuals to “Rethink Their Drink”. For the body image piece of the unit, a Life Size Barbie cardboard model was created based on the proportions of the actual Barbie doll. The life size version yields a six foot tall female that would have to stand on all fours to support the disproportionate body parts. The visual helps students to be aware of the media ploys that are utilized to sell a product.

Regulation of the Host Immune System by the Hookworm Ancylostoma ceylanicum

Diliani, Nicholas

Faculty Mentor(s): Blaise Dondji, Biological Sciences

Oral Presentation, Session #19
12:20-12:40 p.m. in Room 137B

Approximately one billion people are currently infected with hookworm. Past studies suggest that infection with these intestinal nematodes is associated with impaired cellular immunity. Despite its high prevalence and the concomitant immune suppression seen in infected individuals, little research has been done on host immunosuppression by hookworm. Our study focused on characterizing the mechanisms by which hookworm suppresses the host immune response. We hypothesized that hookworm secretes proteins to shift the immune system away from a normal, healing TH2 response, to a non-healing mixed TH1/TH2 immune response. Splenocytes and draining lymph node cells from mice injected with excretory/secretory (ES) proteins showed decreased proliferation in response to a mitogen while also having increased nitric oxide secretion. Analysis by fluorescence-activated cell sorting revealed that mice injected with ES had reduced percentages of CD4+ T cells while CD8+ T cell numbers were unaffected indicating shift in immune response from TH2 to a mixed TH1/TH2. Analysis of antibody and cytokine levels revealed that injection with ES proteins decreased Immunoglobulin-G antibody production while also decreasing IL-4 and increasing IFN-γ cytokine production suggesting decreased B cell activation and a shift towards a TH1 immune response. Together, these data demonstrate that immunosuppression by hookworm infection is caused by ES proteins and detail the mechanism behind the shift in immune response in infected hosts. Work is underway to identify the hookworm individual proteins involved in the suppression of the vertebrate host.
Castle City, Carcassonne: The Education of Its Youth

Donahoe, Susan

Faculty Mentor(s): Susan Donahoe, Education

Oral Presentation, Session #33
1:30-1:50 p.m. in Room 301

Descriptive Study: How are children in France taught literacy skills? What kinds of schools are there? What curriculum? What processes are used in the elementary years? Does the presence of an enormous historical and cultural site within the city have an affect on the education of the elementary aged students? A small French town, Carcassonne, in the foothills of wine countryside is in many ways similar to Ellensburg. Most parents work; children go to school. Most children attend the regular state-supported schools for reading, writing, and so forth. There is one astounding difference: a huge, looming, double-walled stone fortress. This overpowering restored medieval castle dominates the town. Castles and other prominent architectural forms effect developing children. Last summer in Carcassonne, I visited three schools, saw children and materials, and talked with educators. Photographs document the visit and show processes of teaching the history of the edifice, its era, and the historical and cultural significance to people of the area. The walled city contains a school with educators and materials to teach significant facts to rotating groups of students of the region. I created a questionnaire for comparing and contrasting other nations’ educational systems for an upcoming sabbatical study on international educational systems across nations that I can contact and visit. Idiosyncratic phenomenon emerged beyond it which are described and documented here. This presentation is a descriptive study of education in Carcassonne, France.

Educational Innovation to Support Industrial Revitalization: From “Made in Liuzhou” to “Created in Liuzhou”

Dong, Yuelin; Li, Wei; Yu, Zhongling

Faculty Mentor(s): Rex Wirth, Political Science

Poster Presentation Session #2, Poster #19
11:30 a.m.-2:00 p.m. in Ballroom C/D

The city of Liuzhou, while small in the context of China, would be a major center in the United States. As a revitalizing industrial center, the city must cope with a series of problems that are shared by other cities of the similar size and proximity to the major urban centers. This poster illustrates how two models of educational innovation come together to support Liuzhou’s model for industrial revitalization. The main pillar of Liuzhou’s overall revitalization effort is a cooperative venture between the city and General Motors that has resulted in the sixth largest automobile manufacturing complex in China, producing more than a million vehicles annually. To fully realize the potential of this venture the city must provide appropriate technical/professional education for 50,000 new workers by 2015. The Liuzhou Railway Technical Vocational College is one of 100 colleges funded by the national government to develop models for training partnerships with enterprises to meet this critical need. In addition to technical competence these professional cadres will need language and cultural competencies to be effective in the globalizing environment. New independent colleges have recently emerged in China to develop new models for Chinese higher education that effectively address this problem. The city with assistance from the national government is developing the physical infrastructure to accommodate the innovations that are being developed by a new breed of professional educators at the city’s newly established independent college (Lushan College of Guangxi University of Technology), the Railway College, and the rest of the vocational/technical establishment.
Insurance Premium Comparison Among Different Countries

Dyer, Vicky

Faculty Mentor(s): Yvonne Chueh, Actuarial Science

Oral Presentation, Session #14
9:30-9:50 a.m. in Room 202

Life tables contain the mortality rates of people at any age and often their remaining life expectancy. These tables are a widely used reference for actuaries and are used to set life insurance premiums and policy reserves. Premiums are well understood in the United States and other well developed countries. The World Health Organization (WHO) studies life tables’ data for many different countries around the world. This project explores and compares some similarities and differences amongst these countries. The life tables from WHO are used to create the spreadsheet of expected data. The consolidated spreadsheet will act as a data source for a comparison application program. The program will allow the user to select mortality rate, annual premium, and net single premium from multiple countries in order to compare the figures side by side. In addition to the spreadsheets, we will also be looking for statistically significant differences between the countries and their development groups. (i.e., group based on Human Development Index)

Scaling Up

Eaton, Lindsey; Douge, Rikayla; Fletcher, Arlen

Faculty Mentor(s): Kun Liao, Operations & Supply Chain Management

Lynnwood Center - Poster Presentation, Poster #2

Brooks Sports Incorporated has been growing at a steady rate for the last eleven years, with profits of 30 percent on average each year. This rapid growth has changed the nature of the business and has uncovered process deficiencies that can, and need, to be adjusted to further increase profits. Analyzing Brooks’ supply chain and operations, by using key performance indicators to measure success, will determine what adjustments should be made to better organize operations in order to maximize and sustain profits while supporting solid growth.

No Place Like Home

Eklund, Andrea

Faculty Mentor(s): Andrea Eklund, Family and Consumer Sciences

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

Purpose: This garment was inspired initially by rolls of dust-covered fabric found in closets as I was cleaning out the sewing lab on campus. I was inspired by the array of colors and immediately thought of the CWU Pride Week and the beautiful colors seen during the week’s events. Process: Once I found the fabric and knew what to create, I thought of a student who had presented a project on drag in a class and knew immediately he would be my model and muse for the design. Focusing on the scale and proportion of the garment in relation to the body was essential for a successful final product. Scale is the relationship of sizes to each other and to the whole regardless of shapes, whereas proportion is the comparative relationship of not only sizes but also distances, amounts and parts. The array of colors used in the garment are very busy, therefore a simple design was used to balance the color intensity. Techniques: This garment was created with the draping method. The garment was draped, trued and transferred
to a paper pattern. Three samples were made and several changes were made. Working with the thin fabric and all the panels posed a new challenge to assure that they were all even and balanced. Twenty yards of net and tulle was used to create the full underlayer of skirting. Materials: Woven exterior, acetate plain weave lining, tulle, net, thread, grommets, ribbon.

**Women and Roller Derby**
*
**Eklund, Andrea; Masberg, Barbara**

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

Oral Presentation, Session #5
8:00-8:20 a.m. in Room 201

Internationally, roller derby is one of the fastest growing women’s sports. In 2006, Roller Derby Worldwide had 160 leagues registered. Today, 1,234 leagues are registered. The newest version of roller derby is played on a flat oval track with two teams vying for points. Each team is composed of four blockers and one jammer. Points are earned when the jammer passes each opposing player. Blockers either block opposing jammers or assist their own jammer through what is called a pack. This study had a twofold emphasis: one, to investigate women’s flat track roller derby as a serious leisure activity and the impact participation is having on its members; and two, to investigate the effect participation in roller derby has on body image. Every league worldwide was e-mailed a survey, respondents self-selected and 2,417 fully completed surveys were submitted. For this research, we are focusing on respondents from the United States (n=1,597). A typical respondent was Caucasian, 20 to 40 years of age, heterosexual, in a married/domestic partnership, and has a post-secondary degree. The great majority of respondents (97.1 percent) indicated that roller derby is their most important leisure activity or one of their more important leisure activities. The majority (97 percent) also indicated that roller derby had a positive effect on their body image.

**The Negative Effects of Discrimination**
*
**Elliot, Riley**

*Faculty Mentor(s): Melissa Johnson, English*

Oral Presentation, Session #43
5:10-5:30 p.m. in Room 135

Social marginalization causes people and groups to feel left out of society, instead of valuing their unique qualities. Discrimination exists everywhere in the world, specifically in peoples’ perceptions of religious beliefs, immigration issues, physical qualities, and obesity. Studies based on ethnic identity show the best way for immigrants to deal with feeling left out is to retain their original culture while adapting to the new culture. Lawrence Baron’s essay summarizes the *X-Men* comics and movies, which build upon the idea of the Holocaust. The mutants in the *X-Men* are people with hidden powers. However, when they transform back into normal humans, they are still outcasts. The social marginalization seen in these movie characters can be related to the struggles that people face today, especially in obesity. Andrea Lee speaks about obesity in the United States, saying that 28 percent of men and 45 percent of women have said they have experienced discrimination regarding their weight. Any kind of discrimination is something everyone can relate to. Having diverse varied examples will help society better understand social marginalization as a whole.
Self-esteem and Depressive Symptoms: Perceptions of Negative Outcomes of Hooking Up
Enders, Sabrina,
Faculty Mentor(s): Duane Dowd, Family Studies
Poster Presentation Session #3, Poster #43
2:15-4:45 p.m. in Ballroom C/D

This study investigated the relationships between depression, self-esteem, and gender and perceived negative effects of hooking up. A sample of 667 students from two universities completed online surveys. Analysis found a statistically significant correlation between depressive symptoms and perceived negative effects of hooking up.

Needs Assessment in Individuals with Asperger’s in a Post-secondary Environment
Enselman, Daniel; Bistricean, Cristina
Faculty Mentor(s): Kara Gabriel, Psychology
Poster Presentation Session #3, Poster #50
2:15-4:45 p.m. in Ballroom C/D

In 2008, the Center for Disease Control estimated that 1 in 88 children born in the United States would be diagnosed with Autism Spectrum Disorder (ASD) with an estimated annual increase of up to 17 percent. Currently, close to 1.5 million individuals in the United States are living with an ASD. Those with a higher functioning form of autism, such as Asperger’s, have a normal IQ range with some social skills deficits. The goal of the present study was to investigate the potential interest in an undergraduate Asperger’s support group at Central Washington University. Nine participants, classified by the University Disability Service as having an ASD, responded to a survey in which a series of open-ended, yes/no, and Likert scale questions helped identify areas of interest or concern for respondents. All but one participant indicated their main social support consisted of parents or family and, because of difficulties socializing with their peers, they reported high levels of loneliness. Multiple participants reported sensory issues such as odors and noise level induced stress. After the survey, a focus group, consisting of some of the original survey respondents further investigated topics addressed in the survey through open dialog where individuals were encouraged to give details on their experiences as well as offer advice on how things could be better for a student with ASD at Central. The findings from the survey and focus group suggest that a peer-based support group would greatly benefit the Asperger’s community at Central.

Only a Facade? Managing Northern Rocky Mountain Ghost Towns.
Evans, Krista
Faculty Mentor(s): Mathew Novak, Geography
Poster Presentation Session #3, Poster #28
2:15-4:45 p.m. in Ballroom C/D

Managing and preserving remote Western ghost towns can be challenging; from choosing a preservation strategy, to attracting enough visitors to remain economically viable. This poster explores current management and preservation practices used in four ghost towns found in the Northern Rocky Mountains of Idaho and Montana. Their histories, geographies, and contemporary contexts are given. By examining examples of well-known, successful ghost towns, such as Bodie, California, and Virginia City, Nevada, models may be elucidated for the revitalization of the four ghost towns I am studying. This poster will provide geographers and heritage preservationists with information and suggestions regarding how to best manage historical townscapes in addition to contributing to a greater understanding of Western ghost town dynamics.
Mindfulness As an Attenuating Factor in the Relationship Between Sexual Orientation and Levels of Stress, Depression, and Self-Esteem

Faust, Emily

Faculty Mentor(s): Robyn Brammer, Mental Health Counseling

Oral Presentation, Session #30
1:10-1:30 p.m. in Room 201

Individuals who identify as gay, lesbian, or bisexual suffer from higher rates of factors that negatively impact psychological health and well-being (Berlan, Corliss, Field, Goodman, & Austin, 2010; Cochran, Sullivan, & Mays, 2003). Mindfulness, a construct characterized by non-judgmental awareness, has been shown to relate to lower levels of several negative emotional factors, including stress, depression, and anxiety (Brown, Ryan, & Creswell, 2007). The current study, a replication of a study previously conducted by this author (Faust, 2012), examines levels of stress, depression, self-esteem, and dispositional mindfulness among students at Central Washington University (N = 100, anticipated). It is hypothesized that individuals who self-identify as members of a sexual minority category will have higher levels of stress and depression, and lower levels of self-esteem, than individuals who identify as exclusively heterosexual. It is also hypothesized that mindfulness will attenuate the relationship between sexual minority status and negative psychological factors. Specifically, it is hypothesized that for sexual minority individuals, those with higher levels of mindfulness will have lower levels of depression and stress and higher levels of self-esteem than those with lower levels of mindfulness. The implications for using mindfulness-based interventions in schools, community centers, and clinical settings with individuals who are struggling with sexual orientation difficulties will be discussed. Data collection in process.

Groundwater Contamination and Archaeological Resources, Hanford, Washington

Ferri, Serafina

Faculty Mentor(s): Steve Hackenberger, Anthropology; Mike Pease, Geography

Poster Presentation Session #1, Poster #9
8:20-10:50 a.m. in Ballroom C/D

This research focuses on the historical overview, remediation procedures, and documenting the environmental impact of Hanford Nuclear Reservation. As a result of the production and disposal methods of nuclear waste, Hanford site has had major implications on the environment. When production ended in the 1980s there were more than 100,000 uranium fuel rods on site. The K-basin, for example, held two nuclear reactors for plutonium production. A combination of core reactors leaking and holding pond overflows leached contaminants into the groundwater. Multiple methods were used to store nuclear waste and hazardous chemicals including holding ponds, unlined pits, trenches, landfills, reverse wells, and underground storage tanks. As a result, contamination has caused major implications on the environment, and contaminated pre-contact archaeological sites including: pre-contact pit houses, hunting and kill sites. In 1994, the remediation process began to extract contaminated water and sediment. The degree to which these sites have been compromised is unknown. This research identifies environmental issues associated with Hanford, and clean-up procedures during remediation processes. It is important to know the history of Hanford and its adverse effects on the environment as well as cultural resources.
Net Level Premium Application: A Look at Smokers Versus Nonsmokers  
Flatebo, Sarah  
Faculty Mentor(s): Yvonne Chueh, Actuarial Science  
Oral Presentation, Session #22  
12:00-12:20 p.m. in Room 202  
Like health insurance, life insurance is a continuously growing and complex field that affects almost everyone, and yet not many people know what goes into pricing the premiums of different people. It involves many complicated aspects including life tables, mortality rates, and other risk factors including smoking. Smoking is one of the few legal risk discriminative factors. This spreadsheet application takes a small glimpse into how different types of premiums are priced. This application focuses on standard pricing of insurance contracts issued to policyholders who are smokers versus nonsmokers. It aims to help people get an idea of the key aspects that go into their premium pricing and how much impact a lifestyle such as smoking increases someone’s premium. The mortality rates used in this application are from an industrial table called: “1980 CSO Smoker and Non-Smoker Mortality Rates” that was developed by actuaries. The table was then used by computer codes to find different premiums for a user who input their own information. Inputs include the user’s age, interest rate, the benefit amount, and the term of life policy. This application runs the users input to find the premium rates of various insurance contracts so the user can see their options and the premium difference caused by smoking status.

Negotiating the Conflict between Gender Roles on the Spectrum of Reality and Fantasy in The House of the Spirits  
Flerchinger, Nick  
Faculty Mentor(s): Christopher Schedler, English  
Oral Presentation, Session #35  
3:20-3:40 p.m. in Room 135  
This analysis of Isabel Allende’s novel The House of the Spirits focuses on the use of Magical Realism as a means to empower the female characters within a patriarchal society that vilifies women’s supernatural attunement and validates male power. I explore the extent to which women in the text are associated with the supernatural and how their position within a spiritual otherworldly realm functions to combat the control and power that men possess in the material and social realm. Through her psychic sensitivity and interaction with spirits, Clara Trueba is identified in opposition to the patriarchs of both her household and the Catholic Church, the major religious institution in Chile. In contrast, Esteban Trueba lacks access to the spiritual realm and is instead a character developed as a master of the concrete, real world. By examining the characters of Clara and Esteban, one can see that Allende employs the literary conventions of Magical Realism in order to contrive a method of empowering women in a patriarchal society wherein they would otherwise be powerless and counter the culture of male dominance, control, and power.
Gender Differences Impacts Peer Networks in Academic Engagement
Foutz Jr., Donald; Lacey, Alex; Lindahl, Kevin; Perez, Carolina; Woodman, Toni
Faculty Mentor(s): Heath Marrs, Psychology

Poster Presentation Session #3, Poster #46
2:15-4:45 p.m. in Ballroom C/D

This study explored the whether gender differences impact peer networks in academic engagement among college students. Students rated the academic engagement of their closest friends and their own academic engagement through an online survey.

Synthesis Towards Several Potential Inhibitors of Anthrax Lethal Factor Through Organoboron Chemistry
Frank, Michael
Faculty Mentor(s): Levente Fabry-Asztalos, Chemistry

Poster Presentation Session #1, Poster #47
8:20-10:50 a.m. in Ballroom C/D

Anthrax is an acute disease caused by infection of active spores from the bacteria Bacillus anthracis. Immediate treatment is required for individuals infected with the bacteria, resulting in a relatively small window of opportunity to prevent death. Bacillus anthracis secretes a toxin composed of three proteins: lethal factor (LF), edema factor (EM), and protective antigen (PA). Current treatments for infection are limited to a window of opportunity which merits a need for new immediate acting inhibitors. This research has developed three novel potential Anthrax LF inhibitors including analogs to be synthesized. Currently, one of the three initial compound pathways has been completed with improvements to the synthetic route during production. The proposed target compounds could potentially serve as a more effective treatment to acute infection caused by Bacillus anthracis.

Towards the Total Synthesis of 5-Bromo-8-Methoxy-1-Methyl-β-Carboline as a Potential Anti-leukemic Agent
Frazier, Katie; Creasy, Rane
Faculty Mentor(s): Stephen Chamberland, Chemistry

Poster Presentation Session #1, Poster #44
8:20-10:50 a.m. in Ballroom C/D

In the United States, cancer accounts for 1 in 4 deaths annually, and leukemia, a type of cancer, is the number one cause of cancer related deaths in children ages 1-14 years. Current treatments are associated with numerous side effects, and consequently, new anti-leukemic drug candidates should be pursued. A compound known as 5-bromo-8-methoxy-1-methyl-β-carboline has been shown to exhibit moderate activity against a model leukemia cell line. However, the organism from which this compound is derived, Pterocella vesiculosa, produces it in very small quantities. Continued testing for biological, anti-leukemic properties requires a more efficient, cost-effective production route. The aim of this project is to complete the first total synthesis of 5-bromo-8-methoxy-1-methyl-β-carboline by completing a series of organic chemistry reactions. Once synthesized, the product will be characterized by carbon and proton nuclear magnetic resonance spectroscopy (1H and 13 C NMR), infrared spectroscopy (IR), and thin layer chromatography (TLC). Successful synthesis of this potentially anti-leukemic drug could ultimately provide patients with new avenues of cheaper, more powerful, less toxic chemotherapies.
Quantifying Channel Responses to the Removal of the Glines Canyon Dam in the Middle Reach of the Elwha River, Washington

Free, Bryon

Faculty Mentor(s): Lisa Ely, Geological Sciences

Poster Presentation Session #1, Poster #58
8:20-10:50 a.m. in Ballroom C/D

The removal of the Glines Canyon and Elwha Dams on the Elwha River, Washington in 2011-2013 is the largest dam-removal project in United States history. The objective of my research is to quantify the sediment deposition and channel changes following the removal of the Glines Canyon Dam. An estimated seven to eight million cubic meters of sand, gravel, and large woody debris will be released into the river within a year after dam removal is completed in April 2013. Previous observations and models have shown that the majority of the sediment deposition following a dam removal occurs within the first two kilometers below the breach. However, these observations and estimates have been made on sediment reservoirs that are one-third the size of the Glines Canyon reservoir. My hypotheses are that within the first year: 1) initial sediment deposition will occur two kilometers below the dam and will propagate several kilometers further downstream; 2) sediment distribution will fill riffles and pools with coarse sediment; and 3) the increase in sediment and new large woody debris will cause lateral channel migration in key areas along the river corridor, such as adjacent to mid-channel bars. My current observations show that the sediment in the river has aggraded the channel, it is consequently filling in the riffles, and pools as far as six kilometers downstream of the dam. It is also evident that the channel is widening during this deposition period but is subject to change as water flows increase with the spring melt.

Creating a CWU Institutional Repository (IR) to Showcase Students’ Research and Scholarly Work

Fu, Ping

Faculty Mentor(s): Ping Fu, Library Technology Services

Oral Presentation, Session #12
9:30-9:50 a.m. in Room 140

Studies have shown that scholarly works available through Institutional Repositories (IRs) are more frequently cited than those solely available through e-journals and/or static websites because e-journals’ subscription can prevent some users from accessing contents and statics website content will not be searchable if the content is not crawled and indexed by search engines. The mission of creating a CWU IR is to capture, deposit, and share the intellectual output of CWU faculty and students, such as articles, monographs, unpublished research, and undergraduate research-creative and scholarly work that is considered an important source of information to researchers and undergraduate scholars. An IR gives life to all of these original works—audio-visual presentations, working papers, reports, conference papers, presentations, posters, theses/dissertations, and datasets—that are challenging to discover and deliver through conventional publishing channels.
Are the Eyes (and the Face) Truly the Windows to the Soul?  
**Galatis, Donald**

*Faculty Mentor(s): Mary Radeke, Psychology*

Poster Presentation Session #3, Poster #47  
2:15-4:45 p.m. in Ballroom C/D

One method for investigating facial inferences and social perception has been to ask individuals to make personality assessments from the faces of unacquainted individuals (Kenny, Albright & Malloy, 1988; Riggio, Lippa & Salinas, 1990; Berry, 1990, 1991). Results generally indicated that individuals unacquainted with stimulus persons can make accurate personality assessments under certain conditions. The current study evaluated the capacities of individuals to make personality assessments of unacquainted individuals from facial expressions in photographs. The photographs were age-varied, pre-fame childhood pictures of individuals who later became famous as adults, either renown for positive behavior and societal contributions, or notorious for negative behavior and destructiveness. Six pre-fame photographs (two toddlers, two 10 year olds, two early teens), three of ‘positive’ individuals and three of ‘negative’ individuals, were selected from a pool of 24 pictures, based on lack of recognition in a pilot study. They were electronically and randomly presented sequentially to single participants in an online survey. Each participant responded to a series of questions about various personality characteristics of the stimulus person, while the photograph remained on screen, before being presented with the next photograph and question set. Results indicated that participants correlate certain emotional and personality characteristics with stimulus persons based on their age in the photographs, their facial expressions, and on their adult positive or negative reputation. Results are discussed in the context of the facial assessment-personality characteristic literature.

Optimizing a Method for Determining the Mitochondrial Membrane Potential of *C. elegans*  
**Gaudette, Samantha**

*Faculty Mentor(s): Carin Thomas, Chemistry; Lucinda Carnell, Biological Sciences*

Poster Presentation Session #1, Poster #39  
8:20-10:50 a.m. in Ballroom C/D

*C. elegans* are microscopic worms used in genetic and biochemical studies. In this study four different parameters of a fluorescence assay for determining mitochondrial membrane potential were examined. The fluorescent dye used in the assay works in dynamic equilibrium with the worm mitochondria, which is dependent on the worm and dye concentration. To best observe the effects of the dye we tested different solvents, dye concentrations, worm concentrations, and data analysis methods. The effectiveness of two solvents, dimethylsulfoxide and ethanol, was examined. Comparisons of the fluorescence emission spectra and analysis of the λ Max (emission spectrum peak) established that 80 nM dye in ethanol provided the optimal conditions. The ideal quantity of worms was determined by comparing the intensity in counts per unit (CPU) of the emission spectra of samples and it was found that approximately 900 worms provided the most repeatable results. Five different forms of statistical data analysis for smoothing the emission spectra data were compared. Observing no significant difference between smoothed data and raw data, no data smoothing was applied. We were able to measure mitochondrial membrane potential in *C. elegans* by noting a 10 nm shift in λ Max between samples containing dye only and samples containing worms with dye. A decrease in the λ Max shift was observed in the presence of the chemical mitochondrial uncoupler carbonyl cyanide m-chlorophenylhydrazone (CCCP), suggesting we are measuring membrane potential in the worms. This method will be used to investigate the effects of high fat diets on mitochondrial function.
Effects of Cannabidiol on MCF-7 Human Breast Cancer Cell Proliferation, Metabolism, and Morphology

Gerrit, VanKommer; Michael, Kyle; Winterstein, Eric
Faculty Mentor(s): Ian Quitadamo, Biological Sciences

Poster Presentation Session #1, Poster #26
8:20-10:50 a.m. in Ballroom C/D

The use of cannabis for both recreational and medicinal purposes is not new or novel. Of the diverse class of compounds found in cannabis, cannabidiol (CBD) has been shown in previous studies to impede cancer cell growth. The ability of CBD to inhibit cancer cell proliferation has wide implications for both cannabis and cancer. The purpose of this study was to determine CBD’s ability to affect MCF-7 human breast cancer cell proliferation and morphology. Briefly, pure CBD was extracted using hexane in two simple chromatographic columns and used to treat subconfluent MCF-7 human breast cancer and C2C12 mouse myoblast cell cultures. MCF-7 and C2C12 cell lines were treated with standard solutions of 1, 2, 10, 50, 100, and 200 µg/mL CBD. MCF-7 and C2C12 metabolism and proliferation was quantitatively analyzed using MTT and hemacytometer counts, respectively and compared across all CBD concentrations. MCF-7 and C2C12 cell morphology was qualitatively evaluated using fluorescence and inverted light microscopy. Results showed that CBD-treated MCF-7 cancer cells experienced decreased proliferation, reduced size, and changed morphology, whereas C2C12 myoblast cells showed negligible decreases in proliferation and morphological changes. The implications of this study show a possible alternative use of CBD for treatment of cancer with reduced non-cancerous cell toxicity.

Parental Perceptions of the Barriers to Continued Participation in Extracurricular Activities for Adolescents With Asperger’s Syndrome

Gilbert, Jamie
Faculty Mentor(s): Sarah Feeney, Family and Consumer Sciences

Poster Presentation Session #3, Poster #42
2:15-4:45 p.m. in Ballroom C/D

This study examines parental perceptions of the barriers to continued participation in extracurricular activities for adolescents with Asperger’s Syndrome. Identifying these barriers can lead to putting proper supports in place, which in turn can improve participation sustainability. One hundred and five parents of adolescents with Asperger’s Syndrome were anonymously surveyed through an online questionnaire. Seven different types of extracurricular activities, such as social events, art classes, organized sports, and school clubs were evaluated to help understand what barriers could be limiting participation. The study found an association between reported participation frequency and parents’ perceptions of how activities were structured, whether parents felt their children could be equal participants, and parents’ perceptions of how well other children interacted with their adolescent with Asperger’s Syndrome.
**Liquid Fuel Rocket Engine**  
*Gilje, Alan*  
*Faculty Mentor(s): Charles Pringle, Mechanical Engineering Technology*

Poster Presentation Session #3, Creative Works, #10  
2:15-4:45 p.m. in Ballroom C/D

Rocket engines are highly complex and technical propulsion devices that are used to position objects in a different orientation or boost them into the atmosphere. The engine itself is composed of a combustion chamber, a nozzle, a cooling jacket, and an injector. This paper explores the design and manufacture of an effective and safe rocket engine that is capable of producing thrust. This was accomplished with complete heat transfer calculations of a bi-propellant chemical reaction, and properties of a material. Thermodynamic analyses were conducted in order to determine the pressures and pressure losses that occur throughout the engine. Bending and stress analysis was also carried out for the mounting fixture, as well as the thickness of the outer walls and bolt sizes. This paper also details the manufacturing methods and operations that were used during the construction of the engine, which includes but is not limited to: lathe and mill machining and welding. The analysis completed led to correct nozzle and combustion chamber dimensions and sizes, as well as cooling pressures and properties necessary. Key Words: Liquid Fuel Rocket Engine, Bi-Propellant, Thermodynamics, Heat Transfer, Stress Analysis, Fluid Dynamics

**Exercise Bike Charging Station**  
*Goheen, Marie*  
*Faculty Mentor(s): Roger Beardsley, Mechanical Engineering Technology*

Poster Presentation Session #3, Creative Works, #9  
2:15-4:45 p.m. in Ballroom C/D

Gyms across the nation depend on vast amounts of energy to keep them running so that people can expel vast amounts of energy to be physically fit. Would it not make sense to harness the energy of the people to run the gyms? With that thought in mind, University Recreation of Central Washington University requested a functional display of sustainable exercise equipment for their center. University Recreation donated a spinning bike to be converted to charge small devices (e.g., laptops, cell phones, etc.) with no permanent changes to be made to the bike. This paper highlights the attachment piece only and will detail the engineering process with results based on the amount of energy the rider is able to create.

**Diversity of Mycena Species in the Eastern Cascades**  
*Goldberg, Christina*  
*Faculty Mentor(s): Jim Johnson, Biological Sciences*

Poster Presentation Session #1, Poster #24  
8:20-10:50 a.m. in Ballroom C/D

Fungi in forest ecosystems compose a large percentage of the biomass, and are involved in complex and poorly understood interactions with other organisms that have rarely been studied in any depth. The genus *Mycena* is a large group of fungi containing approximately 300 species, with diverse morphological forms including typical mushrooms, bolete-like forms, and pleurotoid types. These fungi function in parasitic relationships with orchids where the orchids are parasites, but most important litter and wood decomposers. This study focuses on the diversity of *Mycena* in established plots in the eastern Cascades, and is part of a larger study focusing on how diversity of tree species affects the diversity of fungi in this ecosystem. This
study includes samples collected between 2009 and 2012 from 30 plots across most major forest types in the Cle Elum Ranger District. DNA was extracted from various representative collections and the internal transcribed spacer region of the rDNA was amplified using PCR. Fragments were then sequenced and analyzed using phylogenetic methods. Results suggest that *Mycena* in the eastern Cascades is very diverse and includes a number both known and undescribed species.

**Plant Flavanoid Isolate F4 Affects MCF-7 Human Breast Cancer Proliferation and Metabolism**

*Goldberg, Christina; Vosteen, Gabrielle; Sortor, Leyna*

*Faculty Mentor(s): Ian Quitadamo, Biological Sciences*

**Poster Presentation Session #1, Poster #25**

8:20-10:50 a.m. in Ballroom C/D

Worldwide breast cancer incidence has increased over recent decades, and is the most common type of cancer in women. A class of secondary plant metabolites called flavonoids are a promising cancer treatment modality due to their chemical similarities to estradiol and therapeutic potential. The estrogen-sensitive human breast cancer cell line MCF-7—used to investigate possible treatment compounds since the 1970s— is a model system for exploring possible anti-cancer treatment compounds. The purpose of this experiment was to determine whether the flavonoid MA-1-45-F4 (F4) extracted from root tissue of the prairie clover *Dalea searlesiae* could influence MCF-7 human breast cancer proliferation and metabolism. Briefly, MCF-7 cells were treated with F4 at concentrations of 1µg/mL to 100 µg/mL, and proliferation and metabolic rate determined. Results showed MCF-7 metabolism increased as F4 concentrations increased, whereas proliferation decreased as F4 concentration increased. These results are consistent with prior studies that show certain cancer types may increase metabolic rate as they preferentially use fermentation rather than oxidative phosphorylation for cellular energy. Further study is recommended to explore breast cancer treatment possibilities with F4.

**21 & Running**

*Gonzalez, Pablo*

*Faculty Mentor(s): Gilberto Garcia, Political Science; Rex Wirth, Political Science*

**Oral Presentation, Session #36**

3:20-3:40 p.m. in Room 137A

This research project is a combination of an actual case study and the application of theoretical interpretations on political participation and political representation. In 2012 the Washington Redistricting Commission created the first Latino Majority-Minority legislative districts the 15th Legislative District. I decided to run for office and in the process learned the applicability of theories in political science. In the Latino politics class offered at Central Washington University, the research initiated as part of a group project focusing on the characteristics of the district and the potential for my election in the district. Studies show that areas with low education levels, high poverty, and new immigrant populations tend to vote less often. Election results indicate that it is considerably difficult to get elected even with a Majority-Minority district, due to various factors including money, political involvement, and political ideology. This research project examined information from newspapers, government documents, and voting records, as well as the small number of studies on the Latino political experience in the United States and the State of Washington.
Evaluating Dispersal and Culvert Passage Performance of Juvenile Coho Salmon (*Oncorhynchus kisutch*) in Urban Streams

**Green, Ethan**

*Faculty Mentor(s): Paul James, Biological Sciences*

Oral Presentation, Session #11
9:50-10:10 a.m. in Room 137B

As world population grows, the boundaries between anthropogenic and natural environments expand. This often leads to habitat degradation and fragmentation. For aquatic systems in the Pacific Northwest, culverts and anthropogenic crossing structures in stream channels pose barriers to the migration of anadromous fish. In the city limits of Ellensburg, Washington, the channels of Wilson and Mercer Creeks collectively flow under anthropogenic structures for over 2,000 meters. Mercer and Wilson Creeks held populations of Coho salmon (*Oncorhynchus kisutch*) that have since been extirpated. To test the impact of culverts on fish movement, individually PIT tagged juvenile Coho salmon (n=6,024) were released at two sites in each stream. Fish were tracked with a portable PIT tag antenna and electrofishing surveys. ArcGIS software was used to plot detections and derive distances travelled by individual fish. Downstream dispersal distance and distance travelled through culverts varied among the population. More fish dispersed from their release site in the lower release sites than in the upper. More data on how culverts impact downstream migration will become available when the juvenile Coho salmon smolt in the spring of 2013. As this study continues, it will provide useful information on how Coho salmon respond to urban environments.

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2013 Cross Cultural Leadership Program Spring Immersion Project

**Gregson, Ryan**

*Faculty Mentor(s): Raymond Hall, Anthropology*

Oral Presentation, Session #41
3:40-4:00 p.m. in Room 271

This project was a cohort of seven Central Washington University students, who traveled to New Orleans for four days studying various districts. The intent of this project was for the cohort to learn about the relationship between culture and leadership. On the trip, the cohort went on several tours including a swamp tour, a service project with Youth Rebuild New Orleans, a twilight walking tour of the French Quarter, a meeting with Councilman Gray, a plantation tour at Oak Alley, and a tour of Loyola University given by Dr. Reed. Through these experiences we achieved our goal by utilizing recorded pictures, video, testimonials, and personal descriptions. We will share what we discovered and learned on our journey.

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A Comparative Study of Urban and Rural Cannabis Politics

**Grimmer, Brian**

*Faculty Mentor(s): Nelson Pichardo, Sociology*

Oral Presentation, Session #13
10:30-10:50 a.m. in Room 201

Cannabis activists in Washington have enjoyed significant successes across the state in both urban (like Seattle) and rural (like Ellensburg) political arenas. However, this success has not been uniform as the movement was defeated in Yakima. Using the results from the 2012 elections, the initiative campaigns of Sensible Washington and New Approach Washington, as well as observations and discussions conducted with activists at festivals such as Seattle Hempfest, Tacoma Hempfest, and Portland Hempstalk, this research investigates those factors that
influenced the different political outcomes across Washington state. Results show that personal dedication, community involvement, and municipal cooperation were the relevant factors explaining the differential political outcome of Cannabis legislation.

**A Study of Gender Within the Cannabis Market**

*Grimmer, Brian*

Faculty Mentor(s): Eric Cheney, Sociology

Poster Presentation Session #3, Poster #54
2:15-4:45 p.m. in Ballroom C/D

Cannabis in Washington has enjoyed significant social acceptance as indicated by high use rates and social tolerance. Yet, despite its current legalized status in the state, sales of cannabis remain illegal and users can still face legal sanctions. With legalization in effect, what roles do gender and sexuality fulfill within the cannabis culture and the illicit market of cannabis sales. Additionally, we examine the various types and frequency of exchanges (gifting, sharing, for-profit sales, etc.). The subject data of this study is based upon the recollections of various relationships the observer has made as an activist within the cannabis movement. The findings are interpreted through a network graph to identify the sales hubs and then color codes are used to reflect gender differences among marijuana users and sellers within the local Ellensburg network.

**Is Deferment Period Protection Necessary**

*Guiles, Samuel*

Faculty Mentor(s): Yvonne Chueh, Actuarial Science

Oral Presentation, Session #14
10:30-10:50 a.m. in Room 202

Retirement planning is a very important part of every middle-aged person’s life. Deferred whole life insurance and annuity contracts can be purchased by periodic payments during the deferment period and allows the contract holder to buy the protection they need before retirement. Special death benefits are often attached to such contracts which will increase premium rates but also offer the contract holder protection during the deferment period. My project takes a look at premium rates for both basic contracts and contracts that return premium payments with interest if death occurs in the deferment period. I have used male and female mortality tables from the Society of Actuaries website and I have used Microsoft Excel to calculate premium rates and to display the premium calculations. I have also used smoker and non-smoker mortality tables to see how smoking affects premium rates for individuals age: 20-50. My Excel project contains tables and graphs of premium rates for annuity and insurance contracts for males, females, smokers, and non-smokers in the United States. My results have shown that smokers should consider buying deferment protection if they start begin payments during their mid 30s and plan on paying until their mid to late 50s. Smoker mortality rates are noticeably higher around age 45 so smokers should either pay for extra protection or purchase basic contracts with shorter deferment periods. The most efficient option for average citizens is to start payments on a 10- to 20-year deferment contract around the age of 30.
ASME Design Competition

_Hadenfeld, Lauren; Smithlin, Mark_

_Faculty Mentor(s): Charles Pringle, Mechanical Engineering Technology_

Poster Presentation Session #3, Creative Works, #2
2:15-4:45 p.m. in Ballroom C/D

Due to the tragedy at the Fukushima nuclear facility after the March 2011 Tohoku earthquake and tsunami, the nuclear industry has issued a request for proposal to design and build a small remotely controlled device. This device would be used to inspect buildings that may otherwise be determined as dangerous and unsafe. The device contains a camera that is able to view the vehicle's path. This way the vehicle can be controlled without actually having to be in the same building. The device also has an arm that is able to grab items. The purpose of the arm is to be able to place radiation sensors and also to pick them up and return them to the operator. This device has been constructed and will be tested at the American Society of Mechanical Engineers Design Competition. There will be a course that the vehicle will run that includes picking up a wooden dowel that will represent a radiation sensor, pushing buttons, and reading text on the ground using the camera alone. The text represents a sensor reading that an actual radiation inspecting device would be able to read that would allow the operator to know if the building is safe or unsafe. This device, radiation sensors, camera, and remote control will help to avoid radiation poisoning and other harmful areas inside unsafe buildings.

_Gone With The Wind: Supplementing Diesel With Wind Energy at a Remote Iron Ore Mine_

_Hadfield, Michael; Sivich, Jason_

_Faculty Mentor(s): Charles Wassell, Economics_

Oral Presentation, Session #40
3:20-3:40 p.m. in Room 202

Throughout the world our natural resources are becoming increasingly difficult to find and excavate, pushing many operations to more remote areas. A consequence of more isolated operations is the high demand for some form of energy to power their facilities. In Nunavut, Canada, a mining company within the Arctic Circle is looking to supplement its diesel fuel needs with wind energy—a relatively inexpensive renewable resource. A mining facility of its capacity requires a substantial amount of diesel fuel, an expensive asset to transport and store, to operate everything from its mining equipment to its onsite living quarters. Using documented and projected diesel and wind electrical generation capital expenditures and operations and maintenance (O&M) costs, technical data on operating efficiencies, and projected fuel costs, we can assess the potential profitability of wind power supplementation. Through our research, we can project that with a twenty-year operational life of the wind facility, the mine can save $CDN150 million on energy costs. This project is a stepping-stone in opening the eyes for venture capitalists to invest in companies transitioning to renewable energy sources.

_Evaluating Lithic Technology and Function Over the Last 5,000 Years at the Sunrise Ridge Borrow Pit Site, Mount Rainier, Washington_

_Hansen, Heather_

_Faculty Mentor(s): Patrick McCutcheon, Anthropology_

Poster Presentation Session #1, Poster #5
8:20-10:50 a.m. in Ballroom C/D

Recent human land use models proposed for the Pacific Northwest are firmly embedded in a forager/collector framework that explain the shift in the organization of technology as a function of human efforts to store resources. Evidence of this shift in upland contexts of the Washington
Cascade Mountains may only be subtle as environmental constraints there are extreme and may select for a limited tool kit regardless of lowland changes in technology. To investigate changes, if any, over the last 5,000 years we employed a paradigmatic lithic classification to test the hypothesis that there is no major change in lithic technology and function. Preliminary results suggest that changes in lithic technology and function are not subtle during the last 5,000 years. Site components dating to the last 2,000 years have a more diverse lithic assemblage than earlier components. The change in diversity is evaluated in terms of tool stone sources, intra-site structure and sample size constraints. These results suggest that there may have been significant differences brought on by changes in the resource structure in upland contexts, as well as restrictions to exotic tool stone sources.

Investigation of the Effect Gd³⁺ on Nanoparticle Host-to-Europium Transfer Efficiency in YBO₃:Gd³⁺, Eu³⁺ Under VUV Excitation

Harrietha, Benjamin
Faculty Mentor(s): Anthony Diaz, Chemistry

Poster Presentation Session #1, Poster #45
8:20-10:50 a.m. in Ballroom C/D

YBO₃:Eu, Gd, is a red phosphor that has several industrial uses such as in plasma display panels and lighting. The host-to-activator transfer efficiency of the phosphors was observed through their respective excitation and reflectance spectra gathered using vacuum ultraviolet (VUV) spectroscopy. These spectra were compared to previous research done on YBO₃:Eu to observe the effect that Gd has on the observed transfer efficiency, particularly when the particle size is decreased. The data at this point suggest that the effect of Gd on transfer efficiency is minimal at best.

Investigating the Addition of Fibersol®-2 to Produce Cookies That Are a Good Source of Fiber

Hartford, Kaitlyn; Israel, Happy; Orr, Carly
Faculty Mentor(s): David Gee, Nutrition, Exercise & Health Science

Poster Presentation Session #2, Poster #15
11:30 a.m.-2:00 p.m. in Ballroom C/D

Many health benefits have been linked to consuming adequate amounts of fiber, but most commercial baked products contain little fiber. This 2013 study determined the overall acceptability, sensory characteristics, and functional properties of cookies made with the addition of Fibersol®-2. Enough Fibersol®-2 was added to make a two cookie serving a good source of fiber. Fibersol®-2 was added to the cookie dough to yield 2.5 grams of soluble fiber per two cookies. Sensory evaluation compared two test variations to a control cookie that contained all-purpose flour and no Fibersol®-2. One cookie variation contained the Fibersol®-2 addition and 50 percent of the all-purpose flour (50/50+F) substituted with whole white wheat flour. The other variation contained the Fibersol®-2 addition and 100 percent of the all-purpose flour (WWW+F) substituted with whole white wheat flour. Fifty-two untrained judges participated in evaluating cookies based on moistness, tenderness, flavor intensity, difference, and preference. Analysis of variance conducted on sensory characteristics indicated a significant difference in tenderness, discrimination, and overall preference. Post hoc analysis (using Fisher’s least significant difference method) indicated that the 100 percent whole white wheat variation was not significantly different from the control for moistness or flavor intensity. The 50 percent whole white wheat variation was significantly different than the control for moistness and flavor intensity. Cookie volume was not affected by the Fibersol®-2, although cookie height and diameter were different for all variations. This study demonstrates that Fibersol®-2 cannot be added to cookies at a good source of fiber without significantly decreasing the eating quality of the cookies.
Analysis of Surface Water-groundwater Interaction in North Kittitas County, WA

Hartman, Trent
Faculty Mentor(s): Carey Gazis, Geological Sciences

Poster Presentation Session #1, Poster #60
8:20-10:50 a.m. in Ballroom C/D

Kittitas County, Washington, is part of the larger Yakima Basin area which boasts a thriving agriculture industry that is heavily reliant on surface water for irrigation. Because surface water in the basin is in such high demand, there has been an ongoing discussion about how to supply water for its many uses in this arid region. Artificial recharge of aquifers in north Kittitas County during high spring flows has been suggested as a means of increasing flow in-stream for irrigation purposes as well as increasing base flow levels for endangered fish species at critical low periods. To assess the feasibility of these techniques locally, the groundwater-surface water relationships were investigated using geochemical analysis. Surface and groundwater samples were collected and underwent major anion, $^{18}\text{O}/^{16}\text{O}$ stable isotope, and trace element analysis. Preliminary data suggests the absence of nitrate in deep groundwater from Cooke Canyon and relatively low but measurable levels within most moderate depth wells of the Ellensburg formation. Measurable nitrate levels in these moderate depth wells are presumed to be the result of small amounts of seepage from irrigation runoff. Elevated sulfate levels were measured in one sample from the deep, basalt aquifer in Cooke Canyon and a single shallow sample from the Ellensburg formation. These increased sulfate concentrations are attributed to ion exchange between specific aquifer materials and groundwater. $^{18}\text{O}/^{16}\text{O}$ ratios similar to generally accepted values for local irrigation canal water were measured in the single shallow sample collected from the Ellensburg formation indicating a large amount of direct recharge of the aquifer by nearby KRD canals. Similarities between isotopic signatures of groundwaters collected from wells finished in the sedimentary basin fill and those that extend into the deeper basalt aquifer suggest some degree of mixing between the two aquifers.

Medieval Folklore: A Representation of the Cultural Shift and Development of the Hero In Medieval Society

Harvey, Renae
Faculty Mentor(s): Roxanne Easley, History

Oral Presentation, Session #15
9:50-10:10 a.m. in Room 271

Most individuals today know Jack and the Beanstalk and Rumpelstiltskin as bedtime stories. Many tales such as Snow White, Robin Hood, and Beowulf, have even made their way into major motion pictures. But these tales are part of a much older tradition in the medieval period. Making their start as an oral tradition in Europe’s villages and small towns, many popular tales were recorded by monks in monasteries in the eleventh century, and reworked by other authors, such as the Brothers Grimm, in the nineteenth century. Tales such as Beowulf, Song of Roland, Saint George and the Dragon, and Snow White give unique insight into medieval cultural values. The purpose of this paper is to examine shifts in the medieval hero as represented in folklore, from formal hero to ideal hero, and from Christian hero to chivalric hero.
Komsomol Participation in the Soviet Antireligious Campaign, 1918-1932
Hastings, Rebecca
Faculty Mentor(s): Roxanne Easley, History

Oral Presentation, Session #7
8:20-8:40 a.m. in Room 271

The antireligious campaign in the Soviet Union was a particularly contentious issue in the immediate post-revolutionary period. Different interpretations of the revolution led to a variety of approaches to antireligious campaigning, including the aggressive tactics employed by the Komsomol (Communist Youth League). The Komsomol’s attempt to make this the officially sanctioned approach indicates that members felt that there was room for the voices of revolutionary groups other than the Communist Party. Ultimately the Komsomol’s method was judged a failure by Party elites, who decided that moderation, rather than aggression, was most effective. By the late 1920s the Party, well on its way to solidifying its position as the sole policy-making authority for the Soviet Union, could enforce this decision. The disarray and spontaneity of the immediate post-revolutionary period was stifled as the Party gradually eliminated the independence of competing organizations.

The Role of Globalization in Changing Nutrition and Health Patterns in Central America and Mexico
Havens, Sarah
Faculty Mentor(s): Tracy Andrews, Anthropology

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

Around the globe, the health status of populations is strongly influenced by nutrition status and diet, which in turn are influenced by a wide variety of factors including economics, politics, and culture. This study addresses the impact of globalization on nutrition transitions, or major changes in dietary patterns. I assess the argument that free trade and neoliberal policies that change agricultural priorities from local subsistence to participation in a global market will benefit the health status of local communities. Case study data from Central America and Mexico are analyzed, since these are areas of the world that have recently seen significant changes as a result of expanding connections to international commercial markets. The rate and nature of nutritional changes, and how such changes have affected the health status of the study populations under these conditions of globalization will be documented. Initial findings indicate that specific variables such as unequal access to land, conversion from local plant species to bio-engineered strains, and increased intake of a typically Western diet may be linked to a decline in nutritional status, an increase in dietary vulnerability, and poorer health outcomes for some populations. This analysis reveals the challenges to human health encountered during globalization processes designed to improve the socioeconomic status and well-being of communities.
Guns and Crime: An Analysis of the Effects of Firearms Associated with Criminal Activity  
*Heber, Drew; Darnall, Micah*  
*Faculty Mentor(s): Dominic Klyve, Actuarial Science*

Oral Presentation, Session #22  
12:40-1:00 p.m. in Room 202

This project analyzes the relationship between gun violence, availability of firearms to criminals, and the types of guns used by criminals. Between 1980 and 1992 a study was done on gun crime by Christopher S. Koper in Houston, Texas. This study collected data on the type of firearms that were confiscated by the police force, and compared it to the number and type of crimes that were committed. We analyzed study data collected from Inter-University Consortium for Political and Social Research (ICPSR) using IBM’s SPSS Statistics Data Editor, EViews (time series analysis), and Microsoft Excel. We are answering some of the crucial questions that have been circulating in the political world about what effects high-powered weapons in the hands of criminals have on public health. Looking at the types and calibers of weapons that were available to criminals in certain time periods and comparing that to the crimes that were committed, we identify the factors contributing to an increase or decrease in gun violence.

Life Insurance Pricing  
*Heber, Drew; Conaway, Andy; Nakamichi, Dustin; Cheng, Jinlong*  
*Faculty Mentor(s): Yvonne Chueh, Actuarial Science*

Oral Presentation, Session #14  
9:50-10:10 a.m. in Room 202

This project analyzes premium rates in a basic form that would be used by insurance companies. The purpose of this project is to understand, analyze, and replicate insurance premiums that clients will spend on purchasing their life insurance or life annuities for retirement. This also gives individuals a good idea what they can expect to pay under different insurance contracts, assuming no expenses and profit earned by the insurer. So far we have used a standard life table from the book *Actuarial Mathematics* by Bowers, Gerber, Hickman, Jones, and Nesbit. We took this life table and then generated probabilities of survival, life expectancy, discount rates, and actuarial present values for both life annuities and life insurance. Future implementation can be done using real-world life tables. By using Microsoft Excel we have created a user friendly application for determining what one’s price will be while purchasing contracts from an insurance company. These pricing values are determined given their age, market interest rate, desired death benefit amount, and term length. The pricing values will be returned to the user in a way that they may compare prices. They can compare life insurance prices according to annual prices verse monthly prices for whole life verse term life insurance. It will also allow them to see what payments are necessary now for future life annuities for retirement.

Decreasing a College Student’s Disorganization  
*Heberling, James*  
*Faculty Mentor(s): Shu-Fei Tsai, Education*

Oral Presentation, Session #42  
2:40-3:00 p.m. in Room 301

College-aged students often have trouble organizing their things because of learned helplessness from parents or guardians growing up. After living on his own, the participant was struggling with disorganization, such as not cleaning/picking up his dishes, garbage, bathroom, toothbrush, bedroom, breadcrumbs etc. The research attempts to bridge the gap between living with and without parents. This study evaluated the effectiveness of verbal prompts and reinforcements
on organizational skills of a college student. The findings showed a decrease in disorganized behaviors after the interventions. Fading the prompts over the course of 10 sessions proved to be effective in decreasing the mean and level of performance. The data showed the participant needed the extra prompting and reinforcement support to continue the organized behaviors. The maintenance of the organized behavior should be studied in the future to examine whether the participant can maintain his organization skills after the intervention.

Truth Over Time: The Evolution of Hollywood’s Thinking on the Vietnam War
Hedgers, Kellie
Faculty Mentor(s): Rex Wirth, Political Science

Oral Presentation, Session #32
1:10-1:30 p.m. in Room 271

The Vietnam War is an event that has seared itself onto the mind of the American public, initially due to comprehensive news coverage and later, generations of filmmakers. The American people of today most definitely have a very concrete set of beliefs about the Vietnam War—mainly that it was a war fought in vain, responsible for the needless deaths of tens of thousands, a war that should never have happened. This begs the question: how did we as a people arrive at this point of view? Did we always feel this way, or was it a gradual process? Interestingly enough, we may find the answer in an unlikely place: Hollywood. The films made about Vietnam, starting in the late sixties and continuing up to the present day, serve as a graphic illustration of the evolution of our thoughts and feelings as a nation regarding the Vietnam War. The lens through which Hollywood has viewed the Vietnam War has undergone quite a bit of evolution over the years. Hollywood’s first foray into the conflict, The Green Berets, asked an important question—did America still have the stomach for WWII-era patriotism? The subsequent movies answered that question with a resounding no. Starting in the late seventies and continuing up until the present day, Hollywood has regarded Vietnam with a potent mixture of resentment and anger, hammering away at several important themes—innocence lost and the bitter veteran in particular.

Robert E. Lee and Southern Memory
Hedgers, Kellie
Faculty Mentor(s): Daniel Herman, History

Oral Presentation, Session #7
9:00-9:20 a.m. in Room 271

Immediately following their defeat in 1865, the Southern people underwent a period of intense spiritual and social upheaval. How could a righteous people, who believed they had the favor of God, suffer such a monumental defeat? This troubling question led to a fierce belief in the Confederacy as a Lost Cause, a glorious and noble society doomed to failure. Belief in this particular vision of Southern society was so powerful that it came to be viewed by many of its proponents as having a near-religious element. This mentality also led to a belief in the knightly chivalry of its leaders. The most venerated Confederate leader in the postwar South was Robert E. Lee, whose military achievements, gentleness, and graceful acceptance of defeat defined him as the embodiment of Southern virtue. By venerating the military glory, admirable personal qualities, and humble postwar life of one man, the South was able to present a noble and defiant face to the world in the shadow of crushing defeat. Drawing on the works of many Lee biographers, including Douglas Southall Freeman, Burke Davis, Emory Thomas, and a host of others, along with some leading experts on Southern memory, including C. Vann Woodward and David Blight, I will trace the changing circumstances that have led to Lee’s current veneration in the South and also the South’s complicated relationship with its Confederate heritage.
“The Stuttering Duet” From The Bartered Bride  
Hemenway, Sarah  
Faculty Mentor(s): Gayla Blaisdell, Music  
Creative Expression Presentation, Session #16  
10:10-10:30 a.m. in Ballroom A  
In this scene from Smetana’s Bartered Bride, the character Vasek (Joe Sacchi) has been promised to marry Marie (Sarah Hemenway), but has never met her. As the scene continues, you find out that Marie knows who he is and eventually convinces Vasek to renounce his promise to marry Marie. She does this by convincing him that there is another lady in the town who loves him instead. By the end you realize the true trick was for Marie to get out of a marriage she didn’t want.

The Epistemic Value of Live Theatre: A Dramatic Response to the Question of Knowledge  
Hicks, Hannah  
Faculty Mentor(s): Gary Bartlett, Philosophy & Religious Studies  
Oral Presentation, Session #6  
8:20-8:40 a.m. in Room 202  
This presentation occupies a niche wedged between philosophy and art, exciting both the creative and inquiring mind. Drawing on both foundational and recent work in the philosophical study of knowledge and aesthetic theory, this paper synthesizes two fields within the humanities: epistemology and live theatre. This presentation challenges the academic barriers that keep philosophy and the performing arts from fully participating in interdisciplinary communication, and challenges the conceptual definition of knowledge itself. The aim is to promote recognition of the value in using that which is live, liminal, and personal in understanding the nature of knowledge. This can be achieved through exploring the ways in which the experiences of engaging with the fiction of live drama are a key to finding the missing element in the definition of knowledge. In exploring the collective views of specific, highly developed fields such as philosophy’s epistemology and art’s live theatre, an underutilized tool emerges: truth through fiction. This tool spurs the emergence of new societal and learning expectations and changes the face of academia in the process.

Dealing With Agricultural Runoff in Washington State  
Hinkins, Case  
Faculty Mentor(s): Rex Wirth, Political Science  
Poster Presentation Session #3, Poster #32  
2:15-4:45 p.m. in Ballroom C/D  
This is an examination of the problem of agricultural runoff such as chemicals and, in particular, nitrates and phosphates, and how they react with the natural water way of the Yakima River. Nitrates and phosphates have the ability to completely decimate a river system by eutrophication which results in hypoxic conditions. This project will explore various policies and statutes that can be implemented to drastically reduce the amount of harmful runoff as well as explore the different biological and chemical problems that are associated with non point agricultural pollution. The Yakima River is extremely susceptible due to the intense amounts of irrigation water that is drawn from it, and put back in, coupled with multiple dairies along its banks. Action must be taken to prevent complete destruction of the ecosystem.
Experiments on mitochondria indicate that the toxicity of atmospheric nanoparticles 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 near physiological conditions while analyzing Fe(II) and the most prevalent oxidative species hydrogen peroxide (H$_2$O$_2$). Realistic concentrations of Fe(II) at sub-nanomolar and H$_2$O$_2$ at nanomolar levels are quantified using flow injection analysis (FIA) with chemiluminescence. Results from this study will allow for better pinpointing of the main culprit in the toxicity of inhalable carbonaceous particles that are emitted from the incomplete combustion of fossil fuel. Results have shown in particular that in the presence of a biological electron donor, such as ascorbate, hydrogen peroxide is produced under physiological conditions.

“Open Your Ears, You Fool!”

Hoff, Jonathan
Faculty Mentor(s): Toni Čuljak, English

I wrote this story in Professor Toni Čuljak's American Indian Oral and Non-Fiction Literature course, for the first project we were assigned, to show that I understood some essential characteristics of Native American culture and relationships. The requirements were to create a story using any Trickster, Transformer, or Culture Hero characters we had recently discussed (such as Coyote or Raven), demonstrate the family-like relationships between Native people and the natural world, and include cosmology (an explanation for how things in the world came to be as they are today). I particularly enjoyed this project for three reasons: I hope to be a fiction and fantasy writer one day, I love folklore of any culture, and Coyote, the main character in this story, has always been my favorite Trickster. Stories in Native culture are much more than simple entertainment: they tell how things came to be and teach important lessons about appropriate behavior and customs to listeners. These stories require no specific type of audience: anyone can listen to them and learn something. Many stories in non-Native societies serve a similar purpose, and I hope that after “Open Your Ears” is concluded, the audience will understand the importance of stories both within and without Native American society.
Cargo Rack With Removable Folding Ramp  
Hoksbergen, Brandon  
Faculty Mentor(s): Charles Pringle, Industrial & Engineering Technology  
Poster Presentation Session #2, Creative Works, #5  
11:30 a.m.-2:00 p.m. in Ballroom C/D  

A cargo rack with a removable folding ramp was constructed to load and transport recreational vehicles. This requires a lightweight design that provides enough strength to support the projected loads. The testing will consist of loading 450 pounds on the cargo rack and using the ramp to load 750 pounds. The results for the testing will be successfully transporting a 450-pound load on the cargo rack and successfully loading a 750-pound load with the ramp. This paper further explains the process of designing and manufacturing the cargo rack and ramp. The design was obtained with the use of beam deflection and shear stress. The lengthy manufacturing process will also be broken down in this paper. Keywords: Cargo Rack, Ramp, Load, Transporting, Beam Deflection, Shear Stress, Manufacturing.

Pika (Ochotona princeps) Home Range Use and Habitat Preference Outside Talus Rock Patches in Relation to Potential Dispersal Corridors  
Hooghkirk, Jill  
Faculty Mentor(s): Kristina Ernest, Biological Sciences  
Oral Presentation, Session #11  
10:10-10:30 a.m. in Room 137B  

For species that live in discrete habitat patches, the ability of individuals to move between subsections of a population is important for maintaining genetic variability and long-term viability. Understanding where animals move and how they use different habitat features is critical for managing habitats to support population connectivity, especially in habitats further fragmented by human activities. The objective of our study was to quantify American pika (Ochotona princeps) movements and habitat use adjacent to their primary rocky habitat patches (talus slopes) in the I-90 corridor near Snoqualmie Pass. Eight adult pikas and five juveniles were radio-collared to track movements away from core rocky patches and to detect potential dispersal. Habitat preference was determined by comparing habitat variables at used and unused locations. Logistic regression showed that pika use was positively associated with complex habitat characterized by broadleaf trees and layered substrate (logs and rocks), and negatively associated with both vertical distance from the ground to overhead plant cover and amount of bare ground. Pikas living in areas with a greater availability of layered substrate left the main patch more frequently and traveled further into the surrounding area. No successful dispersal events were recorded; all individuals that moved from primary habitat patches into non-protective habitats were presumably killed by predators. Providing preferred habitats adjacent to rocky patches and enhancing them with specific habitat features in corridors between existing rocky patches and new wildlife crossing structures on I-90 is predicted to increase dispersal distances and improve population connectivity across the highway.
The IRA: Portrayal, Perception, and Reality, 1916-1921
Hoolbrook-Bruns, Elise
Faculty Mentor(s): Jason Knirck, History

Oral Presentation, Session #23
12:00-12:20 p.m. in Room 271

The main issue examined in the paper is how the portrayal and perception of the Irish Republican Army’s (IRA) military effectiveness is intertwined with its social standing and with its actual military success or lack thereof. I tackle this issue by examining Bureau of Military History documents, a variety of newspapers, and several secondary sources. My argument is that there was significant disorganization within the IRA, which fed into a completely confused public perception of it, making it difficult to judge its military and social effectiveness. The time frame I discuss spans from the 1916 Easter Rising, mentioned only briefly, through to the truce in July 1921.

Doctored, Strange Love: Or How We Learned to Stop Worrying and Love the Zomb
Hopkins, Cyphar
Faculty Mentor(s): Liahna Armstrong, English

Oral Presentation, Session #32
1:50-2:10 p.m. in Room 271

My project explores the almost exponential rise in popularity of the zombie film genre over the past fifty years. As one probable cause, my presentation explores the connections between zombie films (as a type of apocalyptic film) and the pervasive nuclear holocaust anxiety which arose in the United States following the advent of atomic weapons and their subsequent use. Although the concept of the destruction of the world was nothing new considering the events/prophecies of the Bible, the level of destructive force which once remained securely in the realm of the divine was now available as part of the push-button age. Though seen by some as a savior when first used against the Japanese in World War II, America’s relationship with nuclear weapons (and later nuclear power as well) soon changed due to the Cold War with its massive over stockpiling of Intercontinental Ballistic Missiles, the Cuban Missile Crisis, and accidents at both Three Mile Island and Chernobyl. Though no longer as actively feared, many scholars would argue that nuclear holocaust anxiety groomed the social consciousness for a general holocaust anxiety which enabled later panics about AIDS, Y2K, severe acute respiratory syndrome, swine/avian flu, and 9/11-related terrorist attacks. Once the anxiety was integrated into the general social consciousness it enabled zombie films to enter the mainstream as a safe, comfortable pressure-release valve where this anxiety could be displaced. I look at what makes the zombie film an idea vehicle for the transfer and amelioration of nuclear holocaust anxiety.
What Can Be a Good Predictor of a Higher ADR in GI Practices?

**Huang, Rui; Cheng, Jinlong**

*Faculty Mentor(s): Dominic Klyve, Actuarial Science*

**Oral Presentation, Session #22**
12:20-12:40 p.m. in Room 202

Our presentation deals with ongoing data collected and analyzed from the Gastroenterology Practice Management Group (GPMG) from 2007–2010. At each participating site, a research coordinator collects de-identified group-level data from ambulatory centers across the United States. We established our main variable as the adenoma detection rate (ADR), which is calculated by dividing the number of colonoscopies with adenomatous polyp by the total number of colonoscopies. ADR was not stratified by gender or indication and was adjusted for age greater than 50. Our main goal is to analyze the performance of ADR, in response to four other highly relevant variables: 1) the quality of the preparation; 2) value of the withdrawal rate; 3) changes of seasons; and 4) location. A total of 256,362 colonoscopies were conducted, of which 84,507 were initial screening (45 percent male, 78 percent over age 50, cecum reached 97 percent), and had been distributed into 13 groups representing 37 gastroenterologists. With statistical analyzing tools, SPSS and Microsoft Excel, we iteratively performed a series of data analyzing methods, including regression analysis, one-way and two-way analyses of variance, and descriptive and inferential analysis techniques. As a result, we are able to find statistically significant relationships among the variables, which can be used as predictors for potential ADRs.

Nonverbal Communication

**Hudson, Emily; Dearinger, Logan; Williams, LeAnn**

*Faculty Mentor(s): Steve Jackson, Communications*

**Poster Presentation Session #3, Poster #40**
2:15-4:45 p.m. in Ballroom C/D

Nonverbal communications is a fascinating and complex world of connections and cues, which can be analyzed and applied in many situations. With an understanding of nonverbal communication relating to multiple domains such as the face, eyes, hands, and posture, a new understanding of others’ emotions, disabilities, and qualities is revealed. In all types of social settings, understanding the aspects of nonverbal communication can effectively reveal unspoken words—information not clear to others. We desired this unique ability and understanding. To acquire this skill of reading others, we accumulated all available information on nonverbal communication and applied this knowledge to everyday situations. The discoveries we made were very intriguing, and this new understanding has helped us significantly to develop a deeper form of communication with colleagues, professors, peers, family members, and even strangers on a daily basis. Simple forms of communication such as a hand gesture, closed posture, or a sly smirk can reveal much more than we ever realized possible.
**Species Differences in Artiodactyl Hyoid Bones**

*Huilca, Jenny*

*Faculty Mentor(s): Patrick Lubinski, Anthropology*

Poster Presentation Session #1, Poster #2
8:20-10:50 a.m. in Ballroom C/D

Hyoid bones are small bones of the throat found beneath the lower jaws of mammals. They are robust and distinctive, but are nonetheless uncommonly reported in archaeological sites. There is little literature available at present that can facilitate element identification as well as species differentiation of hyoid bones. To address this gap, I examined 35 hyoid bones from eight important artiodactyl (hoofed mammal) species in the CWU Zooarchaeology collection and Burke Museum Mammalogy collection. The hyoid bones of bison, cattle, deer, elk, pronghorn, bighorn and domestic sheep vary in length, shaft thickness, anterior and posterior morphology, and degree of shaft curvature. For example, compared to the other species, pronghorn hyoids have shafts that are thinner and less arched, as well as a much wider, anterior-curving process on the posterior end. Domesticated species seem to have thicker medial-lateral widths than their most closely related wild species. The characteristics described here are suggestive rather than deterministic, and more research as well as larger sample sizes are needed.

**DNA From Chewed Vegetation: A Non-Invasive Collection Strategy for Arboreal Primates**

*Humphreys, Jennifer*

*Faculty Mentor(s): Joseph Lorenz, Anthropology*

Poster Presentation Session #1, Poster #11
8:20-10:50 a.m. in Ballroom C/D

Noninvasive collection of genetic materials from cryptic and endangered primates is challenging and thus traditionally limited to samples such as feces, urine or hair. Saliva, while higher-quality, is more difficult to obtain and thus limited to terrestrial and/or habituated populations. This study examines a novel procedure for noninvasive saliva collection using fruit specimens discarded by golden-handed tamarins (*Saguinus midas*) in Bergendal, Republic of Suriname. The mtDNA CO1 locus amplifies successfully which is indicative of the presence of platyrrhine DNA. This technique could have wide application for obtaining saliva samples from endangered, cryptic, arboreal and/or non-habituated primate populations.

**National Trumpet Competition: Solo Divisions**

*Hurd, Tristan*

*Faculty Mentor(s): John Harbaugh, Music*

Creative Expression Presentation, Session #24
11:40 a.m.-12:00 pm. in Ballroom A

I will be presenting about my experience as a soloist at the National Trumpet Competition. I will be describing the process of being accepted to the competition and what a performance at the event entails. I will also perform a brief work as a performance demonstration. The purpose of this presentation is to inform my audience of the nature of the competition and what is involved in being successful at the event, as well as sharing the types of valuable feedback and professional connections that can be made. The work is fueled by the theories of music preparation and performance nurtured by our outstanding music department. This work is particularly meaningful to musicians interested in participating in any musical competition, or performance in general. I hope that the audience will come away from the presentation with a better idea of musical performance and competition, as well as the preparation involved.
Rocky Brand Supply Chain Improvement
Iem, Sochetra; Logan, Nicole; Nazarali, Rizwan
Faculty Mentor(s): Kun Liao, Operations & Supply Chain Management

Lynnwood Center - Poster Presentation, Poster #3

Rocky Brand Inc. is a developer, designer, manufacturer, and marketer of boots, outdoor and work wear, and accessories. The company’s products range in styles from outdoor and western boots to work and military boots. The company has concerns with reference to their inventories due to their new computer system not updating their daily run of actual goods and logistical challenges. Due to delays in shipment from China and lack of approved logistics vendor(s) the company is facing stock outs. The idea is to analyze and research these challenges and provide the company with potential solutions that will benefit the company going forward.

Evaluating the Environment on a University Campus Toward Students With Learning Disabilities
Jackle, Samantha; Bistricean, Cristina
Faculty Mentor(s): Kara Gabriel, Psychology

Poster Presentation Session #3, Poster #51
2:15-4:45 p.m. in Ballroom C/D

The Americans with Disabilities Act (ADA), passed in 1990, prohibits discrimination against individuals with physical and/or mental impairment(s)—ensuring equal access to education, employment, and other public accommodations nationwide. Perhaps one implication of the ADA is that college campuses are experiencing increased enrollment rates among individuals with disabilities. The present study was designed to measure undergraduate students’ perceptions of individuals with learning disabilities, as well as their knowledge of the resources available at their university to support said individuals. Male (n = 36) and female (n = 96) respondents responded to forty-three questions pertaining to their own knowledge and attitudes toward individuals with learning disabilities, as well as their perceptions of other students’ attitudes using a Likert scale of 1 to 6 (1 = strongly disagree; 6 = strongly agree). The majority of respondents agreed that someone with a disability could be successful on campus if they received additional support (M = 4.87, SD = 0.81) and disagreed with the statement that individuals with learning disabilities should figure out the college environment on their own (M = 2.64, SD = 1.01). The current findings indicate that undergraduate students, in general, support services for those with learning disabilities and believe themselves and others to be accepting of said students. However, the use of self-report methods suggests the possible influence of social desirability bias among respondents. Further investigations should utilize methods that are independent of self-report, which may yield more accurate assessments of actual perceptions.
Evaluating the Perceptions of Psychology and Sociology Majors by University Undergraduates
Jackle, Samantha
Faculty Mentor(s): Michael Harrod, Sociology; Kara Gabriel, Psychology
Poster Presentation Session #3, Poster #52
2:15-4:45 p.m. in Ballroom C/D

The present study was designed to measure undergraduate students’ perceptions of psychology and sociology as majors, as well as their perceptions of science and the significance of social sciences as a whole. Male (n = 85) and female (n = 143) respondents between the ages of 18 and 57 responded to forty-five questions designed to measure their perceptions of psychology and sociology, utilizing a semantic differential scale. Participants were also asked to respond to an additional 47 questions that measured their perceptions of science in general on a Likert scale of 1 to 6 (1 = Strongly disagree, 6 = Strongly agree). While data collection is ongoing, preliminary findings indicate that overall, undergraduates perceive the study of individuals to relate more to psychology (M = 2.16, SD = 1.25), whereas the exploration of how social structures operate relates more to sociology (M = 4.93, SD = 1.10). The majority of respondents agree that science can change over time (M = 5.05, SD = 0.87), as well as that science can be poorly done (M = 5.03, SD = 1.07). Preliminary data also indicates that the majority of respondents do not view disagreements between scientists to be a weakness of science (M = 2.63, SD = 1.29). These data contribute to information regarding undergraduates’ perceptions of different majors, as well as the perceptions they have surrounding the validity and effectiveness of the social sciences.

Greener Lunches for a Greener Future
Jackson, Jennifer; Summer, Star
Mentor(s): Jeff Hashimoto, Ellensburg High School
Poster Presentation Session #2, Poster #41
11:30 a.m.-2:00 p.m. in Ballroom C/D

Much of the food packaging from school lunches makes up a majority of the waste produced by a school each day. By finding a way for students to pack environmentally friendly lunches that are both affordable and desirable we can reduce a school’s overall waste. We will find eco-friendly plastic bags and lunch packing material that not only are good for the environment (not using oil to make the plastic or renewable) but are also something that a student would be willing to bring to school every day.

Identification of Proteins that Interact with Lhx2 in the Embryonic Neocortex
Jackson, William
Faculty Mentor(s): Todd Kroll, Chemistry
Oral Presentation, Session #37
3:00-3:20 p.m. in Room 137B

Neocortex is a mammalian region of the brain that gives rise to conscious decision making and is divided into functional areas that perform discrete computational tasks. Lhx2 is one of several transcription factors—proteins that turn other genes on and off—produced in concentration gradients across the neocortex during embryonic development. These gradients provide positional information that induces individual neocortical areas: the auditory, visual, motor and somatosensory cortices. The primary question of my research is to investigate the biochemical means through which Lhx2 determines the positions of boundaries between these functional areas. We hypothesize that the function of Lhx2, like most transcription factors, is mediated by interactions with additional proteins. To begin investigating this possibility, we conducted a yeast-two-hybrid screen which uses protein interaction to turn on genes allowing us to identify
possible binding partners for Lhx2. The results of this screen suggest some novel and interesting binding partners for Lhx2 which suggest potentially new mechanisms for the action of Lhx2 within the context of neocortical arealization. We are now initiating experiments to confirm the interactions between Lhx2 and these identified proteins by using pair-wise yeast two-hybrid assays and co-immunoprecipitation with the full length binding partners. These results will shed light onto how Lhx2 performs its role in the neocortex and suggest additional experiments to probe the relevance of these interactions in the context of neocortical arealization.

Two-Toned Madness
Jakubal, Reale
Faculty Mentor(s): Andrea Eklund, Apparel, Textiles and Merchandising
Poster Presentation Session #2, Creative Works, #51
11:30 a.m.-2:00 p.m. in Ballroom C/D

Purpose: This garment was created to convey a bold personality through vibrant and beautiful colors. The colors are incorporated via geometric blocks for a unique and modernized style.

Process: My inspiration is based on the color scheme of the design. Sharp differences in the colors for a high contrasting, clean look in the bodice and pant. The design lines of the bodice were chosen to give it more of an edgy look, my take on the punk-rock look. I went with a long shirt that is loose fitting, with longer sides to give it a geometric half moon shape. The pants have a classic cut with a modern two-toned accent. Techniques: The bodice was created via draping, which is forming fabric over a mannequin or live model and manipulating it, creating each piece of clothing separately. While draping, it was essential that I kept the silhouette loose to get achieve the flowing look I was trying to achieve. The pants were flat-patterned using the model's measurements. On both the bodice and pants the color blocks were precisely measured and drawn from the draping and flat pattern, and separate patterns were made. Using the patterns I constructed samples and fit them. From the fitting the pattern was altered and the final garments then made. Materials: 100 percent Cotton, 100 percent Spandex, thread, elastic.

How America's Drug War Affects Mexico's Tourism
James, Carley
Faculty Mentor(s): Dorothy Chase, Recreation & Tourism
Oral Presentation, Session #41
2:40-3:00 p.m. in Room 271

In 2006, Felipe Calderon was elected into office as Mexico’s president after running on an anti-drug, anti-cartel platform. Since 2006, the violence in Mexico has increased dramatically, which has negatively affected Mexico’s number one industry: tourism. Ports are being taken off-route on cruise lines, and Mazatlan’s tourism market has fallen by 79 percent. There are many states in Mexico which the United States Travel Bureau suggests that American citizens stay out of as safety precautions. Mexico is one of the countries with the strongest gun control laws, and it can take a year or more in order for a citizen to legally own a gun. Where are these drug cartels getting their guns from? It is the same place that the illegal drugs are going–America. America’s lax laws on international gun trafficking is making it easy for drug cartel to get high quality, military-style guns. These guns are being used to protect the illegal drugs over the border and into America to be sold for profit. There is little that can be done to stop the trafficking of drugs and guns by the cartel, while increasing the tourism market to what it once was in Mexico. Aeromexico and other airlines are offering deals in order to help increase Mexico’s travel market. My purpose of researching this issue is to draw attention to Mexico’s tourism decrease, as well as make clear in which areas the violence is focused in.
How to Make Homemade Creative Teaching Aides for Health Lessons
Johnson, Mary
Faculty Mentor(s): Mark Perez, Physical Education, School & Public Health

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

Creating homemade Outrageous Teaching Aids can add powerful teaching moments to any lesson. This Communications Tool Box was created for a junior high or high school health lesson. Inside the tool box are three different types of communication tools that we use in the real world: a megaphone, walkie-talkies, and a laptop or iphone. Students will describe why each is a good tool, but answer if it is the best tool to use. By going through each tool, students will come to the realization that the most effective tool was the one that allowed a person to both see and hear the other person. This helps students to understand that verbal and non-verbal communication used together is the clearest form of communication.

Solar Water Heater
Judy, Michael
Faculty Mentor(s): Roger Beardsley, Mechanical Engineering Technology

Poster Presentation Session #3, Creative Works, #4
2:15-4:45 p.m. in Ballroom C/D

How could a person develop a system to heat water without the need for electricity or gas? To answer the question, we must look into solar energy. First, a proposal filled with information about budget, time and analysis has already been constructed on a flat plate solar collector. From this proposal, a reader could get an understanding of how a solar collector absorbs energy, along with knowing how much it costs to make, and roughly how long it would take to construct for home use. Second, readers could build the collector and use the detailed proposal for issues along the way. Within the proposal is how to construct the system with pump and water tank to make the system complete. Finally, we test the flat plate solar collector. Testing the temperature of the surface to determine the amount of energy being absorbed into the water, along with knowing how much water can be heated in a certain amount of time. A theoretical and practical implication of engineering has been used and discussed within the proposal.

Pollution Control in the Puyallup Floodplain: The Problem of Urban Sprawl
Kajca, Spencer
Faculty Mentor(s): Rex Wirth, Political Science

Oral Presentation, Session #27
1:30-1:50 p.m. in Room 137A

The Puyallup River is fed by glacier melt on Mt. Rainer. It runs across forty-five miles of western Washington, before emptying into the Puget Sound. The river valley is a popular attraction for homeowners. There are currently 150,000 people residing in the river valley. Improper management of urban growth is damaging the rivers floodplain and reducing water quality. The consequences of floodplain modifications are intensified during rainy seasons. Homes are being inundated by storm water, carrying household chemicals and large debris into the river. As this continues to happen oxygen levels are reduced, creating a hypoxic environment. In hypoxic waters, fish and water organisms numbers will decline. My research explores the current Puyallup River floodplain policies, specifically, where policy has failed to protect habitat and how it can be improved.
Revolution and Education in Iran

Kaviani, Khodadad

Faculty Mentor(s): Khodadad Kaviani, Education

Oral Presentation, Session #33
1:10-1:30 p.m. in Room 301

How has the 1979 Iranian Revolution changed education for millions of Iranian children? The ideological shift from monarchy to theocracy has been broad and deep. On the surface, this tectonic shift has meant the replacement of national hero statues in public places with Islamic symbols, enforcement of the Islamic dress code on women and men, commemoration of Islamic religious events and down playing or elimination of pre-Islamic traditions, renaming of streets to honor religious leaders and martyrs, large displays of propaganda paintings on public and private buildings, and even on cake packaging that remind the consumers, “praying is the pillar of faith.” On a deeper level, this ideological shift to theocracy has changed what children are taught in schools and the presence of religious watchdogs in every school ensures the indoctrination of the young children. Children are required to attend prayer sessions in schools and the curriculum includes a heavy dose of religious teaching that promotes obedience to the religious authorities and the theocratic model of government. A careful examination of the textbooks used in Iranian schools from the Shah’s era to today show a remarkable shift from loyalty to the Shah and country, to loyalty to a theocracy that is based on “velayat-e Faghih.” Under this model, ultimate power rests with the highest religious authority and the Iranian people are considered as minors in need of guidance and protection.

Sign Dialects in Chimpanzees

Keenan, Susan Ann; Jensvold, Mary Lee

Faculty Mentor(s): Mary Lee Jensvold, Primate Behavior

Oral Presentation, Session #39
2:40-3:00 p.m. in Room 201

Dialects encompass myriad elements of discourse, such as accents, rhythm, and intonation. These language features and more are noted in spoken and signed languages for humans (e.g., Purnell, Idsardi, & Baugh, 1999; Nespor & Sandler, 1999). Accents are commonly associated with sounds, but they also exist in visual languages, such as American Sign Language (ASL). Variations in signs enable us to see these differences from one individual to another. Children will talk and sign in childish forms that differ from adult pronunciations and handshapes. Pronunciations can alter the rhythm of speech in different dialects (e.g., Ghazali, Hamdi, & Barkat, 2002). Chimpanzees who were exposed to ASL provide an outlet to explore these elements in non-human communication. There are many examples of instances that chimpanzees modulate their signs in size, speed, and form.
New Synthesis of Novel Phosphor for LED Technology: \( \text{Sr}_3\text{Y}_2(\text{BO}_3)_4:\text{Eu} \) Using \( \text{Sr}_3\text{B}_2\text{O}_6:\text{Eu} \) and \( \text{SrB}_4\text{O}_7:\text{Eu} \) Precursors

Kilburn, Troy; Way, Zachary
Faculty Mentor(s): Anthony Diaz, Chemistry

Oral Presentation, Session #45
4:50-5:10 p.m. in Room 137B

Phosphors, used in plasma screens, medical imaging, and LED lighting, are materials that absorb energy and emit light. A promising activator for use in phosphors is divalent europium (Eu\(^{2+}\)). Depending on the host, this dopant can emit anywhere in the visible spectrum. However, in many host compounds, it is difficult to dope Eu\(^{2+}\) due to the stability of trivalent europium (Eu\(^{3+}\)). The literature indicates that the phosphor \( \text{SrB}_4\text{O}_7 \) readily incorporates Eu\(^{2+}\) into its structure, but that \( \text{Sr}_3\text{B}_2\text{O}_6 \) does not. Here, we show that we can increase the ratio of Eu\(^{2+}\) emission to Eu\(^{3+}\) emission in \( \text{Sr}_3\text{B}_2\text{O}_6:\text{Eu} \) by using \( \text{SrB}_4\text{O}_7:\text{Eu}^{2+} \) as a precursor. Divalent europium emission in \( \text{Sr}_3\text{Y}_2(\text{BO}_3)_4 \) has not been reported in the literature. To look for Eu\(^{2+}\) emission, we prepared samples of \( \text{Sr}_3\text{Y}_2(\text{BO}_3)_4 \) by using \( \text{Sr}_3\text{B}_2\text{O}_6 \) and \( \text{SrB}_4\text{O}_7 \) precursors. Samples of \( \text{SrB}_4\text{O}_7:\text{Eu} \) precursor were prepared using traditional methods: grinding stoichiometric amounts of strontium carbonate, boric acid, and europium oxide and firing in a reducing atmosphere. To make the \( \text{Sr}_3\text{B}_2\text{O}_6:\text{Eu} \) precursor, portions of the \( \text{SrB}_4\text{O}_7:\text{Eu}^{2+} \) precursor were ground with stoichiometric amounts of SrCO\(_3\), and samples were fired in a reducing atmosphere again. To transform the precursors, the \( \text{SrB}_4\text{O}_7 \) precursor was ground with stoichiometric amounts of yttrium oxide and strontium carbonate, and fired in a reduction furnace. \( \text{Sr}_3\text{B}_2\text{O}_6 \) precursor was ground with stoichiometric amounts of yttrium oxide and boric acid, and fired in a reduction furnace. We show that undoped samples of \( \text{Sr}_3\text{B}_2\text{O}_6 \) and \( \text{SrB}_4\text{O}_7 \) can be transformed phase-pure to \( \text{Sr}_3\text{Y}_2(\text{BO}_3)_4 \). This method may lead to previously unmade novel phosphors.

Creative Writing About Wind, Water and Fire

Klouse, Jamie; Hanberg, Claire; Tranchell, TJ; Epperson, Megan; Degon, Ash
Faculty Mentor(s): Lisa Norris, English

Oral Presentation, Session #1
8:00-9:20 p.m. in Room 135

The English Department Writing Specialization--inspired by the College of Arts and Humanities theme of “How Green is My Valley?” as well as the wildfires of Summer 2012 in the Kittitas Valley—will showcase students’ short creative pieces about wind, water, and fire. Faculty mentor Lisa Norris will introduce the presentation, and students will read their original work.

Rebellious Elegance

Knutz, Krissy

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

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

Purpose: The inspiration for my garment came from my older sister. Through my childhood and developmental years, I looked to her for guidance and support through nearly every aspect in my life. Rebellious Elegance represents a strong-willed, young-hearted, spontaneous woman who thrives on the adventure of living life to the fullest and conquering anything that stands in her way. This made me think of black swans. They stand out in the middle of a flock of white swans because of their natural born characteristics of being visually attractive, confident, and having a mind of their own. Process: Initially I started sketching designs that I have always imagined
my sister wearing. Being the older sister, I always felt that she was a bit more risqué and daring in her choices. Therefore, I created the dress with triangle shaped cutouts on the side panels of the princess seam dress. I knew that I wanted her dress to resemble a black swan and after researching photographs and artwork of black swans, gowns, and trend forecasts, I came up with a flouncy yet fitted silhouette. My sister’s personality is integrated into the overall design of the dress with its open side panels, low back, fitted bodice, and high leg slit. Techniques: The dress was created through the draping technique, which is a method of constructing a garment through arranging fabric on a mannequin using the natural hang or fall of to get a desired look. Once draped and trued, a pattern was made. Next I constructed a sample and fit the sample on my model. I made the necessary alterations to my pattern from the fitting and created the final fully lined garment. To finish off the design I added a satin ribbon detail around the neckline and back bodice edge. Materials: Exterior Fashion Fabric 50 percent Cotton, 48 percent Polyester and 2 percent Spandex Plain Weave, Lining 100 percent Acetate Plain Weave, Satin Ribbon, Polyester Invisible Zipper, Hook and Eye, Thread.

Weak Domestic or Fighting Female: Anime and the Portrayal of Women
Kobashigawa, Amy
Faculty Mentor(s): E. Rick Hutchins, English

Oral Presentation, Session #32
2:10-2:30 p.m. in Room 271

Japanese animation or “anime” started out as television shows and films for children, but anime has evolved to portray women using degrading and sexist images. Both anime series and films have continued to use those images without restraint and are presented to audiences of various ages, races, and genders. Evidence from peer-reviewed articles, books, and actual anime series and films displays that some anime creators are forcing female characters into traditional feminine roles where they must depend on men. In these roles, the characters must be motherly figures proficient at domestic work in order to be considered worthy love interests. In addition, anime portrays women with specific physical features that are intended to be more appealing and desirable by audiences. However, these portrayals create unrealistic images and ideals of women that are broadcasted to current and future generations of young women. Female audiences may go on watching anime without realizing the effects that these degrading stereotypes have upon them. If left unchecked, girls are encouraged to emulate the passive characteristics found in their favorite anime heroines. Audiences should increase their awareness of sexism in anime and other media if they are to come up with a possible answer to the widespread problem. The purpose of this paper is to inform an ever growing audience of the portrayal of women in anime productions in order for the audience to reach better understanding of the animated films of the Japanese culture.

Field Studies of the Reecer Creek Flood Plain Restoration Project, Ellensburg
Koch, Ceona; Strom, Ceana; Hale, Brinn; Jackson, Jennifer; Bottcher, Ben; Wood, Ben; Hurson, Eric; Stockdale, Benjamin; Merrill-Steskal, Gabe; Nickerson, Amber; Swan, Charlie; Orcutt, Alexa; Synder, Britney
Mentor(s): Jeff Hashimoto, Ellensburg High School

Poster Presentation Session #2, Poster #43-45
11:30 a.m.-2:00 p.m. in Ballroom C/D

Advanced Placement Environmental Studies classes at Ellensburg High School studied conditions around the Reecer Creek Floodplain Restoration project since the projects’ completion in Fall 2011. Student groups designed projects to measure conditions in the creek and riparian zone. Projects monitored vegetation, sediments, invertebrates, and channel morphology.
Creating an Arts Parade for the Ellensburg Downtown Association's Event, Buskers in the Burg

Kooser, Brian
Faculty Mentor(s): Gregg Schlanger, Art

Oral Presentation, Session #44
4:10-4:30 p.m. in Room 137A

The first weekend of October 2011 was the first annual Buskers in the Burg festival. Held in Ellensburg and organized by the Ellensburg Downtown Association, the event was designed to highlight street performers on various corners downtown, performing in a variety of different ways. One of those performers, Brian Kooser, wore a 12-foot tall robot puppet which proved to be popular at the poorly attended event. In preparing for the second annual event, Carolyn Honeycutt, with the Ellensburg Downtown Association, approached Brian about increasing his presence at the event and he began to organize and plan. Grants were written and earned through the Ellensburg Arts Commission and the College of Arts and Humanities at CWU. Workshops were organized with Monica Miller at Gallery One to open the creative process to the community. Children's costume workshops were devised through the Children's Activity Museum to include the youth and families in town. Various businesses donated materials and building space to help create a parade that would kick off the Buskers in the Burg event. Volunteers included local and visiting artists, community members, residents, Rodeo City Rollergirls, university faculty, and students who worked together with Kooser to create a mostly recycled, arts based spectacle of floats, dozens of giant puppets, costumed individuals, and musicians that flowed through downtown and drew hundreds of visitors to the community to enjoy a very successful new festival in its second year.

Assessment of Anthelminthic Activity of Plant Extracts on the Hookworm Ancylostoma ceylanicum

Koppinger, Kaitlin
Faculty Mentor(s): Blaise Dondji, Biological Sciences; Gil Belofsky, Chemistry

Oral Presentation, Session #19
12:40-1:00 p.m. in Room 137B

Approximately one billion people world-wide are infected with hookworms. Hookworm infection is also the leading cause of physical growth delay, intellectual growth delay, retardation, and poor outcomes for pregnant women and their newborns. We have assessed the anthelmintic effects of natural plant extracts on the hookworm Ancylostoma ceylanicum. Studies have shown that hookworms are developing resistance to current anthelminthic drugs. To test the plant extracts obtained from Dr. Belofsky's lab in the Chemistry Department, an in vitro assay was developed in Dr. Dondji's lab that allows adult hookworms to survive outside of a host. Syrian hamsters were used as laboratory invertebrate host. Twenty-one days post infection the animals were sacrificed and the worms manually collected from the small intestines. Following an overnight incubation of worms in a culture medium, the worms were later placed with the plant extracts and monitored for mortality every 24 hours. Currently, five extracts have been tested with two showing activity against hookworms, Dalea ornata and Oemlaria cerasiformis. After seventy-two hours, we recorded the worm survival rates of 11 percent for Dalea ornata and 9 percent for Oemlaria cerasiformis. In addition, Dalea ornata has been fractioned for the first time and showed a decrease of worm survival to 0 percent on Day 3. Plans are underway to test more fractions and for in vivo trials.
Demonstration of Style Variations Within French-Canadian Fiddling

Koran, Laurel

Faculty Mentor(s): Bret Smith, Music

Creative Expression Presentation, Session #16
9:30-9:50 a.m. in Ballroom A

My C. Farell Scholarship project was studying the development and practice of traditional French-Canadian fiddling and foot-percussion, and teaching it to others. I will show that talking about French-Canadian fiddling in a generalized sense is problematic due to its extensive variety. There are not only regional variations, but also variations influenced by the course of time and other factors. Learning these different styles showed me that the key areas of distinction are bowing technique, dance type/form (in many cases, this can be thought of in terms of Native versus Scottish influence on formal structure), and overall performance context of the music. I will use examples played in the style of well-known Québécois fiddlers André Brunet, Louis “Pitou” Boudreault, Aimé Gagnon, and Jules Verret, accompanied by French-Canadian foot-percussion.

Saudi Arabian Women: Hijab Covering

Kovalevich, Kristina

Faculty Mentor(s): Michael Mulcahy, Sociology

Des Moines Center - Poster Presentation, Poster #2

Saudi Arabia has long been considered one of the most conservative states with regard to the gender equality. In the past decade, however, some observers have pointed to changes in Saudi laws and policies regarding women’s rights. In 2000, Saudi Arabia approved the United Nations Convention on the Elimination of All Forms Discrimination against Women (CEDAW) treaty. Since ratification of the treaty, new laws and policies have been adopted, and new governance structures created, that may signal the beginning of a significant reform movement in Saudi society. How can we account for the nature and timing of these changes? Do they reflect a shift in dominant interpretation of Salafism, or in the dominance of Salafism vis-à-vis other Islamic sects? Or are the best understood as responses to developments in Saudi civil society and politics? Or do they signal an adaptation to an institutionalizing world culture that espouses gender equality and women’s rights? In this paper, we draw on power-resource theory, and world polity theory, to develop a framework for interpreting these changes. We draw on a range of data sources, including the annual reports of the UN Committee on the Elimination of Discrimination against Women, and various issues of the World Bank’s World Development Reports, and the Freedom House’s surveys of women’s rights in the Middle East and North Africa, to evaluate the relative merits of the alternative frameworks for understanding these changes.
Hogue Hall Material Science Water Distiller
Kuhlmann, Torrey
Faculty Mentor(s): Charles Pringle, Mechanical Engineering Technology
Poster Presentation Session #3, Creative Works, #3
2:15-4:45 p.m. in Ballroom C/D

The mechanical engineering technology department’s metallurgy course requires students to identify steel alloys as a part of the Jominy end quench test. Steel rods are polished and etched with acid before being magnified and comparing grain structures with known alloys. It is necessary to use distilled water to rinse off the acid solution, thus necessitating the design and construction of a lab distiller. A boiler tank, heat exchanger and cooling reservoir were designed for weight, volume and distilling capacity to meet the needs of the teaching professor. The distiller was designed to have a wet weight of 40 pounds maximum, take up a maximum table volume of two cubic feet while producing 12oz of distilled water per 50 minute class period. Testing the unit with a range of water reservoir temperatures produced changes in distilling efficiency. It was found that the reservoir with average-temperature tap water only successfully produced distilled water at 75 percent of its calculated output.

Performance Analysis of a Gamma Type Stirling Cycle Engine
LaPointe, Charlie
Faculty Mentor(s): Charles Pringle, Industrial & Engineering Technology
Poster Presentation Session #3, Creative Works, #12
11:30 a.m.-2:00 p.m. in Ballroom C/D

A gamma type Stirling cycle engine was purchased with the intent of discovering means to test the device for a power output under various conditions. In the previous quarter the test apparatus A failed due to a shortage of power necessary for the configuration to measure. Test apparatus B will require less power to produce reasonable data. After a configuration is confirmed the outlined testing procedures will be performed in order to better understand the thermodynamic characteristics of the engine. The following report will outline the successes and failures of the configuration design as well as corresponding results from tests performed at various temperature differentials. Also the measured power data will be compared to the ideal thermodynamic effects of the engine as well as the overall efficiency. In addition the report will also include the design criteria necessary to build a gamma-type engine.

Conducting Social Research on the Occupy Movement
Lee, Michael
Faculty Mentor(s): Pamela McMullin-Messier, Sociology; Nelson Pichardo, Sociology; Tracey Hoover, Sociology
Poster Presentation Session #3, Poster #53
2:15-4:45 p.m. in Ballroom C/D

For this project, I co-presented a paper at the 2013 Pacific Sociological Association conference with Professors Nelson Pichardo, Pamela McMullin-Messier and Tracey Hoover. In the course of this project I have learned firsthand how research is conducted in sociology, which includes applying for grants, conducting surveys and interview research, and applying for and receiving HSRC approval. The paper, “Internet Activism and the Mitigation of Costs and Risks: The OWS Movement in the Pacific Northwest,” is the culmination of a research project that I have been conducting with the aforementioned professors over the last two years in collecting web-based and survey research on new forms of social activism that have taken shape in the age of the Internet. New forms of communication and new forms of social networking have had a significant impact on the repertoire of social movements. However, the literature that has
focused on these new repertoires of internet-based activism has primarily focused on low-risk/cost forms of social movement behavior while only speculating on high-cost/risk forms of activism. In this paper we examined the means by which the Occupy movement that took shape in Seattle and Portland lowered or mitigated the high costs and risks associated with Occupy Wall Street activism.

The Catmobile Electric Drive System
Lee, Thomas; Padilla Jr., Jorge
Faculty Mentor(s): Charles Pringle, Mechanical Engineering Technology

Poster Presentation Session #3, Creative Works, #1
2:15-4:45 p.m. in Ballroom C/D

The CWU EV team participates in the Electrathon America racing series. In this series the objective is to go as far as one can in one hour using only two deep cell 12 volt batteries. However, the vehicle that the EV club competed with last year was based largely on a 25 year old cloud car design. To be a legitimate competitive team we must construct an electric car of our own design that can out-perform the previous one. For that to happen, a drive system had to be designed and built that can out accelerate and drive the new car at least as fast as the old one was capable of. The new car will be constructed on the previously fabricated frame and attached to the Catmobile body that has been sitting in Hogue untouched for several years. The drive system was largely fabricated in the metal shop from raw stock materials, as well as using a modern high efficiency motor. Using finite element analysis and bending stress analysis, a detachable sub-frame was designed to be both lightweight to preserve efficiency and maximized strength to resist shock. A velocity ratio analysis has been performed to determine the optimal drive ratio for a satisfactory top speed while providing ample torque multiplication to out accelerate the previous entry. The resulting drive system and related analyses are discussed.

Cheetah Girl
Lewis, Cassie
Faculty Mentor(s): Andrea Eklund, Family and Consumer Sciences

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

Purpose: For my collection, I went on a journey of self-discovery to find my personal design aesthetic. I reflected upon my personal fashion sense and drew inspiration from a recent fascination with swag pop music, which is a side genre of pop music utilizing upbeat drums, catchy melodies, top-40 hooks, and rap-style bridges. In my closet, I have a cheetah print trench coat, which I bought before starting college. I wore the coat so much that I became known as “cheetah girl.” This jacket and newfound persona were a major source of inspiration for this piece. Process: “Cheetah Girl” is my rendition of the little black dress with a fun and sexy twist. I wanted the piece to be very structured; I love structured dresses because they are classic and figure flattering. I used the pop of cheetah print in the waistband, bow, and cap sleeve to keep the piece fun and young. The low back adds subtle sex appeal while still maintaining a sense of modesty. I added the studs at the shoulders for an unexpected edge. I think the piece is a perfect mix between sexy, sweet, and edgy. It is the perfect look for a girl who wants to stand out in a crowd. Techniques: This piece was created using the draping technique. Draping is the smoothing, contouring, and the manipulation of fabric on a dress form to create a design and ultimately a pattern. From this pattern, I constructed a sample garment using sheets purchased from the Goodwill. After the sample was created, I fit it to my model and made major changes to the pattern to assure proper fit. Once the pattern was updated, I then started on the fully lined final garment. Materials: Black woven stretch satin, black woven lining, cotton blend cheetah print, invisible zipper, studs, and thread.
Undergraduate Students’ Self-Assessment of Study Skills: A Preliminary Analysis

*Little, Suzanne; Petersen, Carolyn*

*Faculty Mentor(s): Suzanne Little, Psychology*

Poster Presentation Session #3, Poster #45
2:15-4:45 p.m. in Ballroom C/D

The purpose of the current study was to investigate study habits of undergraduate students enrolled in a regional university in the Pacific Northwest. Previous research has demonstrated that a better understanding of the study habits of undergraduate students may assist in developing programs to support student success and in increasing retention and completion rates of students. Participants included more than 550 undergraduate students attending a regional university in Washington State. Preliminary analyses indicated that more than 70 percent of participants identified as female, and more than 45 percent of participants were classified as freshmen. More than half of participants reported living on-campus, and nearly 80 percent of participants identify as Caucasian. Further analyses will be presented including the potential impacts of student employment and peer interactions on study skills, and student use of on-campus resources such as writing and math centers and computer labs will be discussed. Additionally, suggestions for increasing student study skills and success will be discussed.

Vortex Tube

*Lizotte, Noah*

*Faculty Mentor(s): Charles Pringle, Mechanical Engineering Technology*

Poster Presentation Session #3, Creative Works, #6
2:15-4:45 p.m. in Ballroom C/D

The purpose of this project is to improve the Hilsch-Ranque Vortex Tube by designing the system to achieve hotter and colder temperature air from a portable air source. In order to complete this task, research was conducted to ensure a complete understanding of the system. After which, using current materials that can be purchased at a store, a new and improved working design could be made. Colder and hotter temperatures can be obtained by the newly developed spiral chamber. After the design is finished and the system is constructed, testing will commence in order to determine the air temperatures the system will obtain. Furthermore, calculations will be made to determine the entropy and enthalpy of the vortex tube. Overall, this project will achieve a great learning experience for this engineer and will fulfill the senior project requirements for the mechanical engineering program at Central Washington University.

Golden Horn Batholith, Washington: Determining Why Sodic Amphiboles Occur in a Peraluminous Composition

*Lochridge, William*

*Faculty Mentor(s): Chris Mattinson, Geological Sciences; Wendy Bohrson, Geological Sciences; Aaron Mayfield, Geological Sciences*

Poster Presentation Session #1, Poster #63
8:20-10:50 a.m. in Ballroom C/D

The Golden Horn batholith is a zoned granitic pluton with a shallow emplacement of the magma chamber in the upper crust, but little is known about the geochemistry and petrography of the entire batholith. Sodic amphiboles usually occur in peralkaline melts but do occur in the peraluminous Golden Horn batholith. Whole rock geochemistry analyses of six alkali granite and granodiorite rocks using XRF (x-ray fluorescence) indicate negative trends for the major oxides versus SiO₂ except for K₂O. Samples from the top of the batholith that have very low concentrations of CaO are indicative of plagioclase fractionation while a spatially nearby sample does not indicate such fractionation meaning that the batholith is not homogeneous in composition. Moderate Al/(Ca+Na+K) ratios indicate peraluminous compositions and FeO̅/
(FeO$_{\text{total}}$+MgO) ratios indicate magnesian compositions trending to ferroan compositions from the bottom to the top of the batholith. Petrographic analyses of fourteen thin sections show that samples from the top of the batholith contain sodic amphiboles (arfvedsonite and riebeckite) with little to no biotite. Hornblende and biotite abundances increase towards the bottom of the batholith, consistent with a more mafic composition. Late crystallizing accessory minerals such as apatite and zircon are seen as inclusions in quartz and feldspars. Quartz is also late crystallizing and seen as intergrowths in feldspars and surrounding mafic minerals. Mantling of albite around potassium feldspar is also seen throughout the batholith indicative of magma mixing event(s). The presence of sodic amphiboles in peraluminous compositions reflects the plagioclase fractionation that occurred in the batholith.

**Antimicrobial Effects of Hops**

**Lopez, Wendy; Foss, Eric**

*Faculty Mentor(s): Steve Wagner, Biological Sciences*

**Poster Presentation Session #1, Poster #29**

8:20-10:50 a.m. in Ballroom C/D

Hops are a main ingredient used in brewing to create and enhance different styles of beer and are the source of hop bitterness acids which include alpha and beta acids. It has been hypothesized that hops reduce microbial growth in beer and contribute to stability of the product. There have been few studies investigating variation of antimicrobial activity in different hop varieties and their effectiveness at reducing growth of different bacterial contaminants. Therefore, we investigated antimicrobial activity of six varieties of hops, with different alpha acid ratings, on growth inhibition of three bacterial species. Discs were soaked in prepared hop extracts and placed on a lawn of bacterial growth in a petri dish. The diameter of growth inhibition was measured after 24 hours. The results indicated significant differences in inhibition among the varieties (ANOVA p < 0.0001) and in among bacterial species (ANOVA p< 0.0001). There was a trend for higher alpha acid hops decreasing microbial growth.

**Ontogenetic Variation in the Thermal Biology of Northern Pacific Rattlesnakes**

**Loughran, Caleb**

*Faculty Mentor(s): Dan Beck, Biological Sciences*

**Oral Presentation, Session #3**

8:40-9:00 a.m. in Room 137B

The strong size discrepancy between adults and neonates within many species of ectotherms results in drastically different rates of heating and cooling. For squamate reptiles, this may have important consequences for how individuals regulate their body temperature in nature. We hypothesized that since neonate snakes can heat and cool faster than adult snakes they would have more variation in body temperatures and may therefore show different thermal preferences than adult snakes. To test this hypothesis, we investigated thermal preferences of neonate and adult Northern Pacific Rattlesnakes in a laboratory thermal gradient at temperatures ranging from 10°C to 35°C. Hide boxes were placed (at intervals of 5°C) throughout the gradient to offer snakes refugia at a range of temperatures. Snake body temperatures were recorded throughout the day using an infrared thermometer and behaviors associated with recorded body temperatures were also recorded. Neonate snakes had a broader range of body temperatures than did adults and were also active more often than adult snakes, using a wider range of locations throughout the gradient. These differences suggest that the thermal biology of neonate rattlesnakes differs from that of adults, which appears to translate into differences in behavior and microhabitat use. The ecological implications for these differences are important for each age class, as they may result in differences in activity patterns, movements, and habitat use. Field studies to corroborate these findings are currently underway.
Supplier selection is of utmost importance when sourcing goods locally and globally. This is especially true for smaller companies with limited resources and less financial flexibility. Selecting a reliable supplier can be difficult for those without internal knowledge of a potential supplier’s organization. This research paper focuses on a simple and effective approach for outsiders to calculate and quantify the risks associated with new suppliers, without needing to gather complicated internal information or enlist the services of a consulting firm. The primary purpose of our research was to provide users with a baseline in which to assist in decision making when selecting suppliers, taking into account financial, country, and operational risks. Research was conducted using numerous academic databases, periodicals, textbooks, and internet resources. An equation has been constructed with various data inputs to arrive at a simple quantitative measurement of supplier quality/reliability; the equation’s benefits are its time efficiency and zero cost to the user. The equation was tested on several large companies who are top-performers in their industry, with results confirming our hypothesis. Supplier risks are weighed before selection is made.

Wildfires are historically common in the ponderosa pine forests of the eastern Cascade Mountains and are critical for maintaining forest health. These forests have been dramatically modified for approximately the past 100 years by human activities such as fire suppression. The effects of this were not noticed until recently, but in the last several decades it has become evident that these forests are experiencing larger, more devastating fire events, such as the Taylor Bridge and Table Mountain fires. The purpose of this study was to reconstruct the recent fire history of Green Lake, located in Okanogan County, Washington, approximately five miles northwest of the town of Omak, by analyzing macroscopic charcoal in a lake sediment core from the site. The core was analyzed at contiguous one centimeter intervals for the past 1,000 years, and only charcoal particles greater than 125 microns were identified and counted, as they indicate local fires. Charcoal peaks were used for determining past changes in fire frequency. The charcoal record from the past century has been compared with that of the previous 900 years. Preliminary results show fluctuations of charcoal in the past century but a general trend to larger fire events; whereas the (past 400 years) shows smaller fire events. This study furthers our understanding of fire activity in such landscapes.
National School Lunch Program Lunches Are Healthier Than Lunches Brought From Home  
Macklin, Atlanta; Schroder, Garen; McCulley, Megan  
Faculty Mentor(s): Tracee Watkins, Nutrition, Exercise & Health Science

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

The purpose of this investigation was to identify nutritional differences in lunches served in school as part of the National School Lunch Program (NSLP) and lunches brought from home (LBFH). Data from a previous study, which analyzed the nutritional content of 1085 lunches, was used to identify these differences. Chi-square tests indicated a statistically significant (p<.05) difference in calories from protein, total fat, calcium, iron, and vitamins A and C. Overall, NSLP lunches met the School Meal Initiative (SMI) standards more frequently than LBFH. NSLP lunches provided significantly higher amounts of protein, calcium, iron, and Vitamins A and C than LBFH, while LBFH provided more calories and total fat than NSLP lunches. These results indicate NSLP lunches are a more nutritious option for most students. Also, parents of children who eat LBFH may benefit from information about foods that contain nutrients that are consistently missing from their children’s lunches.

Feelings About the Farm: In-depth Interviews With Local Business Owners  
Macumber, Jamie; Hodgman, Jessica; Norgard, Erika; Waskom, Brittany  
Faculty Mentor(s): Mark Pritchard, Management

Poster Presentation Session #3, Poster #36  
2:15-4:45 p.m. in Ballroom C/D

The purpose of this study was to gain some insight into how local business owners felt about Wild Horse Wind Farm (WH), and green energy in general. Feedback from depth interviews with 16 local business owners help researchers explore how to improve the image and experience at WH. Sixty-nine percent of respondents were familiar with/had visited the wind farm. Puget Sound Energy (PSE), the owner of WH, was also viewed favorably by the local business community.

The Emphasis of Social Justice in Undergraduate Public Health Programs  
Marks, Jaron  
Faculty Mentor(s): Rebecca Pearson, Physical Education, School & Public Health

Poster Presentation Session #2, Poster #17  
11:30 a.m.-2:00 p.m. in Ballroom C/D

The purpose of this study was to analyze the emphasis of social justice in undergraduate public health program websites. One of the focuses of public health is eliminating health disparities. Social justice is one of the ways in which public health addresses health disparities by focusing on changing existing infrastructures of inequality. We used the Association of Schools of Public Health (ASPH) website to find undergraduate public health programs to examine. Key words in different sections of university websites were used as a way of measuring a schools emphasis on social justice. All schools had several of the key words, but only 4 of the 13 universities explicitly mention social justice on their websites. Further research should be done to gauge professors and students’ knowledge, attitudes, and beliefs around social justice and its importance.
Family Dinners, Eating Regulation, and Dietary Intake
Marquardt, Katrina
Faculty Mentor(s): Sarah Feeney, Family and Consumer Sciences

Poster Presentation Session #2, Poster #16
11:30 a.m.-2:00 p.m. in Ballroom C/D

The goal of this study was to find associations between family dinners and their influence on college students’ current dietary intake. Dietary intake is in regards to the Daily Recommended Allowance of specific foods. I also was looking to see if eating regulation behaviors are associated with family dinners and dietary intake. Eating regulation reflects motivation styles. I focused primarily on college students because I wanted to see if past family life influences one’s choices in college later on. Nutrition and eating regulation patterns are important for college students to comprehend. Literature supports that using results of studies regarding college students and eating behaviors can be used for interventions to change bad habits, preventing heart disease, obesity, diabetes, etc. Family dinners were investigated to show how family life does influence one’s eating habits. This also may suggest how good habits are learned in the home and can be applied to adult life. Studies support how family dinners are associated with overall good health and well-being. Therefore, eating regulations will be studied to see if family dinners affect how one makes decisions with eating habits. Two of the scales were permitted for me to use by the authors, the Regulation of Eating Behavior (EBS) scale, for eating regulation styles, and the Food Frequency Questionnaire. I created the family dinner scale. I collected my data from participants who were at least 18 years old. Taking my questionnaire, they gave their consent. I distributed my survey via social networking and the student intranet to receive responses.

New Molecular Scaffolds for Frustrated Lewis Pair Systems
Marrese, Anthony; Maverick, Rebecca
Faculty Mentor(s): Eric Abbey, Chemistry

Poster Presentation Session #1, Poster #42
8:20-10:50 a.m. in Ballroom C/D

The goal of this research is to synthesize new bulky Lewis acid and base molecules and incorporate them into frustrated Lewis pair systems (FLPs). FLP systems consist of a bulky Lewis acid combined with a bulky Lewis base. Due to steric hindrance, classical bonding interactions cannot occur. Instead an energy potential is created between the frustrated molecules which is capable of activating unreactive small molecules. FLPs have received a great deal of attention in recent years for their ability to activate small molecules like carbon dioxide and perform the first examples of metal-free catalytic hydrogenation. By creating a Lewis acidic borane based on a carborane, we aim to demonstrate that carboranes are suitable structural components for construction of FLPs. Carboranes have a similar size to the aryl rings used in existing FLPs, but project in three dimensions, making them bulkier and possibly superior to phenyl rings as pendant groups for FLP acids. Once produced, the new boranes will be evaluated on their ability to participate in FLP chemistry, and on their potential in catalyzing metal-free hydrogenation and activation of small molecules. If the acid shows FLP activity a new bulky Lewis base will then be synthesized by linking a phosphine group to a carborane cage similar to the acid cage. Once produced, the phosphine will be combined with the Lewis acidic borane and evaluated on its potential in hydrogen activation. These new compounds may have potential applications in catalysis, green chemistry, carbon dioxide capture and hydrogen storage.
Experimental Alteration of DNA Methylation Affects the Phenotypic Plasticity of Ecologically Relevant Traits in *Arabidopsis thaliana*

**Marrese, Anthony**  
*Faculty Mentor(s): Jennifer Dechaine, Biological Science*

Oral Presentation, Session #28  
1:50-2:10 p.m. in Room 137B

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, but 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 eight 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). Our preliminary results indicate that demethylated plants do not respond in the predicted manner to shade treatments, and that demethylation affects lines differently. These results suggest that DNA methylation is an important aspect of plant phenotypic plasticity to shade, and that this response is genetically variable. This study is one of the first to demonstrate that DNA methylation affects phenotypic plasticity to ecologically relevant environmental conditions, and lends insight into the genetic control of phenotypic plasticity in natural plant populations.

Northern Lights  
**Martin, Caitlin**  
*Faculty Mentor(s): Andrea Eklund, Family and Consumer Sciences*

Poster Presentation Session #2, Creative Works, #54  
11:30 a.m.-2:00 p.m. in Ballroom C/D

Purpose: My garment is geared towards the full-figured woman. Whether petite or plus size I wanted to create a garment for women with true curves. Through personal experience, I have found that many trendy clothes never fit my curves quite right. It’s frustrating seeing a trend that speaks to you, going in and trying it on, and having it not fit your body. There is a real lack of fashionable clothing for full-figured women, and I wanted to create a garment that helped fill that void. Process: During the development stage I started with my fabric selection, specifically I have been drawn to the color cobalt blue and decided to feature it in this design. I saw the fabric and it reminded me of the galaxy with the gold sparkle representing the stars with the aurora borealis mixed in. I wanted to make a garment that was a little edgy as well as ethereal to capture the essence of outer space. Via research I incorporated the current trends of the Peter Pan collar, stud trim, and flare skirt. Techniques: The dress was created through draping, which is manipulating fabric on a dress form to create patterns. The draping was then trued to create the final paper patterns. A sample was created, fitted on my model and changes were made to the pattern. When constructing the final fully lined garment I used a straight stitch on all the seams and added boning in the bodice for structure, as well as a denim inner lining for further bust support. Materials: 100 percent cotton exterior, 100 percent polyester lining, bronze stud trim, invisible zipper, thread.
Salmon have been culturally, economically, and environmentally important to the Pacific Northwest throughout history and improving their passage survival through the Federal Columbia River Power System (FCRPS) continues to be a high priority. The FCRPS is a series of hydropower projects on the Columbia and lower Snake rivers that collectively provide about 30% of the electricity used in the Pacific Northwest and provide power to other states. The United States Army Corps of Engineers has conducted survival studies to evaluate passage behavior, timing, and survival of juvenile salmonids through the FCRPS. An important aspect of these studies has been the evaluation of fish condition (FC). Some agencies assess FC using numerous external observations but do not link them to internal condition or survival. Data collected during the 2012 Lower Columbia River survival study on juvenile Chinook salmon (Oncorhynchus tshawytscha) were analyzed for fin erosion and erythema patterns. The role of hatcheries on FC was assessed by comparing fin condition between adipose-clipped and adipose-intact salmon. Preliminary analyses indicated that fin erosion severity significantly increased with fork length, and was more severe in adipose-clipped salmon. Fin erythema rarely occurred, but overall, was 1.78 times more prevalent in adipose-clipped fish. Ultimately, fin condition plays a role in a juvenile salmon's ability to migrate, avoid predators, and maneuver through and past obstacles. These results will help to assist fishery managers to determine potential causes for fin condition degradation, as well as the impact of fin condition on survival.

Zoo visitors can be stressful to zoo residents. Understanding how visitors’ behavior impacts zoo residents is imperative to the overall well being of captive populations. Video data of zoo visitors at a chimpanzee exhibit were collected at the Zoo of Northwest Florida (ZNWF) in the summer of 2009. There were three conditions presented at the exhibit to educate visitors on chimpanzee behaviors: with a trained docent present, with a graphic sign explaining species typical behaviors, and with a control condition. We hypothesized that educating the visitors either orally or with a sign would change their behavior. Visitors spent longer at the exhibit in the docent condition than in the sign condition. Visitors were significantly more active in the sign condition.
years until the present has helped make activism and protest a central part of Burmese monastic life. This paper looks at how the combinations of religious traditions and political struggles have led Theravada Buddhist monks in a practice of socially engaged Buddhism. It also explores how these protests have been motivated by a military disturbance in the symbiotic relationship between monks and the laity. Interviews with socially engaged monks as well as records of major demonstrations are a couple of the methods used to help reveal patterns that indicate reason for involvement. Ultimately the junta’s suppressive rule has urged monks to use their understanding of compassion and loving kindness to support their lay community and become active in protest.

Cordage From the Rosa Rockshelter, Yakima River Canyon, Washington State

Matthes, Whitney
Faculty Mentor(s): Steve Hackenberger, Anthropology
Poster Presentation Session #1, Poster #6
8:20-10:50 a.m. in Ballroom C/D

William Smith, CWU professor of anthropology, excavated Rosa Rockshelter in 1971 and recovered a unique assemblage of preserved plant remains from a single storage feature. These materials include over 30 fragments of cordage and basketry that date to the Cayuse Phase (ca. 2000 years ago). Fragments of two-ply S twist cordage of Dogbane (Indian Hemp) dominate the assemblage and several of these items are found stitched in tule mat. Several fragments of two-ply Z twist cedar cordage, found woven with cedar plats, probably formed the rims of one or more open-weave basket. Examples of grass, sage bark, and hair cordage are also represented. The type and frequency of cordage fragments are compared to other larger assemblages from dry caves in the Columbia River Basin to contribute information on the material culture and technological abilities of prehistoric inhabitants from a unique time and place on the Columbia Plateau.

Does Western Spruce Budworm Frass Directly Affect Stream Food Webs?

Matthew, Brianna
Faculty Mentor(s): Clay Arango, Environmental Studies
Poster Presentation Session #3, Poster #19
2:15-4:45 p.m. in Ballroom C/D

The Western spruce budworm is the most destructive defoliator of coniferous forests in western North America, and the Teanaway region of central Washington currently has a heavy outbreak of budworms. In my prior research on samples collected in July and August 2011, I found that spruce budworm frass (solid excrement) has nitrogen content 3.5 times greater than litterfall, but these samples just measured deposition onto the forest floor. Some of this frass could fall directly in the low-nutrient streams that drain this region and that support endangered fish species such as bull trout and steelhead. Organic matter input to streams supports higher trophic levels such as insects and fish, so nitrogen-rich budworm frass that falls directly into stream channels could alter the stream food web and/or affect stream nutrient concentrations. It is unknown how much budworm frass falls directly into streams. In summer 2013, I will measure direct inputs of spruce budworm frass into three stream systems in the North Fork Teanaway River, and compare those sites to a control site with minimal budworm influence in Taneum Canyon. This will allow me to quantify the direct contribution of spruce budworm frass to stream systems in this region. As part of this summer research I will also evaluate the influence of budworm frass on stream nutrient concentrations. My work will contribute to a larger pool of data that will quantify the ecosystem impact of the spruce budworm outbreak in the Teanaway region.
Model-T Planetary Transmission Fixture
McConkey, Scott
Faculty Mentor(s): Charles Pringle, Industrial & Engineering Technology

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

Planetary transmissions are important mechanical devices used in modern automobiles. They are composed of sun gears and planet gears that can be combined in different ratios to achieve different speeds. Central Washington University has a Ford Model-T planetary transmission with no effective way to demonstrate its function to students. This project explores the design and manufacture of a suitable fixture to effectively show the transmission as it operates to students. This was accomplished though shear and bending stress analysis of the frame members. Stress analysis in drive shafts and axles used in the fixture was also performed, along with a gear analysis of the transmission. This project also shows the manufacturing methods used during construction such as welding and machining. The analysis resulted in correct sizing and placement of frame members, sizing and location of shafts, and gear ratio values.

McCoy, Amy
Faculty Mentor(s): Michael Pease, Geography; Craig Revels, Geography

Poster Presentation Session #3, Poster #26
2:15-4:45 p.m. in Ballroom C/D

The Republic of South Africa’s establishment of the Working for Water program in 1995 brought with it substantial international attention. After the abolishment of apartheid in 1994, the Republic of South Africa still faced endemic social inequalities, and a large strata of the nation’s population relied on primary economic activities requiring adequate freshwater supplies. Created as a means to simultaneously address water scarcity, invasive species, and unemployment levels estimated up to 51 percent, the Working for Water program, which employs citizens to remove water-intensive invasive plants, has simultaneously received sharp criticisms and substantial accolades. This research utilizes a mixed-methods approach, integrating qualitative and quantitative research methodologies to identify the principle successes, limitations, and socio-economic impacts of the program. While results indicate substantial success in increasing water availability, at least temporarily, the more illuminating outputs are less tangible: identifying how a nation deals with the harsh realities of centuries of colonialism and social injustice while attempting to restore the country and its environment.

Recombinant PFR-like Proteins Cloned From Trypanosoma cruzi
McDonald, Jay
Faculty Mentor(s): Gabrielle Stryker, Biological Sciences

Poster Presentation Session #1, Poster #34
8:20-10:50 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, which is transmitted by the reduviid, or kissing bug, a large blood-sucking insect that often lives in rural 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 is 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 will be harvested, purified, and injected into mice. The mouse immune system will recognize the foreign proteins and respond by producing PFR-5 and PFR-6 antibodies. These antibodies will be harvested and used to determine the subcellular location of the proteins in *T. cruzi*, using fluorescent markers.

**Read Trimming of Chloroplast Genome Sequences May Lead to Better Quality Assemblies**

**McFadden, Angela**

*Faculty Mentor(s): Linda Raubeson, Biological Sciences*

Oral Presentation, Session #28

1:10-1:30 p.m. in Room 137B

Obtaining the DNA sequence of an entire genome requires the computer assembly of many small segments of DNA sequence data called reads. These reads are pieced together by their overlapping information. For example, if one read was ACGTTTCGAT and another was TCGATCAGTG, they would be ‘overlapped’ because the last five nucleotides of the first sequence and the first five nucleotides of the second sequence are the same. In reality, the reads are longer (80-800 nucleotides in length depending on the method) and there can be millions of them. Because all genomes contain some repeated sequences and because the reads can include sequencing errors, reads can be misassembled by assembly programs. These misassemblies can be hard to detect, and when present lead to a misunderstanding of gene order in the genome. We are investigating the effect of trimming reads by length or by quality, prior to the assembly step, to see if removal of lower quality sequence data improves assembly quality. We are using 80bp read sequence data generated for the chloroplast genomes in a family of conifers. So far, we have trimmed by length and compared untrimmed reads with reads with 70 and 60bp. For each of six species tested, assemblies using the most extensively trimmed reads produce the best outcomes.

**Utilizing Summer Programs to Promote Wellness Knowledge through Physical Education and Health Classes in Micronesia**

**McFadden, Kevin; Johnson, Evan; Avila, Joe**

*Faculty Mentor(s): Stefan Ward, Physical Education, School & Public Health; Mark Perez, Physical Education, School & Public Health*

Oral Presentation, Session #47

4:50-5:10 p.m. in Room 271

Increasing the knowledge of children and adolescents is imperative to empower youth to make healthy lifestyle choices (Aermican Alliance for Health, Physical Education, Recreation and Dance, 1999). This is particularly true in the Micronesian islands where obesity, low fitness levels, tobacco use, poor nutrition choices, and bullying and suicide rates are often higher than United States’ counterparts (Youth Risk Behavior Surveillance System, 2007; 2009). This study explored the impact of a wellness-based summer program planned and implemented by college-level education students. Specifically, is this type of program successful in increasing knowledge in the areas of fitness, nutrition, tobacco, bullying, and suicide prevention? Eighty three students ages 7-15 were given a 25-question, multiple choice test prior to and after attending a two-week session for five hours per day. Data were analyzed using dependent t-tests in SPSS to determine whether mean scores were statistically different from pre-test to post-test in the five subscales. Results indicated there were positive differences in knowledge related to the tobacco and fitness but not in the other sub-scales. Item design, teacher experience level, and prior participant knowledge may have contributed to mixed findings.
Torch
McGehee, Sean; Gahley, Skyler
Faculty Mentor(s): Michael Ogden, Film and Video Studies
Creative Expression Presentation, Session #25
12:40-1:00 p.m. in Theatre

“In the summer of ‘84, two lovers discover that death waits for no one.” Having only 48 hours to create a film, as well as drawing “horror” as our genre, we realized that it would be fairly easy to fall into the category of overdone and cliché. It’s very easy to fill the stereotype of how a film should be simply by mimicking what others have done before. Breaking this isn’t something I believe is done very easily at a college level, let alone within a 48 hour time span. So we made it our goal from the very beginning to break this stereotype, and we did just that. Torch brings you into the world of the 80s: through character development, costumes and props, scene locations, and even the soundtrack. On top of all this, we break the format of classic 80s slasher films and create a suspenseful ride that leaves you wondering what exactly happens in the end. Created for the 48 Hour Film Slam, February 2013. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)

Residential Stormwater and the Contamination of Puget Sound
McLeod, Kirsten
Faculty Mentor(s): Rex Wirth, Political Science
Oral Presentation, Session #27
1:50-2:10 p.m. in Room 137A

This study is an examination of the effects of contaminants produced by under-regulated urbanization on ecosystems that support critical wildlife communities and the public health in the Puget Sound basin of Washington State. Residential stormwater runoff is the number one source of pollution in Puget Sound. My research examines the threat posed by endocrine-disrupting chemicals (EDCs) in the Puget Sound basin. Every time it rains, millions of pollutants are washed off streets and other impervious surfaces and into our waterways. Developed areas send contaminated stormwater into streams, rivers, and groundwater that all empty into Puget Sound. There are numerous toxins of concern, however, the largest class of chemicals of greatest concern in Puget Sound is endocrine-disrupting chemicals (EDCs). EDCs encompass a variety of chemical classes that are pervasive in our everyday lives. EDCs are of deep concern because they are found everywhere: in beauty products, pesticides, pharmaceutical drugs and more. EDCs have been shown to significantly affect the endocrine system of organisms that ingest them, causing numerous adverse side effects including (but not limited to) genetic mutations, birth defects, and reproductive difficulties. The number of known endocrine disruptors that enter into the Puget Sound can be significantly reduced with new non-point source pollution regulatory controls. Current regulations to combat stormwater runoff in the Puget Sound are inadequate. At the end of my analysis, I make a policy recommendation and propose policy alternatives that implement various statutes, and application and enforcement of both the precautionary principle and product bans on the most prevalent and studied EDCs found in Puget Sound.
Store Brands: Friend or Foe?
*Meberg, Kari; McLeod, Mark; May, Patrick*
*Faculty Mentor(s): Kun Liao, Finance & OSC*

Lynnwood Center - Poster Presentation, Poster #7

The purpose of this project is to study the prevalence and success of store brands in relation to national brand products from both the supplier and retailer’s perspectives. We seek to learn the benefits, costs, limitations, and risks associated with integration of suppliers with retailers across a variety of product lines through research of scholarly articles, books, business journals, and financial statements.

The Solar Solution
*Merrill-Steskal, Gabe; Bottcher, Ben; Alkire, Trevor; Whitaker, Scott; Stockdale, Benjamin*
*Mentor(s): Jeff Hashimoto, Ellensburg High School*

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

One problem with solar energy is that the sun is only out during the day and cannot be used during the night for applications such as charging electric cars. We designed and built a model of a system for a house that works entirely off the grid using solar energy to run pumped hydro that stores energy that can be used at night. The solar panels will pump water uphill in the day when the sun is out, and the water can then be let back down when electricity from the solar panels is not sufficient (when it is cloudy or dark out). We also calculated the elevation rise and tank volume needed to scale up this technology for an actual home.

The Effects of 2-Deoxy-D-Glucose and Different *E. coli* Diets on *C. elegans* Mitochondrial Metabolism
*Messerman, Hayden*
*Faculty Mentor(s): Carin Thomas, Chemistry; Lucinda Carnell, Biological Sciences*

Poster Presentation Session #1, Poster #37
8:20-10:50 a.m. in Ballroom C/D

We have investigated the effects of different bacterial diets on *C. elegans* as a model for metabolic studies in obesity and diabetes research. Our goal was to understand *C. elegans*’ base line metabolism by measuring ATP content under different dietary conditions. This study examined three strains of *E. coli* that can be used as food for *C. elegans*. The *E. coli* strains OP50 and HB101 are used as regular diets and HT115, which is a derivative of HB101. It has previously been shown that OP50 has higher fatty acid composition and HB101 has higher carbohydrate composition. The ATP content in OP50 fed worms was significantly lower than the HB101 and HT115 fed worms in both wild-type and nnt-1 strains of *C. elegans*. The nnt-1 strain is deficient in a mitochondrial protein, nicotinamide nucleotide transhydrogenase (NNT-1), associated with type-2 diabetes. In addition to these baseline studies, 2-deoxy-D-glucose was used as an inhibitor of glycolysis as a method for forcing fat metabolism in *C. elegans*. This dietary model could then be used to investigate the effects of increased fat metabolism on mitochondrial function in *C. elegans*. The baseline results were reversed in the 2-deoxy-D-glucose experiments suggesting that the worms were relying on fat metabolism. Future studies are planned to measure mitochondrial membrane potential, hydrogen peroxide production, and respiration to further understand the effects of increased fat metabolism on the mitochondria.
Expression and Purification of Neocortical Arealization Factors

Miller, Alonna; Meyers, Nick

Faculty Mentor(s): Todd Kroll, Chemistry

Poster Presentation Session #1, Poster #41
8:20-10:50 a.m. in Ballroom C/D

The neocortex is a mammalian-specific division of the cerebral cortex involved in higher cognitive functions including conscious thoughts and actions. The neocortex is divided into discrete functional areas that process specific types of visual, auditory, motor, and somatosensory (touch) information. The embryonic process by which these different neocortical areas take on their functional properties is called arealization. This process is mediated by a specific class of proteins called transcription factors; proteins that determine when genes are turned on or off. In order to reveal how one of these transcription factors, Emx2, mediates neocortical arealization, we performed a genetic screen to identify proteins that are potentially interacting with Emx2. The next phase of this research will be to use a biochemical experiment, co-immunoprecipitation, to confirm these protein-protein interactions in a much more stringent manner. The first step in conducting a co-immunoprecipitation is the generation and purification of the interacting proteins. The DNA sequences coding for each of the interacting proteins have been cloned into bacterial expression plasmids that will generate our proteins with additional protein tags that will be used for purification. We have successfully used these plasmids to program E. coli to produce high levels of the desired proteins. Our work is currently focused on utilizing the “tags” on our recombinant proteins for affinity purification, which is the last step required before they can be used for in vitro co-immunoprecipitation assays.

The Effects of Virtual Actions on Real World Behaviors

Miller, Brian; Boozer, Kelly

Faculty Mentor(s): Kara Gabriel, Psychology; Terry DeVietti, Psychology; Susan Lonborg, Psychology

Poster Presentation Session #3, Poster #48
2:15-4:45 p.m. in Ballroom C/D

The purpose of the current study was to investigate the effect of virtual avatars on health behaviors in the real world. Previous research indicates that actions performed by a virtual avatar can result in behavioral changes in the person watching the avatar. In the current study, participants were undergraduate psychology students at Central Washington University. Participants were randomly assigned to one of four experimental groups: 1) creating an avatar of themselves and exercising with it; 2) creating an avatar of themselves and not exercising with it; 3) using a control avatar and exercising with it; or 4) using a control avatar and not exercising with it. It was hypothesized that participants who had watched an avatar with an appearance similar to them exercise in a virtual reality would be inclined to engage in more healthy behaviors in the real world, such as eating less candy and planning to exercise more when compared to participants in the other three groups. In addition to measures of their inclination to healthy behaviors immediately after the manipulation, participants were asked about their agreement that the avatar looked like them (i.e., avatar copresence), their anxiety in working out (i.e., social physique anxiety), their typical reasons for exercising, and their activity levels 48-hours after the experimental manipulation. The results of this study should have implications for developing low-cost, online treatments or activities that can improve health-related behaviors.
Protein-Protein Interactions in the Embryonic Mouse Neocortex: Emx2 and Binding Partners

*Miller, Cierra*

*Faculty Mentor(s): Todd Kroll, Chemistry*

Oral Presentation, Session #37
2:40-3:00 p.m. in Room 137B

The mammalian neocortex, the brain structure responsible for consciousness, is divided into discrete functional areas that are marked by distinct boundaries whose positions are assigned through a process called neocortical arealization. The process of neocortical arealization is primarily mediated by the graded production of transcription factors (proteins that turn genes on and off). One of the proteins involved in this process is Emx2, a transcription factor that is expressed, or made, in a gradient along the anterior-posterior axis of the neocortex and is partially responsible for determining the positions of these areal boundaries. In order to determine how the varying levels of Emx2 act to assign areas to the neocortex at the molecular level, we have begun to search for proteins that interact with Emx2. This work has led to the identification of the proteins QKI-7 and Cnot6l as binding partners of Emx2 and we are currently working to confirm these interactions. To these ends, we have performed several pair-wise yeast two-hybrid experiments and have begun preparing to initiate more stringent additional experiments. This work involves expressing and purifying the proteins Emx2, QKI-7 and Cnot6l so that a more stringent method of confirming these protein-protein interactions, co-immunoprecipitation, can be performed. By identifying and confirming these protein-protein interactions between these proteins involved in neocortical arealization, we hope to shed light on the molecular events underlying the process of neocortical arealization.

The Effect of the Fullerene Nanoparticle on Mitochondrial Respiration

*Miller, Zachary*

*Faculty Mentor(s): Carin Thomas, Chemistry*

Poster Presentation Session #1, Poster #40
8:20-10:50 a.m. in Ballroom C/D

C60, or fullerenes, are a controversial nanoparticle because of their unknown effects to biological systems. With increased research into many different industrial and medical applications for C60, such as commercial lubricants and medical delivery devices, scientists are concerned of the potential adverse effects these nanoparticles could have on human health. We investigated the potential adverse effects of C60 on respiration of bovine heart mitochondria by monitoring oxygen consumption in the presence of NADH. C60 was solubilized in 7.5 percent Bovine Serum Albumin to keep the nanoparticles from clumping. C60 was used in concentrations ranging from 2 to 35 parts per million and incubated with bovine heart mitochondria for up to 10 minutes before measuring oxygen consumption. The rate of oxygen consumption was collected using a Clark-electrode and the data were analyzed using MS Excel. Preliminary results show that oxygen consumption from bovine heart mitochondria in the presence of NADH (Complexes I, III and IV of the electron transport chain) was affected by different concentrations of C60 or time of incubation with C60.
Magic, Zeitgeists, and Cognitive Dissonance
Miracle, Melinda
Faculty Mentor(s): Elizabeth Kerns, Communications

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

This paper examines the Obama and Romney campaigns, and why Obama experienced victory in the 2012 presidential election. Obama and his public relations team utilized many communication theories, but three stand out the most: framing theory, social exchange theory, and effects theory. These theories are all about putting oneself in the best possible frame, telling the people what they want to hear, and enforcing what people believe. This is what politicians should live and breathe when it comes to elections.

Status Update: A Theoretical Look at Social Media
Miracle, Melinda
Faculty Mentor(s): Elizabeth Kerns, Communications

Oral Presentation, Session #12
9:50-10:10 a.m. in Room 140

The information superhighway has been open since the ‘90s, but the social media lane has only been open since 2007. While social media adds more information to our lives, it organizes our lives as well. This research examines social media from the perspective of chaos theory, narrative theory, convergence theory, and adaptive structure theory.

A B3LYP Study on the C−H Activation in Propane by Neutral and +1 Charged Platinum Clusters with 2−6 Atoms
Mith, Drake
Faculty Mentor(s): Yingbin Ge, Chemistry

Poster Presentation Session #1, Poster #49
8:20-10:50 a.m. in Ballroom C/D

The global optimization of neutral and +1 charged Pt\textsubscript{n} (n = 2–6) clusters were conducted at the B3LYP/LANL2DZ(f) level of theory. The lowest-energy structures of neutral Pt\textsubscript{n} (n = 3–6) clusters adopt an equilateral triangle, a tetrahedron, an edge-capped tetrahedron, and a prism structure, respectively. The insertion of Pt\textsubscript{n} (n = 2–6) into one of the central C−H bonds in propane, Pt\textsubscript{n}+C\textsubscript{3}H\textsubscript{8} → H−Pt\textsubscript{n}−CH(CH\textsubscript{3})\textsubscript{2}, was studied subsequently for selected low-energy Pt cluster structures. We found that the Pt\textsubscript{n} global minimum does not necessary make the most contribution to the catalyzed dehydrogenation of propane. For example, the prism structure in the septet electronic state is the global minimum of Pt\textsubscript{7}, yet the $^5$Pt\textsubscript{6} edge-capped pyramid structure makes significantly more contribution to the activation of C−H bonds in propane. In sum, the energy barrier for the Pt\textsubscript{n}+C\textsubscript{3}H\textsubscript{8} → H−Pt\textsubscript{n}−CH(CH\textsubscript{3})\textsubscript{2} reaction is 33 kJ/mol; Pt\textsubscript{3}−6 have significantly lower barriers of 4–16 kJ/mol. The +1 charged Pt\textsubscript{n}+ (n = 2–6) clusters are much more active towards propane than their neutral counterparts because of the large amount of energy (30–140 kJ/mol) released in the formation of the Pt\textsubscript{n}+C\textsubscript{3}H\textsubscript{8} reactant complex. A similar charge effect is also observed for the larger Pt\textsubscript{10+} cluster.
Analysis of Cascadian Forest Resilience Following Volcanic Ash Fall

_Mockel, Karen; Walsh, Megan_

_Faculty Mentor(s): Megan Walsh, Geography_

Poster Presentation Session #3, Poster #22
2:15-4:45 p.m. in Ballroom C/D

When Mt. Saint Helens exploded in 1980, its lateral blast devastated a large tract of forest north of the mountain, an area that is still recovering more than 30 years later. While scientists continue to study the regeneration of this forest, little research has been done concerning the distant effects of explosive volcanic eruptions on forests in the Cascades. The high-elevation forests of Mt. Rainier National Park, which received fallout from both Mt. Rainier and Mt. Saint Helens, are an ideal location to analyze the impacts of, and recovery from, volcanic ash fall. Bench Lake, which is within the park, was chosen for this study because of its location within a high-altitude subalpine fir forest. In the summer of 2012, a 2.95-meter-deep lake sediment core was collected from this site in order to investigate the impacts of volcanic ash fall. To do this, macroscopic charcoal and pollen analysis are being used to reconstruct the fire and vegetation history of the site within the last 10,000 years. Preliminary charcoal counts indicate that fire activity has varied considerably throughout the late Holocene. The ongoing Bench Lake charcoal analysis has shown that fires in this area are more frequent than originally expected. The pollen analysis, which will be conducted in the coming year, should shed more light on the forest response to major volcanic eruptions.

James Bond and All His Women

_Moffat, Jannicke_

_Faculty Mentor(s): Melissa Johnson, English_

Oral Presentation, Session #43
4:30-4:50 p.m. in Room 135

The James Bond series is known for its extremely masculine lead, Agent 007 and the always-anticipated women pining for Bond which, usually leads to their death. The irresistible wit and charm of James Bond is never questioned even when involving violence or unwanted sexual advances. These Bond girls developed from purely sexual objects to playing major roles in plot progression in recent Bond films. Despite the common trends of sexualization and romance among Bond and female characters, not all followed the same pattern. Female characters such as Miss Moneypenny and “M” represented the progression of females in society through their roles in the 007 film series. These two characters stand as representations of how society has changed their views on women, and the James Bond film series continues to do so through their increased incorporation of women and their involvement in the overall plot as more than just sexual objects.
College Students Underage Drinking, the Law, and the Police: A Survey Study.

**Mohamed, Saeed**

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

Oral Presentation, Session #2
9:00-9:20 a.m. in Room 137A

This paper examines the effects of underage drinking on college campuses. Underage drinking in United States colleges has been a serious issue, especially binge drinking. Along with that, there are negative consequences from underage drinking for law enforcement which are secondary impacts. These impacts include property damage, vandalism, fights, sexual violence, and reduced quality of life. The research method design consists of acquiring data from first and transfer year students who are going to attend Central Washington University. The data examines approximately 1,000 students’ responses to a Likert-scale survey concerning alcohol use, the law, and the police. The data will be placed in the context of relevant literature and public policy.

*Florence v. Board of Chosen Freeholders of County of Burlington et. al.*

**Mohamed, Saeed; Wassell, Alison**

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

Oral Presentation, Session #10
9:30-10:50 a.m. in Room 137A

This United States Supreme Court case presents an important issue regarding search and seizure, and due process. A person was arrested based on a warrant for a minor offense. He was subjected to a very invasive strip search at two correctional centers and subsequently released when it was discovered the warrant was invalid. He was successful in the lower court in arguing that such an invasive search for a minor offense violates his Fourth and Fourteenth Amendment rights. The Third Circuit reversed that ruling and the Supreme Court upheld the Third Circuit ruling in a 5-4 decision. The majority and the minority decisions touch upon significant issues in weighing individual rights and freedoms and institutional concerns.

*Respondus LockDown Browser Revisited: Disclosure*

**Moncrief, Donald**

*Faculty Mentor(s): Chet Claar, ITAM*

Oral Presentation, Session #12
10:10-10:30 a.m. in Room 140

This is a follow up to last year’s “Well That Was Easy: Misdirecting Respondus LockDown Browser for Fun and Profit” wherein we demonstrated the ability to direct the Respondus LockDown Browser to an arbitrary IP address of our choosing. For various reasons we chose not to disclose at that time specific details about how this was achieved or the methodology used to discover the vulnerability. In this presentation, we will make those disclosures, discuss some periphery findings we made during the course of our research, and talk about the reasons for not disclosing last year.
Messier Marathon Scheduler: A Software Tool for Novice Star-Gazers and Experienced Astronomers
Moore, Katherine
Faculty Mentor(s): Filip Jagodzinski, Computer Science

Oral Presentation, Session #4
8:00-8:20 a.m. in Room 140

Messier Marathons are all-night astronomy observing sessions during which star-gazers are challenged to find all 110 well-known deep-sky objects, such as the Pleiades, Andromeda Galaxy, and Eagle Nebula, that were catalogued by Frenchman Charles Messier (“MEZZ-ee-ay”) in the 1780s. However, beginning astronomers are often unable to participate successfully in such events due to still-developing skills in telescope usage and celestial observing. I developed Messier Marathon Scheduler (MMS), an interactive computer program for scheduling an observing session to locate a subset of these celestial objects. MMS implements long-established algorithms to determine the locations of celestial bodies at any one time and from any location on Earth. Although there are other tools that schedule these observing sessions, none of those tools are easy for a novice astronomer to use, with features that also help advanced users. MMS provides users the option to select their level of participation, from beginner (10 naked-eye objects) to intermediate (beginner level plus 46 binocular objects) to advanced (intermediate level plus 54 telescope objects, totaling 110). With the sorting and rating choices that MMS provides, users can successfully participate in a Messier Marathon at a level appropriate to their observing skills, thereby providing the impetus to strive for a higher level of participation during the next observing attempt.

Mirage of Love Screenplay
Mosier, Wesley
Faculty Mentor(s): Michael Ogden, Film and Video Studies

Creative Expression Presentation, Session #25
12:00-12:20 p.m. in Theatre

The story follows Ben, a young man suffering from depression. Ben meets up with Clarissa Greene, his ex-girlfriend from his past as he wishes to rekindle their romance. Throughout the day, Ben takes Clarissa out for a date just for one day all while taking antidepressants. Having lunch at the café where the two originally had their first date several years ago, the two end up having a really great time. Near the end of their date, the two agree upon coming over to Clarissa’s house later that night. After the date, Ben runs into Alex, one of his best friends. The two small talked for a little bit. He wished the best for Ben, since Ben was feeling down after the tragedy of the loss of the youngest daughter in the Greene family, who was a very close friend to both of them. Later that night, Ben visits the Greene residence bringing over flowers for Clarissa. Ringing the doorbell, Chelsie, the Greene family’s oldest daughter opens the door. Ben hands Chelsie the flowers mentioning that they are for Clarissa and walks away after declining Chelsie’s offer to come inside. A montage of memories throughout the day flash through Ben’s mind on how all his conversations with Clarissa were only his imagination. He drops the bottle of antidepressants on the side of the road. Chelsie carries the flowers and places them next to Clarissa’s grave.
Influence of Stream Channel Form on Leaf Decomposition Rates
*Mulliken, Mika; Caris, Daniel*

*Faculty Mentor(s): Clay Arango, Environmental Studies*

Poster Presentation Session #3, Poster #17
2:15-4:45 p.m. in Ballroom C/D

Forested stream headwaters receive little light due to heavy shading, so leaves falling into the stream provide organic matter to fuel the food web. Leaf decomposition is an integrative ecosystem-level process that links abiotic and biotic characteristics. For example, most nutrients leach from the leaves within a few days of falling into the stream, leaving only cellulose and lignin. Animals cannot digest these compounds so fungi and bacteria breakdown this material, softening the leaves for aquatic insects called shredders. These organisms convert leaves to smaller material which becomes a food source for other organisms. The rate at which leaves decompose in streams and how efficiently the nutrients are cycled will contribute to the health of the stream. In cobble-bed streams, channel morphology can affect decomposition. Along a single stream segment, surface water enters a down-welling zone and moves into the sediment. This water flows beneath the stream and eventually upwells at a downstream point, bringing warmer and more nitrogen-rich water to the surface. Warmer temperatures and higher nitrogen concentrations can increase leaf decomposition rates. My objective is to compare decomposition rates of leaves in Taneum Creek. I selected six sites that each have a connected upwelling and down-welling zone. Each site has 18 leaf packs which will be sampled six times to calculate the decomposition rate as mass lost versus time. Water chemistry and temperature for each site will also be recorded. I hypothesize that upwelling sites will have faster decomposition rates because of higher nitrogen concentrations and warmer temperatures.

Bondage: How the James Bond Films Effect the Female Gender
*Murillo-Rosales, Jessica*

*Faculty Mentor(s): Melissa Johnson, English*

Oral Presentation, Session #43
4:10-4:30 p.m. in Room 135

The James Bond movies are a classic in our American society. Many movies and shows parody and copy the same structure of this secret agent film. Although the James Bond movies are well known, the view of sexism lingers in each scene, especially in *Casino Royale*. To help give a broader example, I will discuss how the Bond girl’s appearances affect women in our society today and the negativity it brings to the word female. Using the movie *Casino Royale*, scenes will be fully analyzed and interpreted in a male to female view. Also, there will be a scholarly document about how Miss Moneypenny, a continuous role in the 007 films, has gradually grown from flirtatious to respectful. This presentation is to inform the hidden theme of sexism to the audience; creating a second guess on this action film and the story plot it is secretly creating.
Maternal Investment in Free-ranging Tibetan Macaques (Macaca thibetana)
Murphy, Ashley; Link, Jessa
Faculty Mentor(s): Lori Sheeran, Anthropology

Oral Presentation, Session #39
3:00-3:20 p.m. in Room 201

The terminal investment hypothesis predicts that in species whose reproductive value decreases with age, primary caregivers should increase energy expended on each successive offspring as a means of enhancing reproductive fitness. We tested this hypothesis on a group of provisioned, habituated Tibetan macaques living in the Valley of the Wild Monkeys, Anhui, China. This species lives in multi-male/multi-female groups. Males disperse at sexual maturity; females remain in the natal group and are the primary caregivers. We conducted our study from August 3 to September 30, 2012 and compared adult females’ investment in offspring born 2009-2012. Females’ ages ranged from 7 to 22 years. We predicted that older mothers would be proximate to their offspring more than were younger mothers, and that older mothers would carry, hold, nurse, and groom their offspring more than did younger mothers. We collected data through randomized, five minute, focal-animal samples during which we recorded mother-offspring proximity (≤ arm’s reach) and maternal behaviors from an ethogram. Mothers did not differ in proximity scores for offspring born in 2009 or 2010, but they did differ for children born in 2011 (Kruskal Wallis One-Way ANOVA, H=27.04, df=3, P<0.0001) and 2012 (H=66.06, df=4, P<0.0001). We found similar results for most maternal behaviors: females significantly differed for children born in 2011 and 2012, but not for older offspring born in 2009 and 2010. Our results cannot be explained by terminal investment and maternal age; rather, they may be related to the child’s age and the total number of dependent offspring the mother has.

Tesla Turbine
Murray, Michael
Faculty Mentor(s): Charles Pringle, Mechanical Engineering Technology

Poster Presentation Session #3, Creative Works, #8
2:15-4:45 p.m. in Ballroom C/D

A disk type turbine was built and tested using a parametric model to predict fluid momentum transfer to the disks. That means a series of flat parallel disks are placed close enough together that friction in the working fluid (in this case air) is enough to drive the disks producing shaft power. The testing consisted of a thermo-dynamic metering of the airflow input using rotometers and k type thermo couples (volume of the air in and temperature of the air). The power out used a brake type dynamometer with a strain gauge to measure the deflection in the brake holder assembly. From data gathered from the strain gauges and airflow, the efficiency and power out are compared to the prediction from the model. Key words: turbine, built, tested, model, momentum.

Understanding the Breadth of Life Contingent Insurance Options
Nesbitt, Alex
Faculty Mentor(s): Yvonne Chueh, Actuarial Science

Poster Presentation Session #2, Poster #22
11:30 a.m.-2:00 p.m. in Ballroom C/D

This project aims to convey actuarial concepts to individuals not well rehearsed in the discipline by providing a simple, easy to understand tool that allows the user to custom-build an insurance product. By allowing the user to choose a number of options related to insurance benefits, annuities, and payment plans, they can learn about some of the options available to them and
how the product’s pricing is influenced by these choices. The prices are calculated on-the-fly using an illustrated life table.

Response to Artificial Selection on a Heritable, Environmentally Induced Defense in *Mimulus guttatus* (Yellow Monkeyflower)

*Neuffer, Sam*

*Faculty Mentor(s): Alison Scoville, Biological Sciences*

Poster Presentation Session #1, Poster #33
8:20-10:50 a.m. in Ballroom C/D

Environmental stress can affect transcription of genes through reversible modifications to the structure of DNA. These epigenetic modifications do not affect the nucleotide sequence, but they can be inherited in the offspring or grand-offspring in specific species. Genes in *Mimulus guttatus* may be epigenetically altered in response to damage from insects, affecting production of trichomes (sticky defensive hairs on the leaves) in the next generation. Higher trichome production protects against insects, possibly allowing for higher reproductive success in the presence of herbivorous insects. To determine the precise mechanisms through which this phenomenon occurs, we conducted an artificial selection experiment. One population of *Mimulus guttatus* was selected for a high increase in trichome density in response to damage. Another population was selected for high baseline trichome density. Both selective regimes were replicated. Selection experiments have produced plant populations with dense trichomes and separate populations with high responsiveness in the number of trichomes, indicating the possibility for evolution in these traits. One future study will quantify the ability to transmit this response to future generations. Plant lines with extreme adaptations will be grown in field to determine if their trichome production patterns are adaptive. These results could enhance our understanding of the mechanisms and evolutionary consequences of inheritance of an induced defense.

Hospitality Resources in Kittitas County

*Newbury, Nicole; Crawley, Veronica*

*Faculty Mentor(s): Barbara Masberg, Recreation and Tourism*

Poster Presentation Session #3, Poster #36
2:15-4:45 p.m. in Ballroom C/D

The tourism industry in Kittitas County contributes $124.1 million to the economy and provides 1,740 jobs. In order for the tourism industry to be sustainable there needs to be ongoing marketing efforts. The goal of the project was to identify and analyze tourism resources in Kittitas County in order to contribute to the development of a comprehensive marketing plan. This poster provides the results of an inventory and analysis of hospitality resources. Data were collected from lodging operations, food and beverage services, and shopping and retail outlets. Amenities, price, and services were noted as well as access (i.e., online) to information about the businesses by visitors. Information was analyzed and compiled into a final report. From the data, it was seen that shopping and dining businesses are predominately locally owned and privately operated. The county lacks a variety in cuisine options. The County would benefit from a wider selection of dining including ethnic and other options (i.e., Indian, vegetarian). In the lodging sector, brand name operations dominated in Ellensburg and Cle Elum and were not present in the other towns analyzed. Bed-and-Breakfast (B&B) establishments were scarce. B&Bs were seen as type of lodging that would be successful and should be encouraged. For the camper, Cle Elum offers the most campsites from primitive to developed sites. In viewing online information, it was noted that the campgrounds do a better job providing information on recreation activities in the area than other types of lodging.
Willis Enterprises Faces a Supply Dilemma
*Ngo, Anthony; Pham, Cuong; Olson, Leslie*

*Faculty Mentor(s): Kun Liao, Operations & Supply Chain Management*

Willis Enterprises has been buying pulp logs by the ton for more than 20 years, to make chips for paper pulp. They were awarded the 2012 Western Region Outstanding Fiber Supplier by the Forest Resource Association. They have five locations in Washington State for this process. In 2009 they purchased a veneer mill in Aberdeen, Washington. The veneer mill peels logs to make plywood. They were able to cut the pulp logs by specific lengths, 9 and 17 feet, to ship to the veneer mill, and continue to use any waste for chips. It is a profitable way to get the most out of an inexpensive log. In mid-2012 the availability of pulp logs diminished and they had to compete with sawmills and exporters for different types of logs. What this means is the available logs could no longer be measured by the ton but had to be measured by grade quality and Scribner scale. They were not ready for this conversion of measurement. We will be researching the solution to this supply dilemma.

**Effect of *Heloderma suspectum* Venom on MCF-7 Breast Cancer Cell Proliferation, Metabolism, and Morphology**

*Nichols, Thomas; Tucker, Dana; Ronk, Seth*

*Faculty Mentor(s): Ian Quitadamo, Biological Sciences*

Poster Presentation Session #1, Poster #27
8:20-10:50 a.m. in Ballroom C/D

Venom is widely known for its ability to destroy biological tissues, but less is known about its potential to treat disease. Venom, a mixture of biological compounds including enzymes, proteins, peptides, and small molecular weight molecules, has been used to treat a wide range of problems, including autoimmune disease, multiple sclerosis, diabetes, and cancer. The purpose of this study was to explore the effects of fractionated Gila monster venom on cultured human MCF-7 breast cancer cell proliferation rates and morphology. Briefly, fresh venom was milked from a Gila monster, dissolved in water, and size-fractionated using Nanosep centrifugation. Five fractions of varying molecular weight (3, 10, 30, 50, and 100kD) were isolated and administered to subconfluent MCF-7 human breast cancer cells that were subsequently assayed for proliferation and metabolic rates and morphology. The 3kD venom fraction had the largest effect on MCF-7 proliferation rate, metabolism, and morphology than did crude venom extract. A direct relationship was observed between fractioned venom concentration and MCF-7 cell death, whereas crude venom showed less proportional changes in MCF-7 death rate. These findings suggest that fractionated Gila monster venom contains factors that more potently affect human breast cancer cell death, and thus presents an intriguing future avenue for the use of venom in human breast cancer research.

**The Value of Anthropomorphic Literature**

*Nielson, Stephanie*

*Faculty Mentor(s): Steven Olson, English*

Oral Presentation, Session #33
2:10-2:30 p.m. in Room 301

Anthropomorphic literature, which attributes human characteristics to animals, is a valuable literary genre. Historically, this genre was written for adults, but today it is often associated with children’s literature and considered less important than more serious or mature literature. My research of this genre shows that it is valuable because it can effectively teach people about the creatures around them, as well as themselves. This genre provides us with distance from an...
issue so that we can gain a new perspective. In addition, it stimulates the imagination to grow by creating whole worlds. At the same time it remains true to the animal species, teaching us about the animals that share the planet with us. It can effectively convey emotions of animals, allowing us a greater capacity to understand them. Anthropomorphism is evident throughout the real world, so it is natural for it to find its way into our literature. I will show that anthropomorphic literature is valuable because it provides a new way of relating to animals and the world around us.

**Classifying Forest Stand Types in the Gifford Pinchot Using Remote Sensing**

*Noble, Nicholas*

*Faculty Mentor(s): Jennifer Lipton, Geography*

Poster Presentation Session #3, Poster #21  
2:15-4:45 p.m. in Ballroom C/D

Over the decades logging has been a part of the landscape. From the 1940s to 1980s, foresters used the plantation method for logging. This was making 15 hectare clear cuts throughout the forest. In this study, I focus on the Gifford Pinchot National Forest located just south of the Mount Rainer. I will use a combination of Landsat images, GIS vegetation layers, United States Forest Service (USFS) vegetation database information, and ground-truthing techniques to determine the different types of forest stand types. The major classifications for the different stand types are: old growth, second growth, new growth, clears cuts and bare earth/water. With remote sensing techniques using ERDAS and GIS, I will determine these different stand types. This project will give us a better understanding of the forest dynamics and give us a detailed map of what forest we have and where it is.

**The Science Talent Expansion Program (STEP) at CWU: A Model for Improving Recruitment and Retention of College Students in STEM**

*Nye, Jessica; Bohrson, Wendy; Braunstein, Michael; Ely, Lisa; Piacsek, Andy; Kurtz, Martha*  
*Faculty Mentor(s): Wendy Bohrson, Geological Sciences*

Poster Presentation Session #2, Poster #21  
11:30 a.m.-2:00 p.m. in Ballroom C/D

The Science Talent Expansion Program (STEP) at CWU (supported by the National Science Foundation and COTS) continues to work toward increasing the number of students obtaining 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. Recruiting of STEP students is accomplished through collaboration between STEP and admissions. Retention efforts focus on helping students prepare for rigorous STEM classes by engaging them in inquiry-based courses that enhance critical-thinking skills and by allowing them to execute student-designed research projects. Freshmen engage in the STEP Freshman Science Seminar Series, three classes that explore interdisciplinary topics. Students propose and conduct experiments that test energy-related hypotheses as well as write proposals to engage in faculty-mentored research and teaching experiences during the sophomore year. STEP transfer students take two classes that prepare them for faculty-mentored research and teaching experiences. STEP has served more than 415 students from 2003/04-2012/13. Statistical measures show that STEP is succeeding in improving retention and academic performance of STEM majors. Compared to the STEM control group, STEP students declare STEM majors to a greater extent and have higher GPAs. Feedback from students suggests 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 CWU STEP Program can be used as a model for non-STEM disciplines to improve recruiting and retention of students, particularly those who are underrepresented.
Toxic Effects of Common Pharmaceutical Contaminants on Daphnia pulex
Okere, Al
Faculty Mentor(s): Alison Scoville, Biological Sciences
Poster Presentation Session #1, Poster #30
8:20-10:50 a.m. in Ballroom C/D

Human activity introduces a wide variety of chemical pollutants to our aquatic habitats, which makes it important to understand the effects of these pollutants on the organisms that live within them. The purpose of my study was to assess the effect of four of some of the most commonly present pharmaceutical compounds (Carbamazepine (CBZ), Diclofenac (DIC), 17α-ethinylestradiol (EE2), and Metoprolol (MET)) on Daphnia pulex, a keystone plankton species. I exposed individuals of a single clonal line of Daphnia to the four pharmaceuticals separately and together as a mixture in order to examine the resultant effects on mortality. CBZ, DIC and MET induced significant mortality at ecologically relevant doses, as did a mixture of all four pharmaceuticals. In a second, ongoing study, I am using a single cell gel electrophoresis (comet) assay to measure whether each compound induces DNA damage in Daphnia embryos. The toxic effects of these pharmaceuticals on organisms such as Daphnia have important implications because they may reflect effects on other eukaryotes, including humans.

Solar Data Monitoring, Logging, and Analysis
Olin, Jacob
Faculty Mentor(s): Nathan Davis, Industrial & Engineering Technology
Poster Presentation Session #3, Creative Works, #14
11:30 a.m.-2:00 p.m. in Ballroom C/D

The purpose of this project was to monitor and log the output of solar panels mounted at different angles. Two solar panels are mounted on the roof of Hogue hall, one at 20 degrees, and one at 37 degrees. I expect the power output of the panel mounted at 20 degrees to be approximately 5 percent greater than the panel mounted at 37 degrees during April and May. A field programmable gate array (FPGA) from National Instruments was used to collect the data. The module used in the FPGA only accepts voltage levels between -10 and 10 volts. Because of this, a voltage divider was used to decrease the panel’s voltage to an acceptable level. The voltage readings are sent through an Ethernet connection to a host computer where the current and power are calculated. The voltage, power, and a time stamp were then logged to a text file for analysis. The initial readings support the hypothesis that a 17 degree shallower panel angle correlates to about 5 percent greater power output during the spring months.

Analysis of Archaeological Faunas From Three Mesa Sites in Grant County, Washington
Oliver, Bethany; Frederickson, Victoria; Kassa, Sonja; Moose, Christopher; Stcherbinine, Sean; Taylor, Allie
Faculty Mentor(s): Patrick Lubinski, Anthropology
Poster Presentation Session #1, Poster #3
8:20-10:50 a.m. in Ballroom C/D

The Mesa Project consisted of archaeological survey and excavations in the Channeled Scablands of the Columbia Plateau, Washington. Dr. William C. Smith of Central Washington University directed the project between 1973 and 1977. Twenty-four mesas were investigated and four were excavated. Of the four excavated, animal remains from three mesas, Mesas 12, 30, and 36 had yet to be studied in-depth prior to this project. The purpose of this project is to investigate how animal remains are related to human occupation on these mesas. Three
teams of two students each analyzed the entire recovered bone specimens from Mesa 30 and Mesa 36, and a one-third sample from Mesa 12, totaling 1,768 specimens. In all three sites, the bones were highly fragmented, with 81-92 percent of specimens less than 2 centimeters in maximum dimension. As a result, few bones were identified to taxon, and analysis focused on size class and taphonomy. Results indicate the majority of animal remains from the mesa sites ranged from unidentified dog to deer to bison-sized mammals; however, less than 3 percent of specimens could be identified to specific taxonomic categories consisting of Artiodactyla (e.g., deer), Reptilia (e.g., turtle), Osteichthyes (e.g., bony fish), and Rodentia (e.g., ground squirrel, vole). It is unclear whether rodent remains are culturally related or remnants of burrowing intrusions. Taphonomic analysis focused on the examination of burning, which was observed on 21-79 percent of total specimens. High fragmentation and degree of burning suggests cultural modification and a potential result of bone grease processing.

New Far-Infrared Laser Emissions From Optically Pumped Formic Acid and Several of Its Isotopic Forms
Olivier, Kerry; DeShano, Brad; Cain, Breanna
Faculty Mentor(s): Mike Jackson, Physics

Oral Presentation, Session #20
11:40-12:00 in Room 140

LASER is an acronym for Light Amplification by Stimulated Emission of Radiation. Following its invention, the laser was often dismissed as the solution in search of a problem. Ironically though, lasers are now commonplace in our modern lives including their use in a variety of medical, defense, service, entertainment, and of course science applications. One can clearly see that lasers have proven to be the solution in search of a problem. The laser lab at Central Washington University has been working to fill the gaps that currently exist in the far-infrared region of the electromagnetic spectrum, specifically focusing on wavelengths ranging from about 200 to 1,100 microns. A recently constructed optically pumped molecular laser system was used for this investigation. This system consists of a carbon dioxide laser that provided the infrared energy necessary to power the far-infrared laser. The medium for the far-infrared laser was either formic acid (HCOOH) or one of its isotopic forms. With this system, 10 new far-infrared laser emissions have been detected, ranging in wavelength from 219.0 to 954.9 microns. Additionally, this optically pumped laser system was capable of generating 95 known far-infrared laser emissions from these molecules with wavelengths up to 1030.378 micron. This presentation will discuss the experimental setup and methods utilized in the search for new far-infrared laser emissions.

What Wins Basketball Games?
Ordonez, Christina; Bowe, Jamie
Faculty Mentor(s): Dominic Klyve, Mathematics

Oral Presentation, Session #31
1:50-2:10 p.m. in Room 202

Most people say that free throws win basketball games. Others say that rebounds or three-point field goals win games. How do we know what has the biggest effect on winning or losing a game? By using the statistics program SPSS, and the data we have collected from several NCAA Division I men’s basketball games, we run tests to determine which factors have the biggest effect on winning or losing a game. By simply looking at the statistics, can we determine which team will win? We will look at the Gonzaga Bulldogs and their toughest opponents to help us determine which factor is the most influential in winning a basketball game.
Rigidity Analysis of Protein-Ligand Conformations Generated by Molecular Dynamics

Orndorff, Brian

Faculty Mentor(s): Filip Jagodzinski, Computer Science

Poster Presentation Session #1, Poster #55
8:20-10:50 a.m. in Ballroom C/D

Proteins are molecules that flex and bend and perform a multitude of functions in our bodies. Scientists carefully create and design different medicines and drugs in order to regulate disease causing proteins. However there is no current way to visualize how a drug affects a protein on an atomic level. Having methods to visualize this interaction would greatly assist in the drug design and development process. This project uses protein structure data produced by X-Ray crystallography from the Protein Data Bank. Next a freely-available molecular dynamic program takes the protein-drug complex taken from the Protein Data Bank and generates multiple conformations. Using these protein-drug complexes we then use established computational geometry techniques to determine the rigidity of each of the conformations. The final step is to analyze how the rigidity is affected in each of the protein's conformations. Using this data we can then determine the overall effect the drug has on the protein's rigidity and flexibility.

The Effects of Message Framing and Emotional Context on Health Behavior

Osterdahl, Stephanie; McLaughlin, Trese

Faculty Mentor(s): Kara Gabriel, Psychology

Poster Presentation Session #3, Poster #49
2:15-4:45 p.m. in Ballroom C/D

The current research was designed to examine if motivation to engage in exercise can change in response to differing emotional context and message framing of the behavior. In particular, self-reported motivation and desire to exercise were measured after an anger, fear, or neutral emotion-inducing task was followed by a short, realistic narrative on health behavior that was framed as either an opportunity to gain something or lose something. In the current study, participants were undergraduate psychology students at Central Washington University. Participants were randomly assigned to one of six experimental conditions: 1) completing an anger-writing task and reading a gain-frame narrative; 2) completing a fear-writing task and reading a gain-frame narrative; 3) completing a control-writing task and reading a gain-frame narrative; 4) completing an anger-writing task and reading a loss-frame narrative; 5) completing a fear-writing task and reading a loss-frame narrative; and 6) completing a control-writing task and reading a loss-frame narrative. Based upon previous research on intentions to eat healthy food, it was hypothesized that, overall, participants exposed to an anger-induction task would be more motivated to exercise than those participants exposed to the fear or control task. It was also hypothesized that the combination of an anger-induction task with a gain-frame narrative would result in the greatest increase in motivation to exercise. The results of this study should have implications for developing effective motivational plans to increase exercise and health behaviors.

Selection on Domestication Traits and QTL in Water-stressed Sunflower Crop-wild Hybrids

Owart, Birkin

Faculty Mentor(s): Jennifer Dechaine, Biological Sciences

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

Renewed interest in the consequences of gene flow between crop and wild plant populations was initially generated with the widespread commercialization of transgenic crops. Although
crop-wild hybridization is observed in most cultivated species, how ecological factors influence the likelihood that a crop allele will persist in wild populations remains unclear. Given that environmental factors influence strength of selection, crop-wild hybridization must be studied under locally relevant conditions in order to determine the risks associated with transgenic crops. Previous risk assessments have considered a range of biotic factors but not the arid conditions prevalent in agricultural regions of Washington. In this study, sunflower (*Helianthus annuus*) crop-wild hybrids were field-grown in an arid region of Washington, utilizing divergent water treatments simulating irrigated (high-water) and native (low-water) conditions. Known phenotypic differences between crop and wild sunflowers were measured at plant senescence, and quantitative trait loci (QTL) were mapped for each trait. Crop-like traits for leaf size, head size, and flowering were strongly associated with fitness (seed-production) under low-water conditions. Significant QTLs for crop-like traits in the low-water treatment were detected with some overlapping with fitness QTLs. These results suggest that some crop-like traits may be advantageous in a wild environment and should be considered in future risk assessments.

**Russian Revolutionary in London: S.M. Stepniak and the Appeal to Foreign Sympathizers**

Owens, Kristopher  

*Faculty Mentor(s): Roxanne Easley, History*

Oral Presentation, Session #7  
8:00-8:20 a.m. in Room 271

This study will focus on the life of Sergei Mikhailovich Kravchinskii, who went by the pseudonym Stepniak. Stepniak was a Russian radical who lived during the late nineteenth century. He was skilled as a propagandist and was involved with revolutionary groups such as Land and Liberty. Throughout his life as a revolutionary, he sought to make alliances with people across ideological boundaries towards a common anti-tsarist goal. After committing a political assassination, Stepniak fled Russia, eventually settling in London. There, he helped found the Society of Friends of Russian Freedom, and worked towards garnering the sympathies of British political moderates towards the Russian revolutionary cause. Stepniak was an important figure in spreading the message of the Russian revolutionary movement abroad.

**Trichloroethylene: The Silent Massacre**

Pace, Terri  

*Faculty Mentor(s): Rex Wirth, Political Science*

Oral Presentation, Session #27  
1:10-1:30 p.m. in Room 137A

Trichloroethylene (TCE) is used worldwide as a solvent and was disposed of in ways that caused disease clusters nationwide. TCE is highly carcinogenic, causing miscarriages, birth defects, heart, brain, skin, autoimmune system diseases, Lupus, multiple sclerosis, nerve damage, and blood and bone cancers such as Leukemia and Renal Cell Carcinoma as well as creating defective DNA in offspring. Case studies like Woburn, the Love Canal, Camp Lejeune, McCall, and countless clusters of disease including the Mattel/Hall Street case in Beaverton, were cause for new laws and policies such as “Honoring America’s Veterans and Caring for Camp Lejeune Families Act of 2012,” and “Trevor’s Law”. Results of my research indicate that the history of laws concerning TCE brings to light that the statutes of limitation on exposure to hazardous materials do block victims from compensation that have been injured or become ill because of toxic poisoning by blatant negligence of corporations and/or our government. I want to change that.
Gender Roles of Indigenous People
**Paco, Ermana**

*Faculty Mentor(s): Trieu Doan, Interdisciplinary Studies*

Lynnwood Center - Poster Presentation, Poster #9

This paper is designed to give an overview of the Indigenous peoples and recognize the different gender roles that each member follows. The paper will compare and contrast the gender roles among males and females to see the differences and similarities within in several different Native American Tribes; for instance, the Cherokee and various other Indian tribes. The paper will outline the roles each member plays within a household. For instance, the role of the male, female, kids, older relatives, etc. This will help to outline the notion of who is the head of the household and which gender carries on most of the power within the household. Understanding indigenous peoples and their roles is important for the study of indigenous communities. In addition, this study explores how the United States gender roles are different and similar to the indigenous peoples. Mixed anthropological methodologies were employed for this research. The goal of this research paper is to determine how similar and/or different the indigenous peoples’ gender roles are from the United States society.

Compact Rio: Analyzing Acceleration and Strain
**Palencia, Louie**

*Faculty Mentor(s): Lad Holden, Industrial & Engineering Technology*

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

Our senior project is based on having the ability to wire up an accelerometer along with constructing a circuit, programming, and the ability to collect data values. These data values will be taken from a cart that will be driven on a track. Once values are collected, results will be viewed on a panel in able to see the activity of the cart. Values that will be shown may consist of acceleration, deceleration, and change of elevation.

Stalking Water: Using Water Geochemistry to Track Groundwater History
**Patterson, James**

*Faculty Mentor(s): Carey Gazis, Geological Sciences*

Poster Presentation Session #1, Poster #59
8:20-10:50 a.m. in Ballroom C/D

The limited available surface water in the arid parts of the Northwest has placed an ever increasing demand on the local groundwater. In the Upper Kittitas County (west of Thorp to Snoqualmie Pass) all of the surface water has long since been allocated; as the headwaters for the Yakima basin, most of this water is used to sustain the multi-million dollar agricultural industry of the basin. Therefore, the burden of population growth depends on the sustainable use of groundwater, a resource that is now being regulated for domestic use. Unlike many groundwater reservoirs, which are located in unconsolidated sediments, the subsurface in the Upper County is composed mostly of fractured bedrock. Thus, water does not flow through pores in the sediment, but instead flows mostly through fractures in the various types of hard bedrock. This complex geology makes identifying aquifer size difficult by conventional methods, but creates a unique opportunity to use and develop geochemical techniques to answer the ever-present questions. In this study, water samples were collected from multiple aquifers and analyzed for trace element concentration using the Inductively Coupled Plasma–Mass
Spectrometer (ICP-MS) in the Geology Department at CWU; with this data, the geochemical fingerprint of each aquifer becomes apparent. Mixing between aquifers can also be traced. This information about where groundwater obtains its geochemical signature and which groundwaters are connected is a crucial part of the answer to the question of how to develop this resource sustainably; a crucial part that cannot be determined without geochemical techniques.

**Martial Arts in the Pacific Northwest after World War II: How Martial Arts Instruction Changed, and How Communities Benefitted**

*Pelley, Carlos*

*Faculty Mentor(s): Brian Carroll, History*

Oral Presentation, Session #15
10:30-10:50 a.m. in Room 271

Martial arts in the Pacific Northwest changed greatly after World War II. They became more formalized and competitive, and Americans transformed the martial arts into a way to make a living, and ultimately a path to fame. This paper focuses on how the growth, spread, and popularization of the martial arts in the Pacific Northwest went hand-in-hand with the ability to commercialize lessons. Two interviews, and one book, and newspaper articles, from various martial arts masters in the Pacific Northwest including Sensei Terou Chinen, Sensei Walter Todd, and Bruce Lee serve as resources. The paper also discusses how martial arts led to greater acceptance of Asian culture, and how the public’s respect of the martial arts facilitated a reputation conducive to developing reliable businesses.

**The Effectiveness of Reintegrative Shaming Theory within the Mechanisms of Secondary Deviance**

*Perkins, Scott*

*Faculty Mentor(s): Cody Stoddard, Law & Justice*

Oral Presentation, Session #18
12:40-1:00 p.m. in Room 137A

Reducing recidivism has been a major goal for researchers and practitioners in the field of criminology and criminal justice. The Bureau of Justice Statistics reported 272,111 prisoners were released in 1994, and 67.5 percent of them were rearrested within three years of their release. In 2007, 1,180,469 parolees were considered at-risk for reoffending, and of them, 16 percent were eventually re-incarcerated within one year of release. A variety of theories have tried to address crime and recidivism. Major theories such as Rational Choice/Deterrence Theories, Strain Theory, and Control Theory have been utilized to explain crime and subsequent recidivism. However, these theories do not always make the distinction between crime and recidivism. This limits these theories in how they can address recidivism. Reintegrative Shaming Theory (RST), developed by John Braithwaite, is one crime reduction approach that has become quite popular in the past several years. However, the state of the empirical support is currently being investigated. Therefore, conclusions at this time cannot be said with a large amount of certainty. Recent studies have shown certain aspects work within the theory, but there is no primary governing study that substantially shows that the theory is effective. In general, the results are mixed, thus results are inconsistent from study to study. Many studies have tried to address the issues surrounding recidivism by using RST. In order to address these issues, this thesis will exhaustively review the current literature on the subject to allow the ability to draw conclusions about the effectiveness of the theory.
Glutathione as an Assay for Determining the Oxidative Ability of Ultrafine Particles

Peters, Joshua

Faculty Mentor(s): Anne Johansen, Environmental Studies

Poster Presentation Session #1, Poster #53
8:20-10:50 a.m. in Ballroom C/D

Continued development of a quick and acellular means of measuring oxidative stress potential of ultrafine particles (UFPs) has firmly established that UFPs increase the rate at which glutathione (GSH) oxidizes in controlled solutions over time. Several GSH assays were exposed to commercially available soot particles and the rate at which concentration decayed was measured using Dithionitrobenzoic acid (Ellman’s reagent) and UV visible spectroscopy. Several additional experimental control experiments such as degradation versus solution temperature and Ellman’s reagent degradation due to sunlight were conducted to improve assay precision. Preliminary results have shown that a number of environmental factors such as light, solution temperature, and solution homogeneity have a profound impact on the rate of GSH oxidation. Research into the further optimization of assay parameters is being conducted to minimize the variation due to system independent variables while maintaining the practicality and expedience of the assay.

Synthesis of Phidianidines A and B

Petersen, Brandon; Buchanan, Jacob

Faculty Mentor(s): Stephen Chamberland, Chemistry

Poster Presentation Session #1, Poster #43
8:20-10:50 a.m. in Ballroom C/D

Phidianidines A and B are compounds originally isolated from the shell-less sea mollusk, Phidiana militaris, in 2011. Testing of phidianidines A and B revealed significant cytotoxicity against C6 rat glioma cells, 3T3-L1 murine embryonic fibroblasts and HeLa human epithelial cervical cancer cells. The phidianidines are unique because they are the first natural products discovered with a 1,2,4-Oxadiazole ring system. Many other man-made medicinal drugs have a 1,2,4- or 1,3,4-Oxadiazole ring. Therefore, there is the possibility for derivatives of phidianidines to be more potent. Total synthesis of phidianidines A and B has been published, but with low yields and an unstable starting material. It is our intent to provide a more concise synthesis of phidianidines A and B using stable starting materials and improve the overall yield of the synthesis. Our convergent approach will start from 1,5-pentadiamine and 6-bromoindole that will be used to create the two precursors that will be combined near the end of the synthesis. This would make our method a more appealing synthesis route for further study and for effective synthesis in industry.

Tools for Coaching Successful Student Teachers: An edTPA Orientation Activity

Petersen, NaomiJeffery

Faculty Mentor(s): NaomiJeffery Petersen, Educational Foundations & Curriculum

Poster Presentation Session #2, Poster #18
11:30 a.m.-2:00 p.m. in Ballroom C/D

Teacher education is a significant component in CWU’s academic profile, with about 1500 quarter credits of instruction provided by the Professional Education Program alone. The 32 endorsement programs in three colleges require at least that many more. More than 500 student teachers each year are assessed with the edTeacher Performance Assessment (edTPA), and in turn their component scores are aggregated to assess the teacher preparation programs that must be approved by the state. Furthermore, these scores are published, and reflect directly
on the stature of CWU. We are particularly vulnerable in several subtests of the edTPA, which are complicated by the complexity and range of all the programs under the accreditation unit. We have recently achieved state approval for another five years, but we must still deliver on the promises we have made to continue improvement. There is a need for intuitive understanding of the logic and purpose of the edTPA instead of the coercive nature of its being a very expensive high stakes test. This orientation activity uses an original instructional method informed by current theory and research regarding student engagement, self-regulation, and multiple modalities. An ongoing challenge in teacher education is to “walk the talk”, that is, to employ the very instructional methods that we promote. This hands-on, three-dimensional metaphor is engaging, meaningful, and easily implemented.

Gender Representations and Stereotypes on Gamers and Games
Phillips, Neko
Faculty Mentor(s): Pamela McMullin-Messier, Sociology
Oral Presentation, Session #13
9:50-10:10 a.m. in Room 201

When it comes to the gaming world, the majority of people who play games—known as gamers—are assumed to be men. The stereotype of these gamers is that they are male, spend hours in front of their consoles and computers, and are mesmerized by the sexualized characters in their games. What very few people realize is that the demographic of the gamer is not as restrictive. Not all gamers agree with the associated stereotypes, gender representations of themselves, or the characters in the games that they play. In the world of gaming, there are gamers who do not want to be boxed in or limited to these negative stereotypes and gender representations. Little is discussed on the subject of these gamers, outside of how women are represented, the objectification of female characters, and the overall sexualization of both genders. An online survey was created to find out more about who these are gamers. What got them started into playing in first place? How do they react toward the sexist representation of women in gaming? Do they feel if they are negatively stereotyped? What changes (if any) do they want to see in the industry? Turning to a better representation of gamers can lead to greater experiences and a step towards a balanced direction for all genders, in addition to all types of gamers. The data from this survey provides a lens to the varying views of gendered stereotypes.

An Estimation of the Proportion of Abundant Numbers
Pidde, Melissa
Faculty Mentor(s): Dominic Klyve, Mathematics
Oral Presentation, Session #31
1:30-1:50 p.m. in Room 202

For 2,500 years mathematicians have studied the “Sum of Divisors” function $\sigma(n)$. To give an example, $\sigma(12) = 28$ because the divisors of 12 are 1, 2, 3, 4, 6 and 12, and the sum of the divisors of 12 is given by $1+2+3+4+6+12 = 28$. Now depending on the value of $\sigma(n) - n$ we classify these numbers as either deficient, perfect or abundant. Perfect numbers are numbers for which $\sigma(n) - n = n$, deficient numbers are numbers for which $\sigma(n) - n < n$ and abundant numbers are numbers for which $\sigma(n) - n > n$. The question I am asking is: what is the proportion of abundant numbers? The best current bounds for this proportion are .2476171 and .2476475. I have written code in Java and used it to generate data to try to improve this estimation using statistics. This presentation will cover what an abundant number is, how I generated my data, how I used statistics to try to close the gap for the estimation of the proportion of abundant numbers, and what the result were.
In the spring of 2012, I was awarded the Birkin Owart College of Arts and Humanities Research or Creative Grant. For this grant I proposed making four concrete dog sculptures that I would donate to Ellensburg’s new dog park after their completion. The purpose of these sculptures is to not only designate the area as a dog park, but to bring humor to the park and create conversations between the dog owners. The dog owners are the main audience for these works. Dogs are natural comedians and lend themselves well to my art. I like my work to bring people together and for it to evoke conversations between strangers. Humor is a great way to create that bond. The sculptures represent some of the activities that dogs do in a dog park. Dogs socialize, play, and go to the bathroom. Each is constructed separately and are made in 6 different phases: 1) welded angle iron frame; 2) application and shaping of polystyrene foam; 3) application of fiber cement; 4) wrapping with wire; 5) application of sand cement; and 6) application of sealant. After completion, the dogs will be installed on-site in the park early this summer. Materials: one-and-three-quarter-inch angle iron, polystyrene foam, spray foam insulation, fiberglass fibers, re-bar tie wire, portland cement, play sand, latex bonding agent and sealant.

Increasing Making the Bed for a 23-Year-Old Male
Piper, Brooke
Faculty Mentor(s): Shu-Fei Tsai, Education Language, Literacy, and Special Education
Oral Presentation, Session #42
3:00-3:20 p.m. in Room 301

The current study sought to evaluate the effectiveness of a positive reinforcement and shaping on the increasing of making the bed using an ABAB reversal design for a 23-year old male. The researcher chose to conduct this study in an attempt to increase the observable behavior of having the participant make the bed on a daily basis in the morning within two minutes of getting out of the bed. All recordings were based on the latency of his behavior, making the bed within two minutes of exiting the bed. Shaping and positive reinforcement were used to teach this behavior. The findings showed that the participant increased making the bed within two minutes of exiting the bed over 20 sessions of the intervention. The outcome of the study showed that there was a direct functional relationship between the independent and dependent variable. Further studies should examine the daily schedule of the participant and take into account days where he might be out of town for work or if the researcher is not there to ensure data are collected.
Gender Norms: The Negative Impact of Pop Culture on the Advancement of Gender Roles

**Pizano, Nancy**

*Faculty Mentor(s): Melissa Johnson, English*

Oral Presentation, Session #43  
4:50-5:10 p.m. in Room 135

The image of women in popular media has progressed through time, but the negative light in which female roles are cast can still be easily found. *Casino Royale*, from the Bond franchise, is a 2006 film and the gender roles expressed in the movie are not drastically different than those John Stuart Mill argued against in 1869 Britain. While the Bond series has had instances of embracing the feminist movement, female roles remain largely viewed as subordinate to men. Empirical data suggests that the portrayal of women’s inferiority to men in film will influence the way women are regarded in society through social cognitive theory. As a result, films such as *Casino Royale* hinder the influence of works such as Mill’s “Subjection of Women” because they help maintain gender norms instead of advancing a progressive, equal relationship between the sexes.

Creating and Utilizing a Working Refrigeration Model to Enhance Student Learning in a Construction Management Program

**Plugge, P. Warren**

*Faculty Mentor(s): David Carns, Industrial & Engineering Technology*

Oral Presentation, Session #46  
4:50-5:10 p.m. in Room 202

This project explains how a working refrigeration model was designed, built in-house, and incorporated into a mechanical systems course within a construction management program to enhance student understanding of the basic refrigeration cycle. An explanation of how a need for the physical model was identified is included, with reference to student learning styles. Designing the model, securing funding for the model, and construction and integration of the model into the classroom is also presented. In addition, documentation of the benefit of utilizing the refrigeration model as a demonstration tool to enhance student learning in two separate courses is included and discussed. Future research and opportunities to utilize this model in other courses have also been identified.

Making, Curing, and Testing Concrete Cylinders in a Senior Level Construction Management Course

**Plugge, P. Warren**

*Faculty Mentor(s): David Carns, Industrial & Engineering Technology*

Oral Presentation, Session #46  
4:30-4:50 p.m. in Room 202

This project details how laboratory exercises for making, curing, capping, and testing concrete compression cylinders, based on the American Society for Testing and Materials (ASTM) procedures, were developed and incorporated into a senior level construction management course. Included is the course history, a description of the laboratory space and equipment and a discussion of how the laboratory exercises relate to student learning. Numerical and graphical results of testing concrete cylinders at four different water-to-cement ratios are presented and discussed. Also, future opportunities for similar hands-on student laboratory exercises are identified and discussed.
Using Game Theory Pedagogy in Construction Management: Prisoner’s Dilemma and the 20-Dollar Game
Plugge, P. Warren
Faculty Mentor(s): David Martin, Industrial & Engineering Technology

Oral Presentation, Session #46
5:10-5:30 p.m. in Room 202

Abstract: Prisoner’s Dilemma and the 20 Dollar Game are two team building games using game theory to highlight concepts in negotiation and collaboration. The purpose of this project is to show how these games may be used in a construction project management course. This project provides students the opportunity, in an informal setting, to actively learn concepts on negotiation and collaboration. The project discusses how the two games were deployed while professors documented student learning through observations and questionnaires. Results of the project will attempt to show the interactions between and within the two games. Included is a presentation highlighting the educational benefit of the games to students as well as suggestions for improvement.

Liar, Liar, Memory on Fire
Polage, Danielle
Faculty Mentor(s): Danielle Polage, Psychology

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

Have you ever told a lie so many times that you came to believe it? The current experiment investigated whether the consistency and timing of lies would influence autobiographical event memory. Seventy-three participants filled out the Life Events Inventory and rated the likelihood that a variety of events had happened to them before age ten. Participants were then interviewed about some of the events and were prompted to either tell the truth, alternate truth/lying, or lie about the events in two separate sessions. Participants lied by saying unlikely events actually happened to them and also by claiming true events had not happened. During the second session (one week later), participants again rated the likelihood of the events using the Life Events Inventory and change scores from Session 1 were calculated. A 2x2 (Session 1 (lie/ truth) x Session 2 (lie/ truth)) repeated measures analysis of variance showed a significant main effect for lying at Session 1 \[F(1, 72) = 4.530, p = .037\] for events that were initially rated as unlikely but were claimed to be true and also for events that were initially rated as highly likely but were claimed to have never happened \[F(1, 72) = 8.021, p = .006\]. Overall, results showed that memory for the truth became more uncertain after lying and shifted towards the lied-about response for both made-up affirmations and denials. Results suggest that lying may result in memory change for the liar. Applications to psychology and the law will be discussed.
**Design and Implementation of an Optical Spectrum Analyzer**  
*Powell, Adam*  
*Faculty Mentor(s): Michael Braunstein, Physics; Michael Jackson, Physics*

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

The goal of this project was to design and construct an optical spectrum analyzer based on one that was characterized in a 1997 article in the *American Journal of Physics*. An optical spectrum analyzer (OSA) is an instrument that measures the frequencies of light present in lasers and other sources of light. The OSA built for this project is based on a spherical mirror scanning Fabry-Perot interferometer. Any Fabry-Perot interferometer has limited resolution of frequencies. The application of a spherical mirror in this design increases the resolution of the instrument compared to a simple Fabry-Perot interferometer, resulting in more precise measurements of the frequencies composing a light source. Setup of the OSA required the design and fabrication of an electrically insulated mount for a piezoelectric (PZT) actuator, a photodiode circuit, and a LabVIEW VI for controlling the system and collecting data. The displacement properties of the designed mount and PZT were characterized using a Michelson interferometer configuration. The results from the Michelson interferometer configuration showed that the PZT actuator and mount were not performing as expected. Testing of a different PZT stack and mount was found to perform as expected based on specifications from the PZT stack manufacturer. The new PZT stack was used in the Michelson interferometer to collect data from two lasers to characterize and calibrate the displacement generated by the PZT stack. Full characterization and calibration of the OSA is currently ongoing.

**Error Detection**  
*Prather, Christopher*  
*Faculty Mentor(s): Marte Fallshore, Psychology*

Oral Presentation, Session #30  
1:50-2:10 p.m. in Room 201

Most people are confident in answering “yes” when asked if they would recognize a change when a person in front of them switches with someone else. Research on a phenomenon, known as change blindness, surprisingly contradicts this belief. In the present study, the question of whether or not change blindness can occur in editing is investigated. There are six different instruments containing an editing exercise. A font size change occurs in either the first, middle, or last sentence in each exercise. The change is by two points, either larger or smaller than the standard 12 point font. How often participants recognize a change in font will be measured to determine if change blindness is present. The hypothesis for this study is that if change blindness does occur in editing, then very few participants will notice the font change. The anticipated results for this study are that most participants will not recognize the font change, confirming the hypothesis.
Variability of Locomotion in Mantled Howling Monkeys (*Alouatta palliata*) in Costa Rica and Nicaragua

Price, Erika

*Faculty Mentor(s): Lori Sheeran, Primate Behavior*

Poster Presentation Session #1, Poster #15
8:20-10:50 a.m. in Ballroom C/D

I examined how differences in sex, age, and habitat affect locomotion in mantled howling monkeys (*Alouatta palliata*). I conducted field observations from June 1 through July 7, 2012 at La Suerte Biological Field Station in Costa Rica and Ometepe Biological Field Station in Nicaragua. I studied two groups of habituated monkeys of about 10 to 20 individuals each, approximately three-fourths adults, one-eighth juveniles, and one-eighth infants. I studied four aspects of locomotion: mode, forest level utilized, substrate type used, and tail use. Data were collected via focal and scan animal sampling, and were later converted into rates for each age group, sex, and field site. Climbing was found to be the most prevalent mode of locomotion among all individuals. Infants and juveniles jumped more than adults, and all adults were generally similar in their patterns of locomotion. No individuals descended to the ground, and descend to the understory occurred at only one site. At both sites, they preferred mid-canopy more than crown, and crown more than emergent trees. Generally, all individuals utilized small substrates the most, then medium, and then large. Oblique substrates were utilized the most, followed by horizontal and, then, vertical. At both locations, infants used their tails more during locomotion than did any other age group. Generally, substrate and forest level use were quite similar between age/sex groups and sites, but modes of locomotion and tail use exhibited more variation. Due to the limited amount of time spent in the field, these results may not represent how locomotion varies over a longer period of time.

Alcohol Consumption and Intercollegiate Athletes

Prigge, Nicole

*Faculty Mentor(s): Daniel Williams, Nutrition, Exercise & Health Science*

Oral Presentation, Session #47
4:30-4:50 p.m. in Room 271

Question: How is athletic performance negatively affected after alcohol consumption? Rationale: Problematic drinking among college athletes is defined as resulting in one or more of the following: behavior offensive to others, damaged friendships, poor academic performance, poor play during matches, and failure to attend training session. Intercollegiate studies show athletes risk for problematic drinking ranges from 67.5 percent to 78 percent. Methods: In order to find articles, I accessed SPORTDiscus through CWU’s Library and searched using the keywords “alcohol consumption,” “effects on athletic performance,” and “physiological effects.” I limited the search to publications from 2002 to the present. Results: Consumption of alcohol within 48 to 72 hours of physical activity reduces resynthesis of glycogen stores in liver and muscle, immune system function, metabolism, aerobic exercise capacity, and cardiorespiratory ability, while it increases dehydration, weight gain, thermoregulatory issues, and injury prevalence. After completing my review I found negative effects of alcohol consumption on physical activity are measurable in athletes 80-meter sprint times, vertical jump height, and treadmill tests to failure. Conclusion: Although the negative effects of alcohol consumption on physiology and performance are numerous, the prevalence of problematic drinking remains high on university campuses. As a future educator and coach, this subject warrants more research so we can enhance awareness among both the general public and the athletic community.
A Methodology for Nominating Behaviors to Measure Personality Traits in Nonhuman Primates

Pritchard, Alexander; Sheeran, Lori; Gabriel, Kara; Li, Jinhua; Wagner, Steve

Faculty Mentor(s): Lori Sheeran, Primate Behavior; Kara Gabriel, Psychology; Steve Wagner, Primate Behavior\Biology

Oral Presentation, Session #39
3:20-3:40 in Room 201

Applications of personality assessments in non-human primates have yet to be fully investigated. The present study is an exploratory technique for personality assessment that utilizes behavioral measures selected without a priori assumptions, which would permit long-term analysis of personality using behavioral proxies. During August–September, 2012, we studied a group of free-living, provisioned Tibetan macaques (Macaca thibetana) at a tourist site in Anhui province, China. Familiar humans rated 12 adult macaques using a 27-item personality survey for each monkey. Behavioral measures were recorded from observations of the same 12 monkeys. A Principal Component Analysis on the reliable elements of the personality survey revealed five personality components: Insecurity, Reactivity, Boldness, Sociability, and Leadership. Discriminant analyses were used to determine which behavior variables best predicted personality group membership for each of the components. Results indicated that the behavioral measures of avoidance, lunging, fear grinning, self-directed behaviors, touching, proximity, and chasing can be used to significantly (Ps ≤ 0.05) predict the respective personality traits in this macaque population. Strong correlations between Component and Discriminant scores show that behaviors are effective exploratory proxies for personality. General Linear Models of repeated measures also examined the situational effects of provisioning and tourists on the relevant behaviors, with significances found in three of the seven behaviors. Personality components in this population show strong comparability with other publications on primate personality. The behaviors are effective proxies for the relevant personality components in these macaques.

Portraits of the Taylor Bridge Fire: Part I and Part II

Professional Writing & Visual Anthropology, Group Projects

Faculty Mentor(s): Lene Pedersen, Anthropology; Katharine Whitcomb, English

Part 1:
Oral Presentation, Session #17
11:40 a.m.-1:00 p.m. in Room 135

Part II:
Oral Presentation, Session #26
1:10-2:10 p.m. in Room 135

In August 2012, the Taylor Bridge Fire raged through 36 square miles of dry grassland northeast of Ellensburg, destroying 61 homes and hundreds of outbuildings. How communities and individuals deal with disasters is an area of growing interest for researchers. As the instructors of the Professional Writing and Visual Anthropology classes, we combined the approaches of our disciplines. We had students work on joint projects to gain insight into the experiences of all the people affected by the Taylor Bridge Fire--those who were threatened by or suffered losses to the fire, and members of the community who worked on rescue or helped report the course of events to the public. The students collaborated with each other and with their subjects, many of whom were tired of dealing with news media but remained open to exploring their experience more on their own terms. These shared projects, combining words and images, create a vehicle for conveying lived realities of the Taylor Creek Fire. Here we present a selection of the projects, individual portraits which collectively cast light on broader issues of threat, loss, community, and recovery in the context of disaster.
Tanned and Ripped: The Growth of Male Objectification
Pucci, Nicholas
Faculty Mentor(s): Nelson Pichardo, Sociology

Oral Presentation, Session #13
10:10-10:30 a.m. in Room 201

For many decades, women have been objectified by men and society; that is, they have been reduced to nothing more than sexual objects. However, in the modern day we are witnessing the growing objectification of men. “Tanned and Ripped: The Growth of Male Objectification” will explore this growing trend and explore the economic reasons behind this trend and its potential social consequences.

Latinos and the United States Political System: A Case Study of Latino Political Participation and Representation in the City of Sunnyside, Washington
Purkey, Krystelle; Pray, Steven; Shearer, Brendan; Cohen, Levi
Faculty Mentor(s): Gilberto Garcia, Political Science

Oral Presentation, Session #36
3:00-3:20 p.m. in Room 137A

The Latino/a people have a unique history in the United States of America; however, the majority of citizens within the United States ignore the long historical experience of this growing population. This research project examines the dramatic demographic growth of the largest ethnic/racial minority in the United States, with a special focus on the Latino/a community in Sunnyside, Washington. This study focuses on the local civic structure and examines the levels of political participation, representation, and the effectiveness of the political system on the more than 12,720 Hispanic or Latino/a inhabitants. One of the central ideas explored is the weak political representation at the local level in spite of the presence of a large Latino/a population. The research project applies the theoretical interpretations on political participation from the social economic status model to the rules of the game and the political mobilization of the Latino community. In conclusion, the study proposes strategies to increase political participation and representation of Latinos/as at the local level. This research uses a combination of demographic data from the US Census (2012), city/municipal documents, newspaper articles, and voting records on the Latino/a population.

Alternative Drive Socket Wrench
Quintana, Jesse
Faculty Mentor(s): Charles Pringle, Mechanical Engineering Technology

Poster Presentation Session #3, Creative Works, #11
2:15-4:45 p.m. in Ballroom C/D

This project includes the design, fabrication, testing, and analysis of a custom tool that will allow individuals who work on automobiles and machines to have more versatility in the process of removing nuts and bolts. The tool works as a normal socket wrench as well as a linear torque transmitter through a secondary drive on the bottom of the wrench which transmits the torque from the bottom of the wrench to the socket head through the internal gear system without having to move the wrench itself. This tool will allow mechanics and machine repair professionals to remove difficult to access bolts more efficiently and in turn save them time and money. The gear system is designed and tested to transmit up to 120 foot pounds of torque which accounts for the majority of bolt removal tasks. A survey done on both people who work on automobiles as well as people who occasionally use a wrench for simple repairs will give a diverse input as to the practicality and ease of use of this custom tool. The results indicate the tool is definitely useful in special cases and can save adequate time in certain situations.
Effectiveness of Stretch and Flex Programs in Preventing Work-related Musculoskeletal Disorders in Construction

Rajendran, Sathyanarayanan
Faculty Mentor(s): Sathyanarayanan Rajendran, Industrial & Engineering Technology

Oral Presentation, Session #46
4:10-4:30 p.m. in Room 202

Objectives: The major objective of this study was to identify the perceptions of construction workers on the effectiveness of stretching programs in preventing work-related musculoskeletal disorders (WMSDs). The study's objective was also to report the current trends of stretching practices. Methods: A quantitative research approach was adopted for the study. This involved the development and distribution of a short questionnaire as the survey mechanism.

Participants: 315 construction workers from five construction projects and five construction firms from the western United States participated in this study. Results: The majority of the workers (97.7 percent) perceived that the Stretch and Flex (SF) program helped prevent WMSDs. Nearly 95 percent of the participants performed SF daily. Participants reported several other perceived benefits of the SF program. Conclusions: There is a common perception among the construction workers who participated in the study, that stretching exercises will prevent WMSDs. Empirical research is recommended to examine why workers perceive that the SF program helps prevent WMSDs.

Cherry Point Coal Transfer Station: To Build or Not To Build

Rakes, Keith
Faculty Mentor(s): Rex Wirth, Political Science

Oral Presentation, Session #27
2:10-2:30 p.m. in Room 137A

Washington State officials have been looking at building an oceanic coal terminal at Cherry Point, near Bellingham, Washington since the late 1980s. An Environmental Impact Statement was completed in 1997 but was withdrawn when the construction company, Pacific International Terminals redrew the plans, increasing the size of the facility. This requires a new Environmental Impact Statement that should be completed by 2015. Many local residents, as well as the Lummi and Nooksack Indian Nations, are against its construction, citing the large amounts of storm water that the area receives. Cherry Point lies in a severe weather zone which can be affected by larger amounts of storm water than other parts of western Washington. Local residents believe that if Cherry Point is struck by a storm equivalent to a Category 3 hurricane, the storm water drainage and treatment system at the proposed terminal will not be sufficient. If the system fails, it will result in a disaster to the local environment, costing upwards of millions of dollars in clean up. Even though both national and state environmental protection acts are updated annually, I propose an update of the storm water section of the Clean Water Act, which has not been updated since 1987. The updated act will require all facilities to upgrade, and maintain storm water treatment facilities, and require back-up systems to be utilized in emergency situations.
Evidence of Self Recognition Using Olfactory Cues in the Coastal Giant Salamander (*Dicamptodon tenebrosus*)

**Reavill, David; Wagner, Steven; Fessler, Brandon; Weaver, Robert**

*Faculty Mentor(s): Robert Weaver, Biological Sciences*

Oral Presentation, Session #3
9:00-9:20 a.m. in Room 137B

Chemical cues are used as ubiquitous markers in salamanders (Urodela), and serve as the primary modality for conveying interspecific information such as species identity, kinship, and individual information, as well as territorial markers. Although the role of chemical cues has been widely studied in many Urodele families, particularly plethodontids, studies on the family Dicamptodontidae are very scarce. In order to test if Coastal Giant Salamanders (*Dicamptodon tenebrosus*) are able to use chemical cues to discriminate among self-marked, conspecific marked and blank substrates, we performed unforced two-choice trials. One of 15 individuals was provided with two shelters (plastic tubes), and tested under three scenarios: (i) self-marked vs control, (ii) conspecific marked vs control, and (iii) self-marked vs conspecific marked. Trials were filmed for 12 hour periods and the video analyzed to determine time spent in each shelter. Our results show that *D. tenebrosus* were able to (i) discriminate between self-marked vs blank tubes, (ii) preferred a tube marked by a conspecific over a blank tube and (iii) preferred a self-marked over a conspecific marked tube. We suggest that attraction to previously marked refuge sites serves as an economical indicator of site quality, which may reduce the risk of unnecessary exposure.

Uncovering the Tectonic Relationship Between Eclogites and Granulites in the Dulan UHP Belt, North Qaidam Mountains, China

**Regel, Megan; Mattinson, Chris**

*Faculty Mentor(s): Chris Mattinson, Geological Sciences*

Poster Presentation Session #1, Poster #62
8:20-10:50 a.m. in Ballroom C/D

In the Dulan ultrahigh-pressure (UHP) terrane, eclogites and granulites outcrop in the east and west, respectively, but their pressure-temperature relationship is not well understood. Previous Fe²⁺-Mg exchange thermometry suggests ~620–800°C temperatures and 27-32 kbar pressures for eclogites and 750-950°C temperatures and ~14 kbar pressures for granulites; these large temperature ranges prevented understanding of P-T histories and exhumation paths. Zirconium-in-Rutile thermometry of 5 representative eclogites yields ~670–710±10°C, which suggests a westward-increasing thermal gradient of 3-5°C/km. Rutile inclusions from two samples show temperatures ~40-50°C lower than the matrix rutile, suggesting increasing temperatures during prograde and peak metamorphism. Rutiles from one representative granulite show two much higher temperature populations: 1) ~775±10°C and 2) ~740±10°C. The lower temperature population likely records exhumation conditions. The higher granulite temperatures are likely underestimated; current pseudosection and past P-T work suggests peak temperatures of ~810-870°C. Zircon U-Pb geochronology of the 5 eclogites give ages of 432.6±4.0 Ma, 433.9±2.5 Ma, 436±3.0 Ma and 432.4±2.4 Ma, which are consistent within error and record eclogite facies metamorphism. These data show that temperatures are a snapshot of the P-T conditions rather than an artifact of crystallization times. The temperature discontinuity between eclogites and granulites supports the presence of an unmapped fault, which could suggest tectonic juxtaposition after peak metamorphism, followed by concurrent amphibolite facies retrogression.
Colockum Craft Brewing
Reichlin, William
Faculty Mentor(s): Dwayne Douglas, ITAM

Oral Presentation, Session #8
11:30 a.m.-12:00 p.m. in Room 301

Colockum Craft Brewing (CCB) is a half-barrel, nano-brewery and home brew supply store located in an early 1900s building in the City of Kittitas, Washington. The focus of CCB is to produce small batches of handcrafted ales and, as the only home brew supply store in the Kittitas Valley, offer local home brewers quality equipment and ingredients locally at an affordable price. CCB is a community-centered business, obtaining as many ingredients as possible for their ales from local area growers, markets, and businesses and highlighting these ingredients in the ales produced to guarantee the customer a unique, local experience. The brewery is also devoted to educating the public on beer styles by offering brewing classes and monthly tasting sessions that will showcase a particular style or ingredient. The taproom has been restored in a fashion consistent with the era of the building and offers a comfortable private room complete with leather couch and arm chairs for meetings and parties. Featuring three ales available year-round, CCB will also have two taps dedicated to rotating seasonal offerings and a sixth tap reserved for ales designed and brewed in cooperation with local home brewers, home brew club members, and CWU Craft Beer Trade Certificate students. These ales will then be featured each month in the tasting room. By sourcing local ingredients and utilizing the talents of local home brewers, Colockum Craft Brewery will offer customers a unparalleled, distinctly local experience unlike any other.

Vin Rosé
Reinke, Kathryn
Faculty Mentor(s): Andrea Eklund, Apparel, Textiles and Merchandising

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

Purpose: I created this garment to be a piece that could be used for a variety of occasions. It can be worn for a night out on the town, or be worn with a jacket or sweater for an afternoon or daytime event. Process: A lot of my inspiration during the initial design process came from browsing spring fashion lines, and summer and spring dresses. I was inspired by garments that were loose and flowing, and decided to juxtapose a flowing bodice with a tight fitting skirt. I was also drawn to metallic fabric and details paired with softer fabrics, and after being inspired by the popular open and low backs of this season, I decided to use metallic fabric to create straps across the open back of the dress as a design element and to add structure. Techniques: The dress was created through draping, which is done by smoothing and manipulating the fabric on a dress form to create a design. I then created a pattern from the draped pieces, which were used to create a sample and the final garment. The back was draped low, and crossing metallic straps were added as a closure and to add visual interest. Materials: 97 percent Polyester, 3 percent Spandex Knit Fabric, 100 percent Polyester Lamé Woven Fabric, Elastic, and Thread.
Macro-Botanical Recovery Rates Using Flotation of Sediments From the Sunrise Ridge Borrow Pit Site

Rennaker, Patrick
Faculty Mentor(s): Patrick McCutcheon, Anthropology

Poster Presentation Session #1, Poster #4
8:20-10:50 a.m. in Ballroom C/D

The paleo-ethnobotany literature on recovering macro-botanical remains from archaeological sites suggests that the pre-treatment of floatation sediment samples will affect recovery rates. In order to determine the best approach at the Sunrise Ridge Borrow Pit Site (45PI408), we conducted a set of experiments with comparable samples of freshly excavated sediment. This site has a diverse set of features that contain large amounts of visible plant remains. Knowing which recovery technique will produce the best identification rates will greatly facilitate comparisons. We collected 13 four-liter samples of freshly excavated sediment during the summer of 2012. Each freshly excavated sample was split into four one-liter samples, one of which was immediately processed in a flotation tank. Two samples were dried, one to be floated after drying, and the other to be gently dry sieved through a nested screen stack. Preliminary results show that samples sent through the nested screens recover greater amounts of charcoal compared to either of the floated samples (fresh and dried). Alternatively, there are differential recovery rates in samples from the flotation system. These results are discussed in relation to the amount of time it takes to process the samples.

History of Mental Disorders as Portrayed in Film

Riggs, Meagan
Faculty Mentor(s): Michael Ogden, Film and Video Studies

Oral Presentation, Session #32
1:30-1:50 p.m. in Room 271

Mental disorders have been present in film since the silent era, but the portrayal of characters with mental disorders gained popularity in the 1960s after the release of Alfred Hitchcock’s Psycho. But how truthful is its depiction? Film leaves a lasting impression, and more often than not, upholds stereotypes within society. Beginning with Psycho and ending with Darren Aronofsky’s Black Swan, Hollywood has blended different disorders together to depict tortured souls and monsters. An examination of four films indicates, that while Hollywood has been more truthful and honest in its portrayal, it will still take creative liberties in order to add more drama and depth to the disorder itself.

Expressions for Life Insurance and Life Annuities and How They are Related

Rindlisbacher, Nathan
Faculty Mentor(s): Yvonne Chueh, Actuarial Science

Oral Presentation, Session #14
10:10-10:30 a.m. in Room 202

In this presentation, I will be going through the various types of life insurance policies and their actuarial notations. As students graduate from college, get married, or have children, life insurance becomes an increasingly important consideration. There are many different types of life insurance contracts offered, so it can be confusing when trying to choose the best policy for a particular lifestyle. I will present the basic contracts, such as whole life or endowment insurance, in both their insurance contract and annuity forms, and explain how the notation works and how they relate to one another through formulas and theory. It is my hope that the audience will have a firmer understanding of life insurance and how companies offer their insurance contracts.
Occupational Employment Analysis for 2012  
**Rindlisbacher, Nathan**  
*Faculty Mentor(s): Dominic Klyve, Mathematics*

Oral Presentation, Session #40  
3:00-3:20 p.m. in Room 202

Getting a degree in college has been shown to increase an individual’s income, but there are a great many degrees to choose from. Deciding a major in college can be one of the most important decisions one makes, and future income is a key factor in making that decision. With this dataset, I use data from the Bureau of Labor Statistics to analyze occupational employment in the United States. The data include geographic area, industry, occupation, total employment, and data for both hourly and annual wages. In the presentation, I will be going through the dataset and showing the differences in wages and unemployment based on the different industries and occupations. I run statistical tests, including regression, discriminant analysis, and t-tests to explore correlation among the data. Presenting this data should give the audience an idea of what jobs are the best paying today and in what industries those jobs can be found.

Excel Application for Insurance Reserves  
**Robertson, Brian**  
*Faculty Mentor(s): Yvonne Chueh, Actuarial Science*

Poster Presentation Session #2, Poster #23  
11:30 a.m.-2:00 p.m. in Ballroom C/D

Insurance reserves represent a financial liability for an institution that has issued contingent contracts to protect people from financial loss. Since it is a long-term liability and important to fulfill, I have created a spreadsheet calculator to compute the net level premium under input policy parameters and then determine the terminal reserves. By knowing the actuarial amount of the policy liabilities that insurance company assumes. You can get an idea of the financial status and strength of a funding arrangement. Actuarial notations that are necessary to define and compute benefit reserves will be presented. A Microsoft Excel program coded to process the contract parameters for calculating the terminal benefit reserves for a variety of insurance product types will be demonstrated.

Food, Music, and Language: The Power of Folklore  
**Rodriguez, Sara**  
*Faculty Mentor(s): Raymond Hall, Anthropology*

Oral Presentation, Session #41  
3:20-3:40 p.m. in Room 271

This presentation will show how food, music, and language help to create a cultural matrix that is reflected in the tourism industry. I will show how these elements of culture from the perspective of folklore help to establish a sense of national identity as well as individual community pride. My area of focus will be the four regions of Ecuador: the coast, the highlands, the heartland, and the archipelago.
Incorporation of Garbanzo Bean Flour As a Fiber Enhancer in Chocolate Cake
Romero, Griselda; Johnson, Whitney; Femrite, Heather
Faculty Mentor(s): David Gee, Nutrition, Exercise & Health Science

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

This study investigated sensory and objective characteristics to determine if garbanzo bean flour (GBF) is an acceptable fiber enhancer in chocolate cake. GBF is an excellent source of dietary fiber, containing five grams of fiber per serving (30 grams). It was used to increase the fiber content of the cake to at least 2.5 grams of fiber per serving, making a good source of fiber. This was accomplished in two ways: 1) adding 40 grams of GBF to a control chocolate cake mix (A), and 2) replacing 40 grams of the cake mix with the 40 grams of GBF (R). The unaltered commercial cake mix was used as the control (C). Objective testing using the TA.TX2 Texture Analyzer determined compression and penetration forces. These tests indicated that A required significantly (p<0.05) higher forces with all four probes used, while R had a higher compression and penetration force (p<0.05) with two out of the four probes. Untrained subjects (n=27 on day 1 and n=35 on day 2) participated in sensory testing using 9-point intensity or hedonic scales. Based on these tests, A was significantly less sweet than C and was significantly less moist than both C and R. No significant sensory differences were determined between R and C. Some objective and subjective differences between the cakes were established but most importantly, the acceptability rating was not significantly different. Overall, this study demonstrates two acceptable methods to increase the fiber intake of consumers using GBF as a fiber enhancer.

Using Caenorhabditis elegans to Understand the Cellular Mechanisms of Serotonin-Dependent Behavioral Adaptation
Ronk, Seth
Faculty Mentor(s): Lucinda Carnell, Biological Sciences

Poster Presentation Session #1, Poster #35
8:20-10:50 a.m. in Ballroom C/D

Behavior of an organism is created and controlled by the signaling within and between neurons throughout the nervous system. In higher organisms the complexity of the nervous system is difficult to understand. Therefore, due to a simple nervous system made up of only 302 neurons we use Caenorhabditis elegans, a microscopic soil nematode, as a model organism to understand how neurons and neuronal circuitry function. Serotonin (5-HT) is an important neurotransmitter that modulates mood, sleep, and appetite. 5-HT signaling is poorly understood on a cellular level and dysfunction in serotonin-dependent signaling is associated with illnesses such as depression and insomnia. We investigated the mechanisms involved in serotonin-dependent behavioral adaptation. We have found that overnight exposure to 3 mg/ml 5-HT results in a recovery of speed from the inhibitory acute effect on locomotion. Acute exposure results in speeds of 35 μm/s that increases to 140 μm/s after adaptation, which is a 60 percent recovery of untreated control speed (215 μm/s). We identified a mutant that is defective in adaptation to 5-HT. Animals deficient in the gene pck-1, similar to a mammalian gene for PKC, are defective in recovery of speed to chronic exposure to 5-HT. The pck-1 mutant produces adaptation speeds of 16 μm/s, which are similar to acute speeds 14 μm/s. These results offer insight to a cellular pathway that is involved in 5-HT-dependent behavioral adaptation.
Noyce Scholars Explore the Potential of Word Walls for ELL Students  
*Rustad, Rebecca; Le Beau, Joey; Ledbeter, Shawnee; Moreno, Omar; Ray, Megan*  
*Faculty Mentor(s): Martha Kurtz, Science Education Program; Janet Shiver, Mathematics*

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

Historically in Washington State, English Language Learners (ELL) perform lower than their mainstream classmates. According to the Washington State Office of Superintendent of Public Instruction in 2011-2012 59.2 percent of all seventh graders met the state standards in mathematics; however, only 18.1 percent of seventh grade ELL students met standard. In seventh grade science, 66.4 percent of students met state standards overall with only 14.4 percent of ELL students meeting standard. This trend repeats across all grade levels. Providing information organization techniques to second language learners should facilitate their academic language acquisition and ultimately their success on standardized tests. The effect of word walls on student utilization of academic language in middle school science, and middle and high school mathematics will be evaluated. Word walls are posters showing a new word, its meaning, and a picture. Center for Excellence in Science and Math Education researchers from Central Washington University will conduct action research in three classrooms that have low state math and/or science test scores and a high percentage of ELL students. Research will be conducted in two phases. In Phase I, students will complete an instructional unit without being exposed to word walls. During Phase II students will be exposed to word walls. Data will be collected during each phase by administering pre- and post-assessments. Analysis of the Phase I pre-tests shows low understanding and low use of academic language for students in all three classrooms.

Ensemble Competition at the Semifinal Round of the 2013 National Trumpet Competition  
*Rutherford, Robert*  
*Faculty Mentor(s): John Harbaugh, Music*

Creative Expression Presentation, Session #24  
12:00-12:20 p.m. in Ballroom A

Two ensembles from the CWU trumpet studio were accepted to compete in the semifinal round of the National Trumpet Competition at George Mason University in Fairfax, Virginia after a blind audition process. It is extremely rare to have two ensembles accepted from the same institution. The groups were comprised of both male and female trumpeters from the CWU trumpet studio. This event was not only a competition but also a conference, where the students in these groups had the opportunity to attend clinics, master classes, and be surrounded by professional development opportunities through networking with potential teachers and/or employers. What we brought back from this competition was the time and effort needed to prepare for something this intense and also what we learned from the professionals at the competition such professionalism, musicality, and the realities of being a musician.
“Confessions of a Coalminer’s Granddaughter”  
**Rutland, Amelia Kate**  
*Faculty Mentor(s): Lisa Norris, English; Ian Buvit, McNair Scholarship Program*  

Oral Presentation, Session #44  
4:30-4:50 p.m. in Room 137A

The genre of creative nonfiction writing can be best described as fluid. To tell a true story depends largely on how we connect to our experiences and how they shape us. This is especially true when collecting and retelling folklore, a genre rich in perspective and perception. During a summer-long creative research project sponsored by the McNair Scholars Program, I explored the folklore of one small town in Kittitas Valley: Roslyn, Washington. Most know this town as the fictional Cicely, Alaska, from the TV show *Northern Exposure*. Few know of Roslyn’s coal mining roots. When I began the project, I did not know what I would find. But after a summer spent mining the small-town-America culture of Roslyn, I discovered that I was more connected than I originally expected. I explored these revelations through the creative nonfiction genre and compiled a short collection of vignettes, entitled *Where Coal was King*, that capture the spirit of Roslyn as well as how the stories of mining became a part of my own. One important aspect of the creative nonfiction genre is the element of sharing. By presenting my results, I will continue the folklore tradition and share how the mining history of Roslyn connected me to my own grandfather, a man I had never known.

**Haunting History in Toni Morrison’s Beloved**  
**Ryker, Hannah**  
*Faculty Mentor(s): Christopher Schedler, English*  

Oral Presentation, Session #35  
3:00-3:20 p.m. in Room 135

In the literary genre of Magical Realism, things like ghosts, haunting, and supernatural events exist and take place alongside the realm of the mundane or commonplace events of everyday life. In Toni Morrison’s novel *Beloved*, the ghosts of the past, Beloved and Baby Suggs, converse with the living in the present to show how the past is constructed from subjective memories and how the future can in turn be constructed from these memories. The two ghosts in *Beloved* not only embody the past of the characters in the novel, they also personify the collective memory of slavery in this nation. Both the ghosts and the living characters in the novel represent the dangers that accompany historical repression or obsession. The ghosts that Toni Morrison creates in *Beloved* ultimately show how the past and present can be constructed differently by looking through different lenses. Beloved haunts in an aggressive manner, forcing characters to come to terms with their pasts or be consumed by it. In contrast, the ghost of Baby Suggs is an encouraging spirit, who suggests that the traumas of history may begin to be healed by reconciling the painful and the enjoyable events of the past. Toni Morrison’s novel exemplifies the destruction that can occur when one cannot overcome the traumas of the past to construct one’s future.
Bacteriological Testing of Novel Flavonoids Against Antibiotic Resistant *Staphylococcus aureus*
*Santana, Felipe; Darley, Jacob; Foss, Eric*
*Faculty Mentor(s): Eric Foss, Biological Sciences*

Poster Presentation Session #1, Poster #28
8:20-10:50 a.m. in Ballroom C/D

An urgent problem facing medicine is the growing number of bacterial species forming resistance to one or more common antibiotics. The need to find other treatments has lead to the isolation and characterization of natural compounds, including a family of biologically active chemicals known as flavonoids. These compounds are present in photosynthesizing organisms and have been shown to have anti-microbial, anti-oxidant, anti-cancer, and anti-inflammatory properties. In a collaborative project between the Chemistry and Biology Departments, we have isolated and characterized four novel flavonoids from *Dalea searlsiae*, a local prairie clover. From crude root extracts, we performed disk diffusion assays against *Staphylococcus aureus* to identify anti-bacterial fractions. These fractions were further separated using column chromatography and the disk diffusion assay was repeated until pure compounds were obtained. After isolation and characterization of these four flavonoids, we used a broth dilution method to determine minimum inhibitory concentrations (MICs) of the compounds against oxacillin sensitive *S. aureus* (OSSA) and oxacillin resistant *S. aureus* (ORSA). We found that the flavonoids have MICs of 5 μg/mL against both OSSA and ORSA compared to oxacillin MICs of 0.5 μg/mL and greater than 16 μg/mL, respectively. This indicates that our flavonoids function to inhibit bacterial growth through an independent mechanism compared to oxacillin. A novel antibiotic could possibly replace or augment compounds in the medical establishment’s antibiotic arsenal.

A Comment Book Analysis of Wind Farm Visitors
*Santos, Araceli; Moreno, Ricky; Purcell, Sam; Softli, Jordan*
*Faculty Mentor(s): Mark Pritchard, Management*

Poster Presentation Session #3, Poster #39
2:15-4:45 p.m. in Ballroom C/D

A content analysis of seven comment diaries with open-ended comments from wind farm visitors (n=2,047) was conducted. Positive and negative visitor comments were recorded and coded according to gender, party size, and visitor origin. Eight-four percent of visitors were from Washington State (22 percent from Ellensburg). The majority (85 percent) generally left positive comments about the wind farm. More specific visitor impressions of the tour guides, the visitor center, the view and the surrounding ecosystem accounted for the remaining 15 percent of comments recorded. On the strength of these findings, recommendations on signage, information provided by the farm, an e-sign in book, and incorporating a customer relationship management system were offered.
American pikas (*Ochotona princeps*) are small rabbit relatives that inhabit rocky talus slopes, typically occupying higher elevations in mountainous regions. Pikas are well adapted to surviving cold climates, but this makes them vulnerable to the higher temperatures brought by global climate change. Recently documented extinctions of pika populations at lower elevations in the Great Basin suggest that pika distribution may be shifting to higher elevations. My objective was to determine the lower elevational limits of pikas along the eastern slopes of the Cascade Range of central Washington. Talus sites were chosen along three transects that decreased in elevation from west to east: Manastash Road, Taneum Road, and the John Wayne Trail (from the Snoqualmie tunnel to Cle-Elum). Elevations obtained from GPS points and analyzed with ArcGIS software ranged from 591 meters to 1,217 meters. Pika presence at each site was determined by conducting formal occupancy surveys. If pikas were seen or heard, or fresh scat or food caches were found, the site was deemed occupied. The lowest elevation at which pikas occurred was 702 meters. Average elevations of occupied versus unoccupied sites, respectively, were, 1,108 vs. 890 meters for Manastash, 1,137 vs. 866 meters for Taneum, and 780 vs. 662 meters for the John Wayne Trail. This study documents the current lower limits of pikas in the eastern Cascades of central Washington, and provides baseline data against which to compare pika distribution in the future, which is predicted to shift to higher elevations as global climate change causes temperatures to rise.
Open Governance: Trends From Cutting Edge Governments in the US and Abroad

Schacht, Sarah

Faculty Mentor(s): Rex Wirth, Political Science

Oral Presentation Session #2
8:00-8:20 a.m. in Room 137A

Government is typically thought of as slow, bureaucratic, and opaque. Yet, in the last five years, we’ve seen a global movement towards open governance which has lead to new technologies, policies, practices, and cultures within government. These new developments are being led by a diversity of governments, ranging from small cities in Texas to the parliaments of national governments in Asia. This presentation highlights the cases of individual governments and open government activists from the US and abroad, providing a window into emerging trends in governance. Individual government cases will provide the audience insights into how citizens and government staff could increase (with small budgets and just a few people) transparency, citizen-government interaction, cost efficiency, and modern technology implementation. Schacht is an energetic and experienced public speaker with ten years of experience working in the open government field with governments ranging from the Obama White House, to United Nations parliament technology gatherings, to the City of Seattle, to advising 10 Downing Street.

Social Science and the Law: The Influence of Social Science on the Eighth Amendment Jurisprudence of the Supreme Court

Schmidt, Alec

Faculty Mentor(s): Simeon Sungi, Law & Justice

Oral Presentation, Session #2
8:40-9:00 a.m. in Room 137A

With developments in the fields of criminology and neurology, social science is more relevant in Supreme Court jurisprudence. Many punishments that were thought to be constitutional have been struck down by the Supreme Court due to groundbreaking empirical data. This presentation explains the influence of social science on the law, specifically focusing on the eighth amendment jurisprudence of the Supreme Court. The role of social science in such rulings is examined. Many cases rely on social science in determining the constitutionality of a punishment, and many cases do not. An influence of social science, as well as a lack of influence, will be discussed. In examining the cases that implement empirical findings, it is found that in some cases social science can serve as an objective tool for determining whether or not a particular punishment is unconstitutional. However, in other cases premature findings are used in an ideological manner, which introduces the possibility of arbitrary rulings. Social science can serve as a method of objectively defining a punishment as either constitutional or cruel and unusual based on unbiased empirical findings. The implications of these findings are immense. The Supreme Court is not required to adhere to empirical findings; however, they have served as important aspects of case rulings. Although social science can benefit eighth amendment jurisprudence, a lack of methodology in its implementation reveals that it may be some time before social science is consistently and objectively relied on.
Thermoregulation Patterns of the Northern Pacific Rattlesnake in a Shrub-Steppe Habitat

Schroeder-LaPlatney, Evin

Faculty Mentor(s): Dan Beck, Biological Sciences

Poster Presentation Session #1, Poster #17
8:20-10:50 a.m. in Ballroom C/D

Little is known about the thermal biology of the Northern Pacific Rattlesnake (Crotalus oreganus) native to Central Washington. Northern Pacific Rattlesnakes are both important predators to many small vertebrates and prey to many carnivores, which make them of particular interest in conservation biology. I used temperature-sensing radio-transmitters and i-button data logger implants to monitor body temperatures of four individual rattlesnakes over the course of 11 months, from June 2012 to April 2013. I also recorded air temperatures and relative humidity using portable data loggers over the same period. Rattlesnakes actively thermoregulated at times during the day. At other times, they passively accepted environmental temperatures, especially during the winter. Rattlesnakes showed a body temperature of about 22°C during the day for the summer months, which at times was 13°C less than the ground temperature, as well as a minimum temperature of about 8°C during overwintering in their hibernacula. Other times their body temperatures were within 1°C of the ground temperature. My results suggest that rattlesnakes show changes in habitats and thermal environments over the year. If they are unable to maintain an optimum body temperature at one location then they may choose to seek out more hospitable thermal environments, or risk a drop in survivorship.

Captive Chimpanzee Preference for Environmental Enrichment: Naturalistic Vs. Artificial

Schulze, Savannah; Mas, Jessica; Stafford, RyAnn; Jensvold, Mary Lee

Faculty Mentor(s): Mary Lee Jensvold, Anthropology

Poster Presentation Session #1, Poster #12
8:20-10:50 a.m. in Ballroom C/D

The cognitive abilities of chimpanzees are complex, requiring challenging environmental enrichment that promotes well-being, and species typical behaviors (Fouts, 1998; Lutz & Novak, 2005). We examined the use and preference of two types of enrichment for three adult chimpanzees living at the Chimpanzee and Human Communication Institute (CHCI). These include (1) artificial: magazines, drawing material, brushes, cardboard, toys etc., and (2) naturalistic: items typically found in a free-living environment such foliage and branches (Davey, 2006). We predicted that as cross-fostered chimpanzees they would demonstrate a preference for artificial enrichment. A chi-square test of independence revealed that the frequency of time intervals during which the chimpanzees touched the enrichment varied with condition in all three individuals. Overall the chimpanzees touched objects more in the naturalistic enrichment condition. Naturalistic enrichment often was edible which may account for the differences in conditions. The implications of these results will be discussed.
Inside the Fish Bowl: Application of Sociological Theory to Observations of State Government

Sebastian, Aleisha

Faculty Mentor(s): Laura Appleton, Sociology

Oral Presentation, Session #13
9:30-9:50 a.m. in Room 201

Sociologists observe, record, and systematically measure interactions between the various structures within a society. Over winter quarter, I served as a legislative intern for the Washington State House of Representatives. While fulfilling my duties as an intern, I observed interactions throughout the Capitol campus. By combing my own experiences as a state employee with observations of state government, special interest parties, and citizens during the legislative session, I entered into a participant observational study. I focused my studies on the multiple social roles and realities these groups of players experience, how they differ, and how they interact. From day one, I was told that Olympia is a fish bowl. Everyone is watching. There is no escape from the political scrutiny of the public’s unblinking eyes. I quickly learned that state government is a stage complete with props, costumes, theaters, and cameras. Each group has a role. Media, lobbyists, legislators, staff and the public all play their parts on a continuous stage for the entirety of session. Behind these roles, regular people function within an institutionalized setting focused on perfecting every performance. How does this affect their social realities? Social realities are personal, relative, malleable, and ever-evolving. Can one person change the social reality of another? How can this be done? Most importantly, how does this affect social change?

Perceptions of Drug Users and Drug Use within Rural Communities

Seitz, Eric

Faculty Mentor(s): Vanessa Harbour, Physical Education, School & Public Health

Oral Presentation, Session #47
4:10-4:30 p.m. in Room 271

The purpose of this research is to investigate the perceptions of drug users and drug use in communities lacking in basic diversity, specifically Ellensburg, Washington. The reasons for conducting more extensive research into this topic is to find out the relationships between community perceptions, drug use, and access to health for those that use drugs, as well as their general health status. We have attempted to answer this question, primarily, to see if those in rural communities suffer from poor health status because of the negative perceptions about those who use serious drugs in rural communities. A survey using a Likert scale was the primary research tool. Many aspects contribute to the negative health outcome of drug users, such as the political climate, and the inherent stigma that is a part of rural communities. These community members’ social perceptions also act as a barrier for drug users and healthcare access.
**VineGearz: Software as a Service**  
_Senekhamphone, Nakhonngeun_

_Faculty Mentor(s): Amy Mumma, Global Wine Studies_

Oral Presentation, Session #8  
12:00-12:30 p.m. in Room 301

VineGearz will be the first company to provide mobile application technology for winery and vineyard management in Washington State. VineGearz recognizes that, with advances in technology, it can offer innovative solutions to facilitating the winemaking process for small-to-medium-sized producers. In order to target the media and trade alongside the Washington State Wine Commission’s mission, VineGearz will offer Software as a Service. Rather than purchasing new software, customers pay a small set-up fee and reasonable monthly fees to use the software we provide and maintain. The mobile technology that VineGearz will provide includes but is not limited to services such as: vineyard growing and management, winery management and tracking, wine club management, and business reporting and communications. Semi-customizable solutions will even go on to handle such aspects as compliance reports to Integrated point-of-sale systems. A competitor analysis demonstrates that while similar software exists in California, other businesses do not represent strong mobile utility and versatility. With more than 700 wineries and vineyards in Washington alone, VineGearz has the potential to help leverage the competition of United States national wine production, not by changing winemaking but by easing the process. Once VineGearz has taken off, assuming contracts with only a quarter of the maximum number of potential customers, VineGearz can expect a $13,125 average monthly profit. From set-up, to user-friendly tutorial and interface, VineGearz’s mission will be to help shape the image of the Washington wine industry while maintaining and improving its quality control in producing wine.

**Ecology of Crime in Seattle, WA: Drug Market Intervention Assessment**  
_Shafer, Jillian_

_Faculty Mentor(s): Cody Stoddard, Law & Justice_

Oral Presentation, Session #18  
12:20-12:40 p.m. in Room 137A

Making up about 5 percent of Seattle’s area, crime hotspots are responsible for more than 50 percent of the city’s crime. Left untouched, it’s theorized these concentrated areas can potentially break down norms and create larger disorder problems, making them important to address early. In 2008 and 2011, the Seattle Police Department addressed these issues using the Drug Market Initiative (DMI), a program attacking open-air drug markets and in turn reducing crime attached to these drug crimes. Using crime mapping and ArcGIS (ageographic information system), crime concentrations are analyzed before and after implementation to further understand the spatial qualities of crime. The current paper offers a glance of the impact Seattle’s DMI has had on crime in the targeted neighborhood as well as surrounding blocks.
Student Attitudes toward Police: The Importance of Perceived Fairness and Procedural Justice
Shafer, Jillian
Faculty Mentor(s): Cody Stoddard, Law & Justice; Ralf Greenwald, Psychology

Oral Presentation, Session #18
11:40 a.m.-12:00 p.m. in Room 137A

An emerging concept in policing is procedural justice, or the perception of being fairly treated in a specific police contact. Many studies have found that procedural justice greatly outweighs commonly examined characteristics, such as race, and the development of global attitudes towards police. These general attitudes are essential in creating a community-police partnership, and have often been used as theoretical measure of community satisfaction. Using data collected from students in a four-year university in the Pacific Northwest, the current study examined the importance of procedural fairness within a specific encounter in comparison with its outcome. Findings relate to the importance of perceived respectfulness of an officer and the impact it has on general attitudes.

The Politics of the Mexican State: Informal Power and Failed State Politics in the Struggle against the Cartels
Shearer, Brendan
Faculty Mentor(s): Gilberto Garcia, Political Science

Oral Presentation, Session #36
2:40-3:00 p.m. in Room 137A

This paper is intended to provide an analysis of the narco-political experience in the United States-Mexico border region and the informal power structure that rises through illegitimate economic processes. Most studies fail to analyze the Mexican state and its ability or inability to exercise state power, which calls into question the legitimacy of the state. I believe that this research is not completely unexplored, but there is no definitive unit of analysis for the current situation. I would like to develop a concise paper with a conclusion on power and the health of the Mexican state today, and into the future. The objective of this research project is to examine the specific role of the state and power structures in Mexico and propose a theoretical application of the theory of failed states. The central hypothesis is the following; “If Mexico is a failed state, does the Mexican state play a lesser role to the informal power of the cartels?” This research explores a diversity of resources including current scholarship, newspaper accounts, and government documents with the goal of developing a concise analytical approach in the study of state power and the rise of criminal organizations as an oppositional power center. This paper is exploratory in nature and the hypotheses will be tested through research and application of raw data and the application of political theories on power.
Barriers Student Face When Cooking in the Dorms  
Shepler, Catherine  
*Faculty Mentor(s): Rebecca Pearson, Physical Education, School & Public Health*

Oral Presentation, Session #5  
9:00-9:20 a.m. in Room 201

In the fall, HED 330 Health Assessment class decided to do a survey on campus food and its sustainability. The students were broken up into groups and the group that I was in decided to do cooking in the dorm rooms. We wanted to look at whether students were using the kitchen provided in their dorm, and the possible barriers to using the kitchen. This was important because students lead healthier lifestyles when they can cook their own food. We used Qualtrix to send out the survey and we used chi square and t-tests to analyze our results. We found that nearly half the students living in the dorms thought it was important to cook meals at home. A common barrier that my group noticed was inadequate cooking space. Additionally we found that a lack of cooking utensils and buying fresh foods were more barriers to consider. We came to the conclusion that students are open to cooking in the dorms if they have adequate space and the proper utensils provided to them. This is important to know because cooking food is typically healthier than eating out.

Flavonoid Effects on Breast Cancer Cells  
Shindruk, Averyl  
*Faculty Mentor(s): Eric Foss, Biological Sciences*

Oral Presentation, Session #37  
3:20-3:40 p.m. in Room 137B

For centuries, human populations around the world have used flavonoids to cure a wide range of ailments. These compounds are present in a variety of plants and plant products, many of which we consume in our diet, where they exist abundantly within photosynthesizing cells. Increasing resistance of bacteria and viruses to commonly used antimicrobial agents has spurred research into the medicinal properties of flavonoids. Many research groups have isolated and identified structures of flavonoids with antifungal, antiviral, and antibacterial function, while others have demonstrated synergistic effects between flavonoids themselves and with chemotherapeutics. The structural backbone of these active flavonoids consists of two benzene rings linked through a heterocyclic pyran ring. Flavonoid compounds have been reported showing anti-inflammatory, oestrogenic, antimicrobial, antiallergic, and antioxidant activity. They have also been known to possess cytotoxic antitumor properties and to inhibit a wide range of eukaryotic enzymes. Our particular compound of interest, MA-1-45-F4, was isolated by Dr. Gil Belofsky’s lab through screening for activity against oxicillin-resistant Staphylococcus aureus (ORSA). The compound, which comes from a prairie clover legume, *Dalea Searlsiae*, is active at a range of 0.1-10 micrograms per milliliter. We were interested in also testing the chemotherapeutic properties of this particular compound. Cancer, the second leading cause of death in the United States, kills nearly 1,500 people each day. Although there is a selection of chemotherapeutic drugs in the market, most are not specific to interfering with the growth of solely cancer cells, and therefore come with extremely detrimental side effects. Our goal with this experiment was to find a concentration of the isolated compound that would inhibit the growth of MCF7 breast cancer cells, while having no impact on healthy cells of the body. We narrowed down the range of flavonoid activity to 0.10 to 10.0 micrograms per milliliter. In these concentrations, the MCF7 cells stopped growing and some apoptosis occurred. The next step is to perform an MTT assay to determine the metabolic effects of the drugs on the cancer cells, and to also test the drug on healthy mouse muscle tissue cells. By finding a new compound that inhibits cancer cell growth, we can increase the options available for chemotherapy patients and potentially save lives.
Supply Chain Optimization at Evergreen Hospital  
*Shoubridge, David; Tsukamoto, Shota; Suzuki, Komei*  
*Faculty Mentor(s): Kun Liao, Operations & Supply Chain Management*

Lynnwood Center - Poster Presentation, Poster #6

In 1972, Evergreen Hospital opened its doors and began servicing the greater Redmond, Woodinville, and Kirkland areas. Since then, it has expanded its capacity and grown into a major service provider in the Seattle area of Washington, specializing in cancer and cardiac care, orthopedics, maternity, and neuroscience. This case study seeks to analyze their supply chain system, specifically its purchasing system, and propose solutions that cut costs, improve efficiency, and maximize patient care. Information will be obtained through interviews with key purchasing personnel, particularly the supply chain director at the hospital. The study’s scope could potentially include the entirety of Evergreen Hospital’s supply chain management system, but will likely be narrowed down to specific purchasing functions and/or departments.

Low-temperature Thermal History Along the Zanskar Normal Fault, Greater Himalayan Range, NW, India  
*Shurtleff, Brett*  
*Faculty Mentor(s): Jeffrey Lee, Geological Sciences; Christian Hager, Geology, University of Kansas, Lawrence, Kansas*

Poster Presentation Session #1, Poster #61  
8:20-10:50 a.m. in Ballroom C/D

The Zanskar fault is a moderately northeast-dipping northwest-striking normal fault bounding the northern flank of the Greater Himalaya Range, NW Himalaya and is the westernmost segment of the South Tibetan Detachment System, an extensive normal fault structure that spans the length of the Himalayan orogen. The Zanskar fault is unique in that this extensional fault has developed within the India-Asia continent-continent collision zone. Detailed new (U-Th)/He zircon and apatite thermochronometric data from the High Himalayan crystalline rocks in the footwall of the Zanskar fault, provide constraints on the middle Miocene to present-day exhumation and normal slip histories along the fault. Inverse modeling of (U-Th)/He zircon and apatite thermochronometric data from the footwall of the Zanskar fault yield age patterns that are interpreted as indicating: (1) initiation of normal fault slip at ~14-13 Ma and rapid exhumation of the footwall between ~14 and 11 Ma at rates of 0.5-2.5 mm/yr, (2) rapid thermal re-equilibration between ~11 and 9 Ma, (3) slow exhumation and possibly a second stage of renewed extension between ~7 and 4 Ma indicated by increased cooling rates of some time-temperature paths, (4) continued slow exhumation and/or quiescence to the present day. The pulse of rapid cooling of footwall rocks to the Zanskar fault at ~14 Ma and possibly at ~7 Ma appear to broadly coincide with postulated continental slab break-off episodes to ~600 km beneath the western Himalaya, a mechanism that can result in an increase in gravitational potential energy and extensional deformation.
Investigation of the Role of Polyelectrolytes in the Stabilization of Reactive Redox Species  
Siegenthaler, James  
Faculty Mentor(s): Dion Rivera, Chemistry  
Oral Presentation, Session #45  
4:30-4:50 p.m. in Room 137B  

The stabilization of electrochemically reactive compounds can lead to new breakthroughs in energy storage technology. This study focuses on the stabilization of an electrochemically reactive dye in the presence of polyelectrolytes. Polyelectrolytes are chains of repeating charged atoms that are counterbalanced with an oppositely charged ion. Polyelectrolytes have been shown to stabilize electrochemically active species. When a negatively charged dye is introduced to a solution of polyelectrolytes with a positively charged backbone, electrostatic interactions of the opposite charges cause attraction between the dye and the polyelectrolytes. This study investigated the reduction and oxidation (redox) stabilization of the dye, indigo tetrasulfonate (ITS) in the presence of the polyelectrolyte poly(diallyldimethylammonium chloride) (poly(DADMAC)). The experiment involved electrochemical characterization using cyclic voltammetry to establish background scans of pure ITS, poly(DADMAC) and supporting electrolyte potassium nitrate (KNO₃). Once background scans were established, characterization of control solutions containing ITS, poly(DADMAC), and KNO₃ were taken to observe electrochemical interactions. The results for electrochemical stabilization were inconclusive, however a change in ITS’s reduction potential was observed. From the data collected the diffusion coefficient of the poly(DADMAC)-ITS complex were calculated. The associated change in Gibbs free energy for ITS in the presence of poly(DADMAC) was also calculated to compare the polyelectrolytes effects on redox stabilization.

Towards the Synthesis of Novel 1,3-Azaborines as Potential HIV-1 Protease Inhibitors  
Sigurjonsson, Kristín  
Faculty Mentor(s): Levente Fabry-Asztalos, Chemistry  
Poster Presentation Session #1, Poster #48  
8:20-10:50 a.m. in Ballroom C/D  

The considerable growth of organoboron chemistry in recent years has promoted a greater interest in the synthetic utility for boron containing compounds. Boron contains distinct chemical properties such as a dynamic coordinate system which can provide additional binding affinity, making it valuable for developing better pharmaceutical drugs. The borinic acid target compounds of this research include a chiral 1,3-azaborine, with nitrogen beta to boron. We are synthesizing novel boronates that are designed as compounds with potential dual-mode, both competitive and associative, inhibitory action of HIV-1 protease. Our target compounds provide a novel synthetic approach to produce the 1,3-azaborine structure due to the specific nature of the project. By incorporating a chiral type 1,3-azaborine into a transition state peptide mimic, we believe it will produce a medicinally significant compound. Cyclic boronates provide greater structural rigidity which are expected to be improved inhibitors than their straight chain analogs. These novel structures will also serve to expand molecular diversity and organoboron chemistry.
Variable Temperature Virtual Star  
**Skousen, Ernest**  
*Faculty Mentor(s): Michael Braunstein, Physics*

Oral Presentation, Session #29  
1:10-1:30 p.m. in Room 140

This project was aimed at developing a virtual star that can be used for qualitative measurements of the surface temperature of a telescopically observed star. The surface temperature of a star plays a fundamental role in stellar astrophysics. The spectrum of a star and hence its apparent color is primarily determined by its surface temperature through the physics of the blackbody spectrum. Through an understanding of the blackbody spectrum and the use of the 1931 CIE Color System which characterizes the response of the human eye to color, it was found that the light emitted from a RGB (Red-Green-Blue) L.E.D. (light emitting diode) with wavelengths 620nm, 515nm, and 480nm (when mixed) could mimic the apparent color of certain stars ranging from 5,000K to 50,000K. Using an optical collimator, optical fiber, and other optical equipment, this apparent color could be coupled into the eyepiece (star diagonal) of a telescope to produce a pin point source of light which can be seen and compared telescopically adjacent to an actual star. Our design includes the ability to vary the color characteristics of our virtual star in response to a virtual temperature dial operated by the user so that the stars can be manually color matched. This color matching performed by the user will correlate to a virtual temperature which will indicate a qualitative measurement of the surface temperature of the real star.

Cell Phone Use by Drivers in Ellensburg  
**Skyllingstad, Reed; Nelson, Sean**  
*Faculty Mentor(s): John Bowen, Geography*

Poster Presentation Session #3, Poster #29  
2:15-4:45 p.m. in Ballroom C/D

Texting-while-driving has become a serious threat to traffic safety, but little research has been done on how this phenomenon varies with respect to spatial, temporal, and demographic factors. In October 2012, the students in Geography 306: Transportation Geography and Planning gathered information about the use of cell phones by drivers at six carefully selected locations in Ellensburg at four times per day over a one week period. During each 20-minute observation period, the students recorded whether each driver passing the selected locations could be observed talking on a cell phone, texting on a cell phone, or doing neither. The students also recorded the gender and approximate age (young, middle-aged, and older) of each driver as well as the weather conditions at the time of the observation. In total, data on 7,022 drivers were compiled. The results show that cell phone use by drivers (counting both texters and talkers) is more common in Ellensburg than in the United States more generally, that female drivers are more likely to use a cell phone while driving than male drivers, and that young people are more likely to exhibit these behaviors than older ones. We further found that cell phone use was more common near the CWU campus especially on Water Street and least likely along Capitol Avenue near several Ellensburg public schools. We conclude by briefly assessing the public policy implications of our findings and offer several ideas for refining and extending our methodology.
Increasing Putting Dishes in the Dishwasher Using Prompting and Positive Reinforcement

Smith, Nadine

Faculty Mentor(s): Shu Fei Tsai, Education

Oral Presentation, Session #42
3:20-3:40 p.m. in Room 301

This behavior study aimed to increase the target behavior of one participant putting dishes in the dishwasher. The method used to increase this behavior was prompt fading and positive reinforcement. The objective was for the participant to put their dishes in the dishwasher each night before going to bed five out of seven days per week for six weeks. The ABAB reversal design was chosen to modify the participant’s behavior because this design involves the successive application and removal of an intervention to validate the intervention's effects on a behavior. By repeatedly comparing baseline data to data collected during application of the strategy, the researcher can determine whether a functional relation exists between the dependent and independent variables. Data of frequency were collected through event recording, whether the participant put the dishes away or not each night. The data were converted into percentages for weekly sessions. The purpose of this study was to learn how to successfully create and implement a behavior management plan as well as learning how to record and graph the data in order to have concrete evidence that the plan was effective as this is a significant aspect of a special educator’s job.

Massively Parallel k-NN Using CUDA and MARS

Smithrud, Joshua; McElroy, Patrick

Faculty Mentor(s): Razvan Andonie, Computer Science

Oral Presentation, Session #4
9:00-9:20 a.m. in Room 140

In pattern recognition, the k-nearest neighbor algorithm (k-NN) is a method for classifying objects based on closest training examples in the feature space. k-NN is a type of instance-based learning, where the function is only approximated locally, and all computation is deferred until classification. An object is classified by a majority vote of its neighbors, with the object being assigned to the class most common amongst its k nearest neighbors (k being a positive integer, typically small). For big datasets, this algorithm can become very slow. One way to increase its efficiency is to use a parallel implementation on Graphic Processing Units (GPUs). CUDA is a parallel computing platform and programming model, developed by Nvidia, which enables dramatic increases in computing performance by harnessing the power of the GPU. Our contribution is a massively parallel implementation using Nvidia GPUs with the CUDA Application Programming Interface (API) and the MARS MapReduce libraries.
1990
Spriggs, Jordan
Faculty Mentor(s): Andrea Eklund, Apparel, Textiles, and Merchandising
Poster Presentation Session #2, Creative Works, #49
11:30 a.m.-2:00 p.m. in Ballroom C/D

Purpose: I chose to create this garment to satisfy my interests and as a form of self-expression. The look of my garments is about crisp clean lines, slim silhouettes, and a jolt of unexpected color and pattern. I wanted to create a garment that would portray myself as well as my interests. Inspiration for my garment came from pop culture, music, art, shoes, and current trends. I used earth tones and wooden buttons to display my love and appreciation for the outdoors and the natural world.

Process: Throughout the design development phase, I researched streetwear trends as well as men's sportswear trends. I wanted to design garments that could be worn comfortably and casual while still giving the appearance of a clean, together look. This led me to use crisp, clean lines, accompanied with a European silhouette.

Techniques: To begin my garments, I first drew flat sketches of my conceptualization. I then took measurements of my model and began the tedious task of creating the patterns. At the drafting table, I began flat patterning the individual pattern pieces. After completion of all of my pattern pieces, I sewed together a sample. From here, I fitted the sample to my model, made alterations to my patterns, trued all of the lines, and began to create my final garment. After many hard hours of sewing, pressing, and top stitching all of my full-felled seams, I arrived at the finish line with my garments pristine.

Materials: Jeans: 11 ounce 99 percent cotton 1 percent spandex twill weave denim, 7 inch zipper, 100 percent polyester coat and outdoor thread, metal button, jean rivets. Shirt: 100 percent cotton black, red, and tan checkered homespun plain weave, wooden buttons, plastic cuff buttons, fusible interfacing.

Examining the Relationship Between Farmers' Markets and Obesity Rates in Washington State
Steele, Taylor
Faculty Mentor(s): Mathew Novak, Geography
Oral Presentation, Session #5
8:40-9:00 a.m. in Room 201

There is a growing awareness that America's obesity issue is linked to poor eating habits. Healthy food options may be inaccessible to large segments of the population, especially for those with reduced mobility including the poor and elderly. Farmers' markets are one way to alleviate these accessibility problems by providing healthy, locally sourced foodstuffs. In Washington State there is legislation (Substitute House Bill 2402 and the Senate Farm Bill) promoting farmers' markets as a healthy food source. Using geographic information systems (GIS), this study evaluates the spatial relationship between local obesity rates and consumer proximity to farmers' markets. Results show that there are lower rates of obesity in counties that have greater access to farmers' markets, suggesting that farmers' markets are providing a healthy food option to local consumers. These findings may help spur further legislation and incentives promoting farmers' markets in Washington State and beyond.
Land Management and The Kittitas Valley Event Center: A Historical View
Steele, Taylor
Faculty Mentor(s): Robert Hickey, Geography
Poster Presentation Session #3, Poster #30
2:15-4:45 p.m. in Ballroom C/D

The Kittitas Valley Event Center is a unique and historic feature within the city limits of Ellensburg, Washington. The largest annual event is the Ellensburg Rodeo and Fair; the rodeo is one of America’s top 10 professional rodeos. Since 1923, the site has grown as different properties were purchased and/or allocated by different stakeholders. The result is a multi-use site with different owners, stakeholders, environmental regulations, and interests. A master plan was created in 1997 to develop and plan for the future. This plan is currently being updated. Unfortunately, there is a lack of complete, organized, and manageable data to use in the planning process. The primary goal of this project is to gather and organize all of the pertinent current and historic data from various sources within a GIS environment. Secondarily, this is an opportunity for the town to work with the university on an important topic through a student internship project. This poster deals with both the data collection and verification process, but also an overview of the changes in the built environment over the event center’s history.

Cuchulain: A Literary Instrument of the Gaelic Revival
Steeves, Aaron
Faculty Mentor(s): Jason Knirck, History
Oral Presentation, Session #23
11:40 a.m.-12:00 p.m. in Room 271

This paper is on the role that the mythological figure Cuchulain played in the Gaelic Revival in Ireland. It explores how this character was used in both the literature of the Revival as well as how the figure of Cuchulain was used in newspapers and politics as a propaganda tool. The paper also assess how the figure of Cuchulain was portrayed in his physical appearance, his relationships with women and his countrymen, and how he was viewed by his peers and his enemies. Because many people have used Cuchulain for literary reasons and for propaganda it is interesting to see what elements of the figure have been used and for what purposes. This paper also puts the use of the figure of Cuchulain into context at all possible times to identify the intent that the use of the figure was meant to portray. This includes identifying the important political events that occurred in both Britain and Ireland. This paper looks at several interpretations of Cuchulain by several authors who have utilized the figure in their works during the Gaelic Revival. This paper demonstrates that Cuchulain was more than just a literary hero to the Irish people; he was a figure that transcended time and they believed he could help Ireland reach its political goals.
Mapping and Radiocarbon Dating Archaic Period Monuments: La Alberca Structure Complex, Highland Michoacán, Mexico
Steinkraus, Mark; DeLeon, Ansel
Faculty Mentor(s): Steven Hackenberger, Anthropology
Poster Presentation Session #1, Poster #7
8:20-10:50 a.m. in Ballroom C/D

During the summers of 2007 and 2009, archaeologists from CWU and California State University-Fullerton conducted fieldwork in central Michoacán, Mexico. The group mapped the ceremonial site known as the La Alberca Structure Complex. It is composed of at least twelve stone terraced structures associated with the Archaic, Classic or Post Classic periods. While finishing the mapping of the complex, the group discovered a buried boulder structure. Radiocarbon samples associated with this structure dated to 6,160±40 BP. This poster presents the results of radiocarbon dating, feature stratigraphy, and GIS 3D models of the Archaic Period buried rock structure.

Being Mexican-American: A Literary Analysis of the Life of Mexican Immigrants in the United States
Stratton, Markie
Faculty Mentor(s): Alejandro Lee, Foreign Languages
Oral Presentation, Session #36
3:40-4:00 p.m. in Room 137A

In the United States of America today, we have seen an increasingly large number of Mexican immigrants. According to the Migration Policy Institute, 11,478 legal Mexican immigrants entered the United States in 2009. In the last couple of years, a number of issues, such as the English-Only Movement, have arisen surrounding these immigrants. Unfortunately, these issues give the impression that for immigrants to be welcome here, they must assimilate themselves completely into American culture. At SOURCE, I will present some of the consequences, both positive and negative, for Mexican immigrants when they immigrate to the United States and assimilate into United States culture. My presentation will explain how the Spanish language and various other parts of Mexican culture are unique and essential to their culture. A literary analysis of works such as Gloria Anzaldua’s Borderlands, La Frontera: The New Mestiza, and Sandra Cisneros’ The House on Mango Street will create a realistic picture of every day life in Mexican-American culture. This topic holds very strong social significance because of its ability to promote interracial and intercultural understanding, as well as to demonstrate the importance that Mexicans, at least in part, retain their own culture.
Automobiles contribute more to global air pollution than any other source and one of the most harmful emission components to human health is the carbon-based particulate matter, known as soot. These particulates are often bound to heavy metals, primarily iron, which is known to increase soot toxicity upon inhalation. However, the processes by which these compounds are formed during combustion, emission and subsequently in the atmosphere are ill-defined. The purpose of this research is to induce and study iron-soot redox reactions under emulated conditions of an automobile tailpipe as well as under ambient atmospheric conditions to increase our understanding of the processes that control iron speciation and surface functional groups of soot. Iron is analyzed via UV-Vis Spectrophotometry and soot surfaces will be examined with X-ray Photoelectron Spectrometry at the Pacific Northwest National Laboratory. Results show that under reducing environments, without the presence of sunlight, iron is reduced significantly in the presence of soot, which confirms that toxicity of soot is dependent on the reducing conditions encountered within the tailpipe as well as the amount of time that an aerosol ages before inhalation.

This study used 727 participants’ survey responses to analyze definitions of hooking-up as well as look at differing definitions with regards to gender. Respondents were asked to report whether specific sexual behaviors represented hooking-up or not. Participants were asked to respond the question: “If this were the only behavior that happened between two people, ______________ would be considered a hook-up.” Frequencies of sexual behaviors being reported as hooking-up were analyzed. Gender difference between frequency of positive reports were found in the activities of “fondling-clothes off,” “fondling-under clothes,” “deep kissing without tongue,” and “spending the night.” For all of these activities, women reported the behavior to be a hook-up with higher frequency than men. (Editor’s Note: This presentation may contain adult themes, content, or imagery.)

Seaweed is a promising renewable source of biofuel because it is underutilized by humans, does not compete with land sources of food, and has no need for fresh water. We will attempt to produce ethanol from seaweed through fermentation using low amounts of energy. We will compare the energy input and output of the process. This will be followed by an evaluation using chemical analysis and practical application to determine whether seaweed ethanol could be processed in larger quantities to be a viable replacement for current fuel sources.
Rendering and Articulation of a Bobcat
Sweepe, Kyleen
Faculty Mentor(s): Patrick Lubinski, Anthropology
Poster Presentation Session #1, Poster #1
8:20-10:50 a.m. in Ballroom C/D

I obtained this juvenile bobcat, gutted and de-fleshed, from Moffat Taxidermy in Spokane, Washington. For rendering, I took the bobcat to Mike Kammenga for his Dermestid beetle colony to clean tissue from the bones, then a crock-pot for about six hours and lastly into 35 percent hydrogen peroxide soak to whiten bones. After, I had a near-complete skeleton missing only two ribs and both clavicles. Articulation started with the shaping of the backbone wire and positioning small pieces of ivory felt between each vertebra to account for the missing epiphyses. I placed each vertebra into correct anatomical order and glued it into place on the wire; the completed backbone was then attached to two steel support rods, glued and wired for further immobility. Then, the pelvis was glued to the sacrum, which articulates to the last lumbar vertebra. The process for the hindlimbs included articulating and gluing the leg bones, tarsals, metatarsals and phalanges. I, then, repeated the process for the forelimbs, including the forelimb bones, carpals, metacarpals, and phalanges. The ribs were glued onto the thoracic vertebrae one by one, with the final step that of gluing the cranium to the first cervical vertebra.

The Trans-Pacific Partnerships Impact on America
Swenson, Matthew; Takei, Hideki
Faculty Mentor(s): Hideki Takei, ITAM
Oral Presentation, Session #12
10:30-10:50 a.m. in Room 140

The United States is currently engaged in the most ambitious trade talks of this century. The Trans-Pacific partnership (TPP) is a negotiated comprehensive trade agreement between 11 countries with two more countries considering joining the talks. The 11 countries in the negotiations account for more than 30 percent world’s Gross Domestic Product, with the probable addition of Japan and South Korea that number is pushed to 40 percent and would include 40 percent of the world’s population. The TPP negotiations are seeking to remove both tariff and non-tariff barriers to trade, the goal being to make sure that tariff barriers are not simply replaced by non-tariff barriers. By removing most of the barriers to trade with a TPP agreement the trade landscape across the Pacific region is going to change dramatically and perhaps in unexpected ways. If the TPP is accepted in its current state, the paradigm shift could lead to such remarkable changes as Japan importing automobiles from produced by Japanese companies in the United States, from the United States to Japan. The benefit of opening up further trade and reducing barriers will be a major boom to smaller less industrialized countries like Vietnam and Brunei, but what if, any advantages will the TPP have for modern industrialized countries? The United States and, once they formally join the negotiations, Japan will be the two most modern and industrialized countries taking part in the TPP. What, if any, advantage might the TPP hold for the United States and Japan?

Local-level Analysis of Multinational Corporations in Less Developed Countries
Tafere, Danait
Faculty Mentor(s): Michael Mulcahy, Sociology
Des Moines Center - Poster Presentation, Poster #1

Since the 1980s a new wave of globalization has caused dramatic increase in foreign investments in less developed countries (LDC), restructuring their international trade relations. In this
context, social scientists have asked about the effects of international economic relationships on social and economic development in LDCs. Most of the previous research on this question focused on national levels of foreign direct investment (FDI), or the (national) level of concentration of FDI, or trade dependence. Researchers in the dependency theory tradition argued that poor countries with a highly concentrated FDI generate a pattern of dependency. High investment concentration by a single or a small number of investing countries limits the autonomy of state and business elites to act in the long term interest of domestic growth in the host country. Similarly, dependency theorists have found that dominance of foreign capital allowed the investing country to obtain and maintain a significant advantage over its dependent partner. Other subset of studies in that tradition focuses on the relationship between economic dependence and food security. One recent study argues that the effects of FDI on food security depend on how FDI is distributed among economic sectors (primary manufacturing, service). The existing research on this topic has not, however, given enough attention to the physical presence of multinational corporations (MNCs) as a distinct form of international economic relationship. If we turn our attention to the physical presence of MNC facilities, then we have these new questions concerning local-level effects of the presence of foreign capital in LDCs. My research takes up questions regarding the relationship between the physical presences of multi-national corporations (MNCs) in Africa and local level effects on development policies and human capital, with a local level analysis. I will be using local level data from African countries found in the sources cited below. I will be looking at the presence of MNCs in 10 African countries and selecting three to five districts from each country where there are MNCs located and then picking comparison three to five districts that are from each country that do not have MNCs. This research should gives us a clear understanding about the effects and outcomes on the physical presence of MNCs in LDCs at the local level.

Using GIS to Assess the Post-Fire Table Mountain Environment for Mass Wasting Susceptibility
Takagi, Owen
Faculty Mentor(s): Karl Lillquist, Geography
Oral Presentation, Session #38
3:20-3:40 p.m. in Room 140

The Table Mountain fire of Central Washington started on September 8, 2012 during a significant lightning storm. The burned area totaled 42,312 acres. Wildfires can form hydrophobic soils, remove duff, and remove stabilizing vegetation from slopes resulting in a decrease in slope stability and an increase in mass wasting susceptibility. The recent and inaccessible nature of the Table Mountain fire has resulted in few studies being conducted on the post-fire environment. My goal was to model how the Table Mountain fire could affect slope stability of burned areas, hence mass wasting susceptibility at Table Mountain. Data was formatted and analyzed in ArcMap 10.1, creating a relative hazard map that encompassed all significant factors potentially influencing mass wasting in the area such as soil burn severity, topography, aspect, geology, vegetation cover, and hydrology. Each parameter was assigned a relative hazard ranking representing their importance in assessing mass wasting hazards. Preliminary results show that DEM’s were useful in providing slope and aspect analysis, and that the use of Landsat 7 imagery was sufficient to show percent vegetation cover. Areas with the greatest landslide susceptibility were near streams in areas with high intensity burning, presence of landslide deposits, and have a slope greater than 35 degrees. Most of the burned area was ranked as moderate mass wasting susceptibility followed by areas of low and high mass wasting susceptibility, respectively, the abundance of basalt bedrock and areas of low slope in the study area may account for the large areas of moderate mass wasting susceptibility.
The Japanese Bushido of the Era of Civil War

Takei, Hideki

Faculty Mentor(s): Hideki Takei, ITAM

Oral Presentation, Session #23
12:40-1:00 p.m. in Room 271

Bushido is the guideline of the samurai’s life. Samurai lived in close quarters with death because they were warriors. This made them think about death all the time so they had to figure out appropriate ways of enriching their life. This is why no matter how samurais’ living environments changed, samurai as warriors used the view of death to interpret bushido. While the essence of bushido was always reflecting the view of death, interpretation of bushido as guideline was not definite because interpretations varied by samurai’s living situations in different eras. Generally, samurai interpreted bushido by its four universal values: loyalty, morality, courage, and honor. For example, the four universal values of bushido during 300 years of the age of civil war (approximately from 1300 to 1600 A.D.) are quite different from those values during the 270 years of peaceful time of Tokugawa era (approximately from 1600 to 1870 A.D.). In this study, we will discuss the view of death as the essence of bushido. Then, we will discuss the four values during the civil war era in three situations from the life of samurai which are (1) learning bushido, (2) training bushido, and (3) showing bushido. We believe discussing the four values of bushido in this particular era is important because it became the main characteristic of bushido of later years.

Events and Attractions in Kittitas County

Tate, Jessica; Mushlitz, Lindsey

Faculty Mentor(s): Barbara Masberg, Recreation & Tourism

Poster Presentation Session #3, Poster #37
2:15-4:45 p.m. in Ballroom C/D

The goal of the project was to complete a gap analysis of events and attractions in Kittitas County in order identify a focus for future development. This poster provides the results of an analysis of the categories, scope, draw, and audience of events and attractions. Data were collected from community organizations, specific attractions and events, and relevant publications. Ellensburg has 28 annual events representing a broad spectrum of interests and visitors. Event categories include: (a) western, (b) family oriented, (c) beer and wine, (d) sales and retail, (e) recreation, and (f) other (i.e. Burnout in Kittitas). The events were evenly distributed among these categories with a slight higher number that were western themed. However, western events do not seem to be conflicting or saturating the number of events offered. The variety of western events may help Ellensburg maintain the unique sense of place, rodeo town. By taking an inventory of the nonevent attractions in Kittitas County, it is apparent that although there is a lot offered there are also gaps, especially in the number and size of built attractions. Attraction categories included (a) western, (b) microbreweries and wineries, (c) entertainment, (d) recreation, (e) education and heritage, and (f) music and art. Attractions were fairly evenly distributed with a slight higher number in the categories of microbreweries and wineries and education and heritage. While there are many built attractions attracting niche markets none of them have large mainstream appeal.
An Essay on the Natural Law and Republican Form of Government
Taylor, Robert
Faculty Mentor(s): Matthew Altman, Philosophy & Religious Studies

Oral Presentation, Session #6
8:40-9:00 a.m. in Room 202

What law compels humankind to construct governments? Does such law also compel humans in while doing the same to construct a specific form of government? Additionally and most importantly, is such law a universal law or, in other words, an inherent law of nature to compel humans to form governments? Granted, most of society can agree to the first law that we ought to construct a government. That said, there ought to be a law that compels humankind to construct, if not a perfect form of government, at least more perfect government. This paper contends that a more perfect government for society is the republican form of government. The republic can be defended as a more perfect system through a secular natural law derived from reason. Namely, by hybridizing the democracy and Philosopher King aristocracy of the Plato’s republic, one can arrive at the republican form of government. Additionally, via the moral philosophy of Immanuel Kant, the government is able to overcome the criticisms of a representative democracy via the notion of unalienable natural rights. Therefore, in summary, it shall be demonstrated that a more perfect form of government is the republican form of government.

Ferrous Iron and Hydrogen Peroxide Produced by Marine Aerosols Deposited in Ocean Water of the Equatorial Pacific Ocean
Teng, Hsiang; Ting, Hoi
Faculty Mentor(s): Anne Johansen, Chemistry

Poster Presentation Session #1, Poster #51
8:20-10:50 a.m. in Ballroom C/D

The Equatorial Pacific Ocean is limited in primary productivity by the micronutrient iron, which is delivered to the ocean through the deposition of continental aerosols. Despite the fact that the amount and speciation of this iron controls phytoplankton productivity and thus has implications on the carbon cycle and global climate, accurate estimates of the atmospheric contribution of bioavailable iron to the surface ocean are difficult to obtain. To further our understanding of reactions that transform iron after it is deposited into the ocean we performed photochemical experiments using real collected aerosol particles in real ocean water. Subnanomolar levels of ferrous iron (Fe(II)) and hydrogen peroxide (H$_2$O$_2$) were determined with chemiluminescence detection in the presence of luminol and acridinium ester, respectively. Fe(II) and H$_2$O$_2$ increased in the presence of light during the course of the dissolution experiments and spiked with the addition of dimethyl sulfide, which is a compound emitted by phytoplankton when under stress such as iron limitation. These results show that Fe(II), which is found to be more bioavailable than its oxidized counterpart, is produced by compounds that are co-deposited with aerosol particles as well as compounds directly emitted by phytoplankton. These mechanisms of iron redox cycling in surface ocean waters allow us to better predict the impact of changing aerosol loadings on the carbon and sulfur cycles and global climate.
The Illusion of Power: An Analysis of Magical Realism and Religion in *Bless Me, Ultima*

*Thomas, James*

*Faculty Mentor(s): Christopher Schedler, English*

Oral Presentation, Session #35  2:40-3:00 p.m. in Room 135

This paper examines Rudolfo Anaya’s novel *Bless Me, Ultima*, analyzing the use of Magical Realism in relation to religion, spiritualism, and the occult. It highlights and scrutinizes the supernatural feats and abilities of the brujas (witches), curanderas (healers), and worshipers of paganism. Each of these religious factions possess powers that have visible effects on the world and are witnessed first hand by the narrator, Antonio Marez. The power of these factions is then used in contrast to the seeming powerlessness of the Catholic Church. Antonio’s confrontation with the supernatural impotence of the Church forces him into the uncomfortable position of questioning the beliefs of his family and community. Finally, an analysis of the power machinations of the Church within the Chicano community provides further insight into Anaya’s treatment of religion within his novel, illustrating how the Church maintains its power and influence despite its inability to provide overt supernatural displays or to oppose the powers of the other religious factions.

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*A Fresh Look at National Dental Data*

*Tokarczyk, Russa; Blanar-Oviatt, Adam*

*Faculty Mentor(s): Dominic Klyve, Mathematics*

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

We look at data from the 2010 Medical Expenditure Panel Survey (MEPS) focusing on the dental data. MEPS is a set of large-scale surveys of families and individuals, their medical providers, and employers across the United States. MEPS collects data on the specific health services that Americans use, how frequently they use them, the cost of these services, and how they are paid for, as well as data on the cost, scope, and breadth of health insurance held by and available to United States workers. We generate our questions based on the interest of local dentists. We use advanced statistical analysis, data manipulation and other analysis tools to examine a broad swath of questions that the local dentists seek to answer.

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*Populations of Daphnia melanica Vary in Their Behavioral Response to Visible and UV Light*

*Tompkins, Amanda*

*Faculty Mentor(s): Alison Scoville, Biological Sciences*

Oral Presentation, Session #28  2:10-2:30 p.m. in Room 137B

*Daphnia* are a genus of freshwater zooplankton that inhabit ponds and lakes. They are commonly used as a model organism for ecological genomics because they are easy to manipulate in the lab, can reproduce clonally, and are considered a keystone species in lake ecosystems. *Daphnia melanica* in high alpine lakes of the Olympic National Park are exposed to high levels of UVB. UVB rays cause DNA damage that can be detrimental to the organism if not fixed. *D. melanica* from more transparent ponds of the Olympic National Park have evolved faster rates of DNA repair compared to *D. melanica* from less transparent ponds. *D. melanica* can also move down the water column to avoid harmful UVB rays. Daily migration up and down the water column, known as Diel Vertical Migration, is a key aspect of *Daphnia* ecology and behavior. In this study, I measured vertical migration behavior of six populations of *D. melanica* in three different light conditions: dark, cold visible light, and UV light. Eight clones were scored
for each population and four individuals were scored for each clone. All populations initially moved downwards in response to both types of light. However, the specific pattern of response differed both between light conditions and between populations. Differences in behavior between populations may reflect adaptation to different UV regimes, invertebrate predators, or distribution of food in the water column.

A Comparison of Plant Growth in Soils from Burned and Unburned Sites
Town, Corrine
Faculty Mentor(s): Raymond Donahue, Biological Sciences
Poster Presentation Session #1, Poster #22
8:20-10:50 a.m. in Ballroom C/D

There are many considerations as to whether fire is beneficial or destructive. When fire is covered by the media they usually declare that areas affected by a fire are “destroyed”. The coverage also includes people who are directly impacted and they echo this feeling since their lives are certainly affected. My question is if the land is really destroyed or if it is simply changed. Soil was collected in the Taylor Bridge area from a deeply burned site and from an untouched site less than half a mile away and grew corn and sunflowers as representative plants to see if there was a difference in plant growth between soils in burned and unburned areas. The weight, texture and nutrient levels of the soil samples were tested and plants grown in pots in the greenhouse to determine if the plants’ growth was affected by the soil from different locations. There were statistically significant differences in measures of both soil texture and plant growth. The soil from the burned area supported more plant growth and had a consistency that potentially made nutrients in the poor local soil more available to plants. The soil test kit was only able to give a general indication of nutrient levels but the land, or at least the soil, seems to be improved by a deep burn and should provide a good medium for germination and new growth.

Plant Anatomical Structures and Art
Town, Corrine
Faculty Mentor(s): Mary Poulson, Biological Sciences
Poster Presentation Session #1, Poster #21
8:20-10:50 a.m. in Ballroom C/D

In the fine arts synthetic products are generally scorned as substrates for pigments and other media. Why are man-made fibers generally considered unsuitable as means of artistic expression? Why are natural fibers preferred? Is it just a traditional artistic prejudice? The material used in paper making is mainly cellulose from wood pulp or cotton. Even man-made cellulose products such as rayon fibers can’t be used exclusively for paper because they don’t adhere to each other properly. Canvases are usually made from traditional materials like cotton or linen and supported on wooden stretcher bars. A woven fabric doesn’t need adherent fiber properties like paper does but the coarsely woven, slightly rough texture of natural fibers absorbs the materials used for priming canvases in a useful manner to create a suitable surface for oil pigments. As an artist I have studied printmaking and the properties of different papers used for various artistic processes. As a botanist, I have studied plant anatomy and plant structures such as xylem and phloem fibers, the seed hairs of cotton, and the bast (phloem) fibers of linen as well as their connections to art, particularly in paper making. I connected my own works in printmaking and painting with the structures of the plants that the materials I used were derived from, and this greatly increased my appreciation and understanding of plant anatomy.
Lies, Valor Lies, and the First Amendment

*Umana, Jonathan; Smith, Nicole*

*Faculty Mentor(s): Cody Stoddard, Law & Justice*

Oral Presentation, Session #10
9:30-10:50 a.m. in Room 137A

The First Amendment has held a unique and controversial place in United States jurisprudence. More specifically, speech that has been deemed unpopular has been shielded by protections under this amendment. However, do the protections of the First Amendment extend to speech that is factually untrue? In *United States v. Alvarez*, the court addressed the constitutionality of the Stolen Valor Act, a decree criminalizing false claims of military decorations or medals with the intent of protecting those that have rightfully acquired such distinctions. In Alvarez, the United States Supreme Court issued a splintered decision and ruled the Stolen Valor Act unconstitutional under the First Amendment. This presentation will discuss the goals of the First Amendment, facts and logic surrounding the Alvarez case, as well as various rationales produced by the court. This presentation will also discuss broad justifications of protecting different types of speech including false statements. In addition, the analysis will focus on the rationalization utilized by the court and the role of the marketplace of ideas in the plurality decision.

Impact of Park Ranger Quality on Tibetan Macaques (*Macaca thibetana*) at Mt. Huangshan, China

*Usui, Rie; Li, Jin-hua; DuVall-Lash, Alexander; Pritchard, Alexander*

*Faculty Mentor(s): Lori Sheeran, Primate Behavior; Steve Wagner, Primate Behavior*

Oral Presentation, Session #39
3:40-4:00 p.m. in Room 201

Previous studies have reported negative impacts on nonhuman primates and tourists at various primate tourism sites and advocate the improvement of tourism management. Yet, it remains unclear what constitutes good quality management. We explored whether rates of macaque aggression and stress levels differed under supervision of different park rangers at Valley of the Wild Monkeys (VWM) in Anhui Province, China. We hypothesized that lower levels of macaque aggression and self-directed behaviors (SDBs) would be observed if park rangers enforced park rules. Behaviors of tourists, park rangers, and monkeys were collected from August 16 to September 30, 2012. Rates of macaque aggression and SDBs were compared across different park rangers. At VWM, two pairs of park rangers interchangeably provisioned a group of macaques on a monthly basis. Our results showed that rates of monkey aggression and stress-related behaviors did not differ significantly among different park ranger conditions. We compared the first and second week rates of macaque aggression and stress-related behaviors post-alternation of park rangers for August and September. Our results showed that rates of aggression were not significantly different during two weeks post-alternation for both August and September, but rates of SDBs were significantly different between first and second weeks in August. Park rangers restricted tourists from interacting with the monkeys on only 8 out of 81 (9.9 percent) visiting sessions, which suggests that rangers’ interventions during tourist interactions with macaques occurred infrequently at VWM.
Research into Columbia Plateau precontact settlement and subsistence patterns has largely focused on Columbia River pithouse villages. As part of a Farrell Scholarship research project I explored an upland plateau site by analyzing the lithics from five excavation units at the Grissom Site located in Kittitas County. I tested two hypotheses: that there is functional differentiation across the Grissom Site; and that those functional differences are both similar and different when compared to other sites. Using stone tool classifications based on previously published Plateau research, I analyzed 525 stone tools. After classifying the tools, an intra-site comparison was conducted to determine if there were differential use areas at the site. Six accelerator mass spectrometry (AMS) radiocarbon dates from bone were obtained to determine the site’s timing and duration of use. All dates place the site within the Cayuse Phase (2,500 B.P. to the historic period). After completing classification and obtaining AMS dates, I conducted an intersite comparison with three other Plateau sites from the same time period. The Grissom Site displays functional differentiation in stone tools across space. The same activities took place at the same locations within the site through time. Activity at the site as a whole was focused on resource extraction and processing, and creation and maintenance of stone tools. The hypothesis that the Grissom Site is regionally unique remains untested as sufficient data for comparison was lacking. Of the three comparison sites, the Grissom Site most closely resembled pithouse villages in the Chief Joseph Reservoir area.

Can we heat a greenhouse using cogeneration with a biodiesel-powered generator and use the greenhouse to grow food for our school? Would this reduce our school’s carbon footprint? We will use published lifecycle analysis of food production and transportation, information about greenhouse design and management, and information from farm-to-school leaders.

A regenerative brake system is a system using the power from the battery to run the bike when going uphill—in saving mode—and recharge the battery when the bike goes downhill or on a flat ground—in charging mode. The system includes the electric part, and the transmission part. However, how can we know whether it works or not, or how efficient it is? This raises some methods to test the system. First, a small bulb will be connected to the circuit, and it will light up
when the battery is charged. Second, the bike will be able to run 20 meters without any human forces. The farther the system can go, the better efficiency it gets. Finally, the system has to be stable, and safe for the user. With all those tasks above, the system will be a success if it can perform them.

Water Quality in Crystal Creek and How It Relates to Salmon Viability
Walter Strom Middle School
Mentor(s): Dale Sweet, Walter Strom Middle School

Sixth Grade Students at Walter Strom Middle School study the life cycle of salmon all year long which includes raising Chinook Salmon from egg to fry in the classroom. Walter Strom Middle School has “adopted” Crystal Creek, a small creek a short quarter mile walk from campus. The Sixth Grade’s responsibility in this adoption is to monitor water quality. In combining these two major units of study the Sixth Graders are posed the yearlong investigation question of: If we released our salmon into Crystal Creek would they be viable? Throughout the school year students collect water quality data in the areas of temperature, pH level, dissolved oxygen level and flow rate. Students research water quality needs for salmon in the same areas. A comparison is made between collected data and researched data to determine if our salmon could live in Crystal Creek.

Field Investigations 7th Grade Walter Strom Middle School
Walter Strom Middle School, 7th Grade Students
Mentor(s): Trish Griswold, Walter Strom Middle School

Seventh grade field investigation posters created from quantitative comparative research studies in the Cle Elum-Roslyn School District forest.

Upper Kittitas County Landscape Investigation
Walter Strom Middle School, 8th Grade Students
Mentor(s): Lisa Browitt, Walter Strom Middle School

Eighth grade students from Walter Strom Midle School in the Cle Elum-Roslyn School District researched the history of their communities, and then ventured into those same communities to talk to local businessmen and women about current issues. The goal was for students to gain a spatial understanding of their communities.
Modeling Metamorphic History of High Pressure Rocks From Western China

Walters, Jesse
Faculty Mentor(s): Chris Mattinson, Geological Sciences

Oral Presentation, Session #38
3:00-3:20 p.m. in Room 140

During continental collision, rocks at the surface can subduct to great depth, metamorphose at extreme pressures, and return to the surface. This study uses computer modeling to construct the pressure-temperature (P-T) history of a gneiss from an extinct collision zone to test the extent of ultra high-pressure metamorphism (greater than or equal to 25 kbar at 750°C). Field evidence of crystallized melt and an alkali-feldspar reaction found in the sample suggest a history of melt loss during the early stages of metamorphism. A P-T diagram constructed from the pre melt-loss sample composition, predicts ~20-35 vol percent melt coexisted with the observed assemblage, ~80-85 percent of which was lost during peak metamorphism. Before melt-loss, the gneiss passed through the alkali-feldspar reaction (~15.5 kbar, 750°C) to the formation of the observed mineral group (~12 kbar, 850°C). Diagrams constructed for the post melt-loss composition predict the observed minerals to form at ~11-15 kbar and ~810-870°C, which is consistent with previous estimates for rocks hosted by the gneiss. Predicted mineral abundances match observed values, with 8-18 vol percent garnet and 0-10 vol percent biotite in the diagram, and 10-15 vol percent garnet and 10 vol percent biotite in the sample. Mineral compositions converge at ~12-12.5 kbar and ~660-700°C, which agree with previous P-T estimates for the gneiss and suggests diffusion altered mineral compositions. Modeling of the gneiss suggests a shared history of metamorphism with the hosted rocks, and that it did not reach the ultra high-pressure metamorphic conditions experienced by adjacent rocks to the east.

Water Filtration System

Wartella, Christopher
Faculty Mentor(s): Charles Pringle, Mechanical Engineering Technology

Poster Presentation Session #2, Creative Works, #7
11:30 a.m.-2:00 p.m. in Ballroom C/D

A portable water filtration unit can be designed and fabricated to produce clean drinking water from an otherwise unhealthy water source. There are already numerous portable filters on the market; however, their effectiveness is limited to the specific filter that they use. This filtration design will consist of three separate treatment stages including sediment screening filter, an ultra violet light filter, and a carbon-activated filter. Mechanical energy will be transferred from a crank mechanism to provide power to a pump and an induction generator that will provide the energy to operate the UV filter. Finished water quality is desired to meet US Department of Health standards.
Analyzing Water Quality and Flow Volume of Ellensburg Streams
Waymire, Matthew
Faculty Mentor(s): Clay Arango, Biological Sciences
Poster Presentation Session #3, Poster #16
2:15-4:45 p.m. in Ballroom C/D

Three branches of Wilson Creek flow through the City of Ellensburg: Mercer Creek, West Branch Wilson, and East Branch Wilson. These creeks carry natural stream flow, but they also carry irrigation return flow and they convey irrigation water deliveries to downstream withdrawal points. Using these streams to convey irrigation flow can alter flow volume and also contribute turbidity and bacteria to the stream, thus degrading water quality. I am collecting stream flow, turbidity, and bacteria data for the City of Ellensburg in six different locations of these three streams. The overarching purpose of my data collection is to see if there is a significant difference in flow volume, turbidity, and bacteria counts before and during the agricultural season. I started measuring turbidity, flow volume, and bacteria twice a week on March 14 and will continue until May 31. April 15 is the start date for irrigation so there will be seven measurements before and 14 after this date. Bacteria samples are taken to a city official where colonies are cultured on media for further inspection of fecal coliform bacterial counts. These data will allow me to track changes occurring in the streams during the growing season. Because Wilson Creek is listed as degraded by fecal coliform, these data will help support creek management activities by city officials. The data collection processes are ongoing, but preliminary results show that stream flow, turbidity, and bacteria counts are noticeably higher during the growing season.

Sonatine for Flute and Piano by Henri Dutilleux: History, Influences, and Analysis
Webster, Megan
Faculty Mentor(s): Hal Ott, Music; Karen Gookin, English; Matthew Altman, Douglas Honors College
Creative Expression Presentation, Session #16
9:50-10:10 a.m. in Ballroom A

Sonatine (1943) by Henri Dutilleux is considered by many in the global flute community to be one of the top pieces written for the instrument. It presents a set of challenges that had not been explored regularly by French composers for the flute prior to its composition. A piece of such weight must have pivotal history connected to it that helped it grow in popularity. Knowledge of this history would also enhance the performer’s concept of the piece while preparing for performance. To explore this history, I have analyzed the piece to look for unusual characteristics in comparison to Dutilleux’s other works and other flute pieces of the time. I have looked into the history of the Paris Conservatoire, for which the work was written as the mastery piece for the graduating class, and the context of the world at war that surrounded Dutilleux at the time of the composition. This presentation will describe findings regarding of Dutilleux’s life as a composer in occupied Paris as well as what possibly influenced Dutilleux to write a piece so different than anyone previously. Audio examples of Sonatine will be presented in correlation with points in the presentation. Dutilleux has also disowned his earlier works, of which Sonatine is included, believing it to not be representative of his talent. Dutilleux’s shame of earlier works like Sonatine will be discussed, especially given that it is by far the most performed work in Dutilleux’s repertoire.
The Relationship Between Homeschooling and Child Abuse
Webster, Rebecca
Faculty Mentor(s): Michael Harrod, Sociology
Oral Presentation, Session #21
12:40-1:00 p.m. in Room 201

Due to the lack of records and regulation on homeschooling, it is difficult to determine if homeschooling poses any more risk for child maltreatment than a child attending regular school and if there is a relationship between homeschooling and child abuse. Here, I look at the risk factors and the reasons why people homeschool their children and compare those to the risk factors involved with child abuse. Also I look into the criticisms of homeschooling and the stigmas attached to it. Among the greatest criticisms leveled are isolation and the deficits of regulating homeschooled children. Despite the risk factors, the interviews imply that child abuse and homeschooling are not similar enough to suggest a pattern. It is clear that homeschooling provides an opportunity to conceal child abuse, but it is not clear that abuse is more prevalent than what occurs to children who attend public schools. Due to the lack of information and records concerning homeschooled children, more investigation is needed to determine if there is a relationship between homeschooling and child abuse. Through interviewing social workers, I examined the relationship between homeschooling and child abuse and found no evidence of their relationship, but there was strong evidence to suggest that parents engaging in maltreatment and educational neglect are more likely to use homeschooling as a guise.

Water Quality Versus Energy Supply: The Dilemma of Hydraulic Fracturing
Weigel, Landon
Faculty Mentor(s): Rex Wirth, Political Science
Poster Presentation Session #3, Poster #33
2:15-4:45 p.m. in Ballroom C/D

Natural gas in the United States is plentiful, inexpensive, and becoming a significant trend in domestic energy production. However, adequate regulation is a challenge. Cost benefit analysis has determined that wastewater processes, exploration, and emissions from production are negatively affecting the environment. Water contamination from fracking is an overwhelming concern. Secrecy has been a major problem since the 2005 ‘Halliburton loophole,’ which exempts hydraulic fracturing from many of the nation’s key environmental-protection laws, including the Clean Water Act, Safe Drinking Water Act, Clean Air Act, Resource Conservation and Recovery Act, and Comprehensive Environmental Response Compensation and Liability Act. According to Dr. Theo Colborn, 90 percent of the fluids used in the fracking process cause major health concerns and birth defects. Production procedures allow for contaminant leaching into local watersheds. This analysis will determine the effectiveness of current regulatory regimes in controlling the effects of hydraulic fracturing on local water quality.
Miller v. Alabama: Juveniles and Eighth Amendment

Welch, Edward

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

Oral Presentation, Session #10
9:30-10:50 a.m. in Room 137A

The recent case of Miller v. Alabama continues the trend of the US Supreme Court looking at juveniles differently than adults regarding sentences and the Eighth Amendment. In the Miller case, Evan Miller was 14 years old when sentenced to life in prison without possibility of parole. The majority of the US Supreme Court found that the mandatory sentencing of life without parole for juveniles was in direct violation of the Eighth Amendment because the sentence was disproportionate for the crime. Since the ruling courts now have to distinguish if the proportionality of the crime fits a sentence of life without parole without giving too much leniency to the juvenile for their crime. This presentation will discuss the facts of the case and the implications for juvenile sentences which have come into conflict with their rights protected under the Eighth Amendment. Also discussed in this presentation will be the trends of the US Supreme Court when deciding penalties for juveniles charged as an adult and their decision in the Roper and Graham cases.

Does Spruce Budworm Herbivory Alter Nitrogen Cycling in Forest Soils?

Wells, Katarina

Faculty Mentor(s): Clay Arango, Environmental Studies

Poster Presentation Session #3, Poster #20
2:15-4:45 p.m. in Ballroom C/D

Spruce budworms (Christoneura occidentalis) are widespread forest defoliators among coniferous trees in western forests. Central Washington currently has a widespread outbreak that has concerned state and federal land managers because of the threat to forest health. When budworms feed upon trees, they affect soil nitrogen processes by returning nitrogen to the forest floor and causing more nitrogen to remain in forest soils. I predict that frass (solid excrement) deposition by spruce budworms increases the soil nitrogen pool, thus increasing the chance that nitrogen runoff will affect stream systems. I will study three sites in the upper North Fork Teanaway River and a control site with no budworms in summer 2013 when spruce budworm activity is highest. I will collect replicate soil cores from each site and extract them with KCl to measure initial NH$_4^+$ and NO$_3^-$ Net mineralization (N release from biomass) and nitrification (NH$_4^+$ conversion to NO$_3^-$ ) will be measured by deploying soil cores with ion-exchange resins and sampling through time. Mineralization rate is calculated as the net change in NH$_4^+$ per unit time and nitrification rate is calculated as the net change in NO$_3^-$ per unit time. I will compare N transformation rates among sites using one-way ANOVA, and positive net nitrification will indicate susceptibility of N loss to streams. If spruce budworm feeding leads to greater nitrogen export from forest soils, it would enrich nearby stream systems with nitrogen and potentially cause excessive algae growth, which could affect endangered species in the streams that drain this region.
Initial Results of Modeling Winds in the Kittitas Valley With the Weather Research and Forecasting Model

Wenger, David

Faculty Mentor(s): Michael Braunstein, Physics

Oral Presentation, Session #29
1:30-1:50 p.m. in Room 140

The purpose of this project was to analyze the characteristic late spring and early summer Ellensburg evening wind and identify conditions associated with it. Previous research published by Doran and Zhong proposed that these typical Ellensburg winds are caused by the creation of a deep mixing layer building up on the west side of the Cascades when there is a large temperature difference between eastern and western Washington. In order to accomplish the analysis, the Weather Research and Forecasting Model (WRF) was selected for modeling and computation. WRF was installed on a CWU workstation and initial models of Kittitas Valley weather were created. It was then realized that in order to understand the model's output fully, it would be necessary to use a graphical display program to interpret the results. NCAR Graphics Command Language (NCL) was chosen as the best program to meet this need. NCL was built on one of the computers in the Physics Department and there are plans to put it on a Linux thumb drive. The entire process of obtaining input data, performing modeling with WRF and interpreting the results with NCL has now been completed for multiple test cases. Throughout the endeavor, the difficulty in identifying, acquiring, and implementing resources has changed the goal of the project to setting up WRF and NCL for future research projects and performing “proof of concept” model runs using WRF and NCL for Ellensburg wind conditions.

Network Analysis

Wentworth, Travis

Faculty Mentor(s): Eric Cheney, Sociology

Oral Presentation, Session #21
11:40 a.m.-12:00 p.m. in Room 201

Every connection and relationship we make in life contributes to our lifelong development. What we see today, particularly in the business world, is a need and desire for long-lasting relationships that engage in the exchange of information, resources, and/or connections. In this study I have tried to identify the type of connections between low-income, nonprofit organizations within the Kittitas County area. Through an interview process that collects some basic structural information from the organizations, I’ll be able to determine the strength of the nonprofit organizations relationships. As a result of my research I have created a socio-matrix, which is an effective visual aid that graphs the interorganizational relationships of these nonprofit organizations. My analysis of each interorganizational relationship identifies the type of exchange these organizations undergo to identify how non-profits operate in Kittitas County. In exploration of who exchanges information, resources, and/or contacts with whom we see if and how all the non-profits are connected and who is at the center of this network.
**Sweet Betrayal**  
*West, Megan*  
*Faculty Mentor(s): Andrea Eklund, Family and Consumer Sciences*

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

**Purpose:** The purpose of this design was to portray an edgy professional style while combining both silky flowing fabrics with stiff and structured ones. This ensemble is inspired by the couture avant garde fashion style that captures the innovation of new concepts and techniques. These can be described by using bulging shoulders, accentuated waistlines, three dimensional figures protruding from the garment, and many other techniques that push the boundaries of everyday attire. I have taken this style and altered it to make these types of garments easily wearable and socially acceptable.  

**Process:** Before the sketching process started, design-provoking images were collected and inspirational design elements gleaned. Since these types of pieces are usually off-kilter and unrealistic, I chose to bring to life a melodious version of the style. In order to incorporate the avant garde style into the outfit I used a firm fabric for the sleeves, chest and shoulder panels to add stiffness, dimension and uniqueness to this silhouette of blouse. The pants are meant to compliment the curvature of the woman’s lower back, buttocks, and thighs. To keep with the avant garde fashion, the waistband is a bit higher, which helps nip in the waist, and elongate the torso even more so.  

**Techniques:** While creating and constructing the pants and blouse, the flat patterning and draping methods were both used to create the fullness and accurately match up the pattern pieces.  

**Materials:** Twill Weave Suiting Blend, Jacquard Weave, Plain Weave, Hook and Eyes, Buttons, All-Purpose Thread.

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**Kinematic Analysis of Prey Capture in Coastal Giant Salamanders (Dicamptodon tenebrosus)**  
*Westervelt, Laura; Weaver, Robert; Reavill, D.; Richbourg, Sara; Fessler, Brandon*  
*Faculty Mentor(s): Steven Wagner, Biological Sciences*

Poster Presentation Session #1, Poster #19  
8:20-10:50 a.m. in Ballroom C/D

**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 and feed on a diverse array of prey items (arthropods, annelids, small mammals, and reptiles). The objectives of our study were to describe and quantify the behavior of terrestrial adult Coastal Giant Salamanders (*D. tenebrosus*). Feeding bouts of three distinct prey types (e.g., crickets, earthworms, and slugs) were recorded using high-speed video (420-1,000 frames/second) with a Casio Exlim EX-ZR100 digital camera. For a feeding trial, salamanders were placed in a clear viewing tank with five millimeter graph paper behind them and offered a single prey items with forceps. Trials were repeated on separated days with each salamander (*N = 12*) being exposed to three crickets, two earthworms, and one slug for a total of 144 trials. Videos were analyzed for velocity of initial strike, lingual projection, lower and upper jaw prehension, and feeding success. Non-metric multidimensional 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.*
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 2013 issue of *Manastash*. Mentor Katharine Whitcomb and faculty advisor Joe Johnson will introduce the presentation with a few words about the magazine and the readers.

This presentation provides wireless solutions based on the IEEE 804.15.4 standard utilizing components from the Microchip™ Corporation. Examples show the relative ease of wireless implementation. Wireless components pass signals between two Explorer 16™ demonstration boards. Differences and similarities in the programming are shown to better understand the systems. Components that are not proprietary in nature are described in further detail including advanced features. The exploration guides provided help students understand how to choose the best arrangement for their wireless application and how to implement them into an established wire control based project. Documentation and examples can be utilized in EET 376 lectures at CWU to introduce wireless functionality of microprocessors currently used by the EET department.

The focus of the Central Washington University Student Affiliates of American Chemical Society (SAACS) Chemistry Club for the 2012-2013 academic year is to increase the year-by-year continuity of the club. One issue that has arisen at the start of each year is maintaining yearly club activities as the leadership changes. To help the transition, the current leadership is compiling a digital and printed document that will serve as a guide as to how to get the club organized and to help new officers learn how to get things done at the university. Additionally, a centralized school network storage space has been set up for club documents and photos, as well as a school e-mail account for club communications. We hope that this infrastructure will help future leaders organize the club and communicate more efficiently.
Songs of Manifest Destiny: A Cultural Reflection  
**Wolitarsky, Brock**  
*Faculty Mentor(s): Daniel Herman, History*

Oral Presentation, Session #15  
9:30-9:50 a.m. in Room 271

The American Westward movement in the mid 1800s is one of the most studied periods in history. However, behind this great movement were thousands of common people simply traveling to make a better life for themselves. These people had dreams, views, and opinions that are often ignored or assumed. This era also gave birth to many songs that we still love today. These songs are a perfect look at the views of the pioneers. By looking at these songs and using what we know of the events of the Overland Trail, we see the daily routine, dreams, and opinions of an ordinary pioneer. To show that these songs are a reflection of culture, I have looked at the songs in their earliest known forms and then compared them with pioneer journals and the research of master historians. Seeing the songs in their historical context is an eye-opener to the message that music provides. There is a powerful correlation between what the opinions and views of the day were and what the songs are saying. My presentation will use the song “Sweet Betsy of Pike” as an example how songs reflect pioneer views. These views were harsh and degrading toward racial and religious minorities, while praising their own virtuous character. These songs provide an enlightening window into the culture and views of the pioneers, views which otherwise would have gone unexplored.

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Variation in Expression of Duplicated Insulin-like Receptor Genes in *Daphnia pulex*  
**Wooller, Ian**  
*Faculty Mentor(s): Alison Scoville, Biological Sciences; Joseph Lorenz, Anthropology*

Creative Expression Presentation, Session #34  
1:50-2:10 p.m. in Ballroom A

Publication of the *Daphnia pulex* genome in 2011 identified *D. pulex* as the arthropod with the highest homology to humans at the genetic level. This conservation of genes opens up the possibility of using *D. pulex* as a model organism for biomedical research. For example, *D. pulex* possesses at least 15 genes with high homology to human genes involved in the insulin signalling pathway (ISP). In addition, both *Daphnia* and vertebrate lineages have experienced duplication of insulin-like receptor genes in their evolutionary history. In this study, we assessed patterns of expression of the insulin-like receptors under calorie restricted conditions in five natural populations of *D. pulex* in Kittitas county. Eight clonal lines from each population were cultured in laboratory conditions under two treatments: fed *ad libitum* and calorie restricted. Expression levels of the four insulin-like receptor genes and three additional genes in the ISP were measured using quantitative PCR. Calorie restriction had a significant effect on expression levels of all genes, but the magnitude and direction of effects differed between populations. In addition, the direction of effect differed between different insulin-like receptors, suggesting neofunctionalization of at least one copy of this gene. To our knowledge, this is the first study to show variation in direction of expression between duplicated insulin-like receptor genes in *D. pulex*. It is also the first to show population-level variation in expression of genes in the ISP in *Daphnia*. Future research will include the effect of other environmental factors on expression of these genes.
Portable Hydro Power  
_Wrest, Teagan_
_Faculty Mentor(s): Charles Pringle, Mechanical Engineering Technology_

Poster Presentation Session #3, Creative Works, #5  
2:15-4:45 p.m. in Ballroom C/D

This project involves designing and developing a portable hydropower turbine that can optimize the natural kinetic energy of a river or water source. The motivation for this project came from the lack of readily available power in the wilderness. Therefore, an implement was need that essentially should: 1) convert the kinetic energy of a river to power; 2) be able to store the converted power; and 3) distribute the converted power at the correct electrical energy needed so that ultimately a cell phone can be charged. Consequently, an implement was designed and constructed that has a maximum weight less than 35 pounds, contains components that easily disassemble (time limit 10 minutes), is water proof for a minimum of two hours, and is made of components that are durable. The theoretical and the real-world application are discussed.

Preserving Natural Resources and the Rock Climbing Experience at Frenchman Coulee Through Cooperative Management Planning  
_Wright, Micah_
_Faculty Mentor(s): Michael Pease, Geography_

Poster Presentation Session #3, Poster #27  
2:15-4:45 p.m. in Ballroom C/D

Frenchman Coulee, part of the Washington Department of Fish and Wildlife (WDFW) Quincy Lakes Wildlife Unit near Vantage, Washington is a popular recreation destination, particularly with rock climbers. The striking geology of the area, combined with the reliably dry climate and large variety of routes makes Frenchman’s Coulee one of the best climbing destinations in the state. The accretive effects of intensive use have led to noticeable increases in human waste, erosion, and other user impacts. This research works towards the creation of a Scoping Document to provide the WDFW with a litany of key resources in the area, as well as to identify principal resource threats while maintaining climbing access. Specific focus is placed on identifying critical indicators of resource vulnerability, along with the concurrent development of mechanisms to enhance collaboration and cooperation between climbers and the WDFW. The Scoping Document is being developed and refined with the goal of providing WDFW with the necessary background information to develop a supplemental Climbing Management Plan that can be integrated within its regional recreation planning efforts.
Development of an Apparatus for Measuring Laser Coherence Length  
Yang, William  
Faculty Mentor(s): Michael Braunstein, Physics  
Poster Presentation Session #1, Poster #57  
8:20-10:50 a.m. in Ballroom C/D  

The goal of this project was to develop an apparatus to measure the coherence length of the light waves produced by different lasers. The coherence length is the distance over which two interacting waves maintain a constant relative phase. The method selected to achieve the goal of the project was to introduce the laser light into a modified Michelson interferometer arrangement while observing and measuring the resulting interference pattern. This pattern can be interpreted in terms of the properties of the laser light from which the pattern was produced, including, it was predicted, its coherence length. In order to characterize the apparatus and develop a means of interpreting the interference patterns, two different lasers were used: a red diode laser taken from an inexpensive laser pointer, and a red He-Ne laser. As part of this project the quantum eraser phenomenon and bandwidth of the diode and He-Ne lasers were also investigated. The project is continuing an investigation of the utility of the apparatus for coherence length measurements.

Estimating Elk Home Range: Significance of Estimation Technique for Habitat Management  
Yost, Anna  
Faculty Mentor(s): Robert Hickey, Resource Management  
Poster Presentation Session #3, Poster #31  
2:15-4:45 p.m. in Ballroom C/D  

The choice of elk home range estimation technique influences how elk habitat is managed in the North Cascades of Washington. In order to best inform wildlife management decisions, it is important to identify the most appropriate home range estimate for a given species and location. If home range size is over or under estimated, then habitat analysis and management will not be strategically focused. A sample of elk GPS location points from the North Cascades are used to create home ranges with GIS tools using the Kernel density estimation (KDE) method. KDE is a common technique for estimating an animal’s home range and is strongly influenced by the choice of smoothing method used in the calculation. KDE home range estimates produced using different smoothing methods are compared to landscape features (landcover, topography, human influence) to help determine which smoothing method is most applicable to defining the home range of North Cascades elk. The home ranges are also compared to a modeled elk habitat suitability coverage to demonstrate how home range estimates can be used to validate an elk habitat suitability model which is used to inform elk habitat management. The data produced using these GIS tools for elk home range analysis and habitat estimation is discussed within the context of elk behavior and management in the North Cascades eco-region.
“I’m Ready Now”  
Young, Therese  
*Faculty Mentor(s): Therese Young, Physical Education, School & Public Health*

Creative Expression Presentation, Session #34  
1:10-1:30 p.m. in Ballroom A

When I heard this song it struck a chord for me. I found myself reflecting back on the various chapters in my life and how to capture it through movement. The piece begins with a young girl living her playful, imaginative childhood, moves through the angst we experience as a young adult trying to make the hard decisions about our life, and finally as a mature adult reflecting back on their life with no regrets and being ready to face the future whatever it holds or however long it lasts. As a young girl there is a freedom in movement that has a sense of abandonment and playfulness. As the next phase of life occurs the young girl flees as the young woman enters. The movement now becomes more difficult and emotional as evidenced by the movement patterns. The young woman confronts her younger image and realizes that it is a part of her that has passed. They dance together with a chorus who reiterate the movements as shadows that capture passing moments. Upon the entrance of the mature woman the young woman exits and the movement becomes a mixture of hanging on to the past with the addition of giving in to the realization that time has passed. The older woman now chases her youth to no avail as she comes to the full realization that she has lived her life well and is ready now for whatever comes.

“Tension”  
Zelenak, Megan  
*Faculty Mentor(s): Therese Young, Physical Education, School & Public Health*

Creative Expression Presentation, Session #34  
1:30-1:50 p.m. in Ballroom A

The dance “Tension” was derived from the idea of using a band to demonstrate the struggles and difficulty of navigating through life and the ensuing tension we endure. The band is representative of things that hold us back in life. The challenge the dancers face is to get free through a series of challenging maneuvers. This is captured by the changing shapes of the tensile band as the dancers do their best to make it through this geometrical maze, manipulating their bodies through space, under and over the symbolic band. This creates its own amount of tension for audience and dancers alike as they skillfully avoid being caught by this elastic barrier in split-second timing. There are moments when each dancer releases their hold on the band only to be drawn back in as the tension ensues. Ultimately the dancers gather the strength to release the band and escape the complexities of life that the band represents.
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K-12 COORDINATORS
Jeff Hashimoto, James Andy Menking, and the CWU CESME Office

PROGRAM AND PROCEEDINGS MANAGING EDITOR
Kara Gabriel

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Valerie Chapman-Stockwell, Christina Barrigan, Michael Braunstein, Eric Foss, James Andy Menking, Robert Pritchett, Steve Wenger

GRAPHIC PRODUCTION STAFF
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