SURCA

SHOWCASE FOR UNDERGRADUATE RESEARCH AND CREATIVE ACTIVITIES

March 30, 2015

SURCA is hosted by the Undergraduate Research Program, part of the WSU Office of Undergraduate Education.

Office of
Undergraduate Education
WASHINGTON STATE UNIVERSITY

SURCA 2015
Showcase for Undergraduate Research and Creative Activities

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Acknowledgements

SURCA 2015 thanks these exceptional companies and organizations for their generous support of the SURCA 2015 awards to top undergraduate research presenters:

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Office of the Provost and Executive Vice President

The SURCA 2015 Committee

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LeeAnn Tibbals	Health Professions Student Center

SURCA 2015
Showcase for Undergraduate Research and Creative Activities

Monday, March 30, 2015
CUB M.G. Carey Senior Ballroom and CUB Junior Ballroom

SCHEDULE OF EVENTS

2:00 – 3:00 PM	Informal Judging, Senior Ballroom – Judges have access to review the posters without presenters present. There will be an area of the Sr. Ballroom open to Judges with refreshments available. No students or public during this period.
3:00 – 4:00 PM	FORMAL JUDGING, Senior Ballroom – Student poster presenters will be available to answer questions. All score and comment sheets must be submitted by 4:00 pm.
3:30 – 4:45 PM	Senior Ballroom is open to the public for viewing of the posters. Refreshments will be served.
4:45 PM	AWARDS PROGRAM, Junior Ballroom Presentation of Awards

RUBRIC FOR WSU SHOWCASE FOR UNDERGRADUATE RESEARCH AND CREATIVE ACTIVITIES (SURCA)

ELEMENT	EXCELLENT (4)	GOOD (3)	ACCEPTABLE (2)	POOR (1)	ABSENT (0)
Student Position *The perspective, thesis, hypothesis, idea, or claim which inspired the project.*	Specific position (perspective, thesis/hypothesis) is imaginative and analyzes the complexities of the position, synthesizes other points of view or disciplinary contexts, and demonstrates a clear understanding of the project limits.	Specific position (perspective, thesis/hypothesis) takes into account the complexities of the project, its underlying assumptions, and identifies other points of view.	Specific position (perspective, thesis/hypothesis) is present and addresses the context of the project.	Specific position (perspective, thesis/hypothesis) is present, but is simplistic and obvious.	Position is not present or is unclear.
Novel Contribution/ Innovative Thinking *Novelty or uniqueness of idea, claim, question, form, etc.*	Expands a novel or unique idea, question, format, product, or approach to generate new knowledge or creative works.	Creates a novel or unique idea, question, format, product, or approach.	Attempts to create a novel or unique idea, question, format, product, or approach.	Reformulates an idea or collection of available ideas or approaches.	Presents already established information.
Process/Method *Discipline-specific approach to addressing the idea, question, hypothesis, or claim.*	Skillfully manifests the relationship between process and end product and methods needed to accomplish the end product.	Understands the relationship between process and end product and methods needed to accomplish the end product.	Recognizes the relationship between process and end product and methods needed to accomplish the end product.	Misunderstands the relationship between process and end product and methods needed to accomplish the end product.	Lacks knowledge of the relationship between process and end product and methods needed to accomplish the end product.
Conclusion/Outcome/Creative Product *A synthesis of key discoveries drawn from evidence or the creative process. How results or creations apply to a larger context or the real world.*	Outcomes reveal insightful patterns, differences, or similarities related to focus. Assertions are well supported. Significance of what was discovered, learned or created is clear and implications are explored.	Outcomes reveal important patterns, differences, or similarities related to focus. Assertions are somewhat supported. Significance of what was discovered, learned, or created is clear.	Outcomes are presented, but the organization is not effective in revealing important patterns, differences, or similarities. Assertions lack adequate support. Significance of what was discovered, learned, or created is unclear.	Presents outcomes, but they are limited and/or are unrelated to focus. Assertions are incorrect or unwarranted. Significance of what was discovered, learned, or created is absent.	Project lacks outcomes, support for assertions, and significance of what was discovered, learned, or created.
Presentation/ Display *Visual presentation of project materials.*	Quality of presentation of materials gives the impression of consistency, professionalism and an astute attention to detail.	Attention to detail is generally good, but there are frequent minor errors or inconsistencies. There are no or very few large problems.	Attention to detail is generally good, but there are frequent minor errors or inconsistencies, and occasional large problems. Professionalism is not obvious.	Numerous small and large errors or inconsistencies in presentation. Details are present, but not sufficient for a professional product.	Presentation is crude, messy, unsophisticated, or very inconsistent.
Presenter *Oral presentation of the content of the project.*	Actively and effectively engages audience; communication indicates extensive knowledge of the project, is articulate and confident, and presents a mature professional demeanor.	Effectively engages with audience, communication indicates appropriate knowledge of the project, speaks clearly, and presents a professional demeanor.	Somewhat enthusiastic but struggles to communicate clearly. Communication indicates adequate knowledge of the project. Demeanor is appropriate.	Is minimally engaged and communicates ineffectively. Communication indicates limited knowledge about the project. Presents an unprofessional demeanor.	Is disinterested, non-communicative, insufficient knowledge base, unprofessional demeanor, or absent.

SURCA 2015
Showcase for Undergraduate Research and Creative Activities

JUDGES

We wish to thank our more than 150 judges who have donated their time this afternoon. The judging pool is comprised of many volunteers from:

Clearwater Paper Corporation

Decagon Devices, Inc.

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USDA Forest Service, Rocky Mountain Research Station

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Showcase for Undergraduate Research and Creative Activities (SURCA) 2015 Entries

ALPHABETICALLY BY PRESENTER

Poster No.	Presenter	Category	Title of Abstract
105	**Jonathan Abarca** Mentor: Zhenqing Shi	Engineering and Physical Sciences	A New Iron-Enhanced Compost for Stormwater Treatment
138	**Taylor Arndt** Mentor: Dave McCarroll	Engineering and Physical Sciences	Washington State University Stormwater Master Plan
159	**Sophie Ascaso** Mentor: Dr. Kwan Hee Kim	Molecular, Cellular, and Chemical Biology	The Importance of Retinoic Acid Receptor Alpha (Rara) in Spermatogonia, Defined through the Characterization of Early Postnatal Germ Cell Populations in the Testis
157	**Anna Aversa** Mentor: Terri Driessen	Molecular, Cellular, and Chemical Biology	Mutations in Histone Demethylase Kdm6a Cause Motor Coordination Deficits in a Mouse Model for Kabuki Syndrome
127	**Caroline Baer** Mentor: Jun Xu	Molecular, Cellular, and Chemical Biology	Histone Demethylase Kdm6a Regulates Depression-like Behaviors (in Mice)
111	**Zachary Bailey** Mentor: Devendra Shah	Molecular, Cellular, and Chemical Biology	Evaluation of Efficacy of Avian Egg-yolk Derived Antibodies (IgY) against C. jejuni Colonization of Human Intestinal Epithelial Cells
5	**Randy Bartoshevich** Mentor: Tom Jobson Ph.D.	Engineering and Physical Sciences	NO+ as a PTR-MS Reagent Ion
152	**Haley Beatty** Mentor: Dr. Dana Lee Baker	Social Sciences	Selective Exposure and Media Bias
99	**Brianna Berg and Jack Hyder** Mentor: Dr. Jonel Saludes	Molecular, Cellular, and Chemical Biology	The Transmembrane Domain of Prostate Specific Membrane Antigen: Deciphering the Role of the Small-XXX-Small Motif in Oligomerization

Poster No.	Presenter	Category	Title of Abstract
161	**Sophia Beyer** Mentor: Dr. Cliff Berkman	Engineering and Physical Sciences	Inhibition of Membrane-Type I Matrix Metalloproteinases
91	**Andelyn Bindon and Alexandra Hemphill** Mentor: John M. Hinson, Paul Whitney, Cristina Wilson	Social Sciences	Reducing Risky Decision Bias with Feedback in Older and Younger Adults
131	**Maira Birrueta** Mentor: Paul Kwon	Social Sciences	The Role of Hope in Perseverance in Higher Education among Ethnic Minority Students
120	**Jake Blaylock** Mentor: Dr. Girish Ganjyal	Applied Sciences	Effects of Oat Fiber Particle Sizes and Levels of Inclusion on Expansion of Regular Corn Starch during Extrusion Processing.
10	**Denise Blohowiak** Mentor: David Field	Engineering and Physical Sciences	Carbon Nanotube Growth Through Modification of Catalyst and Heat Treatment Process Parameters
133	**Kendra Bone** Mentor: Kathleen Ryan	Arts and Design	Historic Walking Tour in Colfax, Washington: A Link to Eastern Washington's Past
15	**Kira Bottles** Mentor: Carol Salusso	Social Sciences	Social Media and its Influence on Purchasing
162	**Kyle Braun** Mentor: Steve Austin	Arts and Design	Falls Mill Master Plan
89	**Jason Breithaupt** Mentor: Bertrand C.W. Tanner	Molecular, Cellular, and Chemical Biology	Myosin Regulatory Light Chain Phosphorylation: A Potential Cardiac Coping Mechanism in Heart Failure
139	**Madeleine Brookman** Mentor: Dene Grigar	Arts and Design	Pathfinders Multimedia Book Draft
110	**Michelle Burns** Mentor: Janet Schmidt	Social Sciences	Lessons Learned: Implementing and Evaluating Rural Summer Robotics Camps

Poster No.	Presenter	Category	Title of Abstract
22	**Samuel Byrd** Mentor: Howard Davis	Engineering and Physical Sciences	Noninvasive Blood Glucose Monitor
106	**Crysta Cady** Mentor: Joyce Ehrlinger	Social Sciences	The Influence of Perceived Parental Support for Higher Education on Confidence and Success in Higher Education
34	**Yessica Carnley** Mentor: Dr. Bin Yang	Engineering and Physical Sciences	Investigation of Microbial Lipid Accumulation by Lignin Decomposition
121	**Megan Caruso** Mentor: Monica Hinds	Molecular, Cellular, and Chemical Biology	Analysis of Structural Changes in Developing Hearts Due to Hyperglycemia
2	**Samantha Case** Mentor: Lydia Gerber	Humanities	Housewives and Rationing in World War II
100	**Colleen Chalmers** Mentor: Dr. Brittany Rhoades Cooper	Social Sciences	Learning at Home: Socio-Demographic Differences in the Home Learning Environment and its Influence on Academic Achievement at the Beginning of Head Start
65	**Michelle Chan** Mentor: James Pru	Molecular, Cellular, and Chemical Biology	Pregnancy is Compromised by Conditional Mutagenesis of TCF3 and TCF12 or Over-Expression of ID4 in the Uterus
1	**Vikram Chandra** Mentor: Dr. Murali Chandra	Molecular, Cellular, and Chemical Biology	The cCrdiomyopathy Mutation, F72L, in Rat Cardiac Troponin T Attenuates Contractile Force by enhancing Crossbridge Detachment Kinetics
158	**Parot Charoonsophonsak** Mentor: Jacob Leachman	Engineering and Physical Sciences	Hydrogen Liquefaction in the Pacific-Northwest
43	**Kyra Christiansen** Mentor: Kathleen Ryan	Arts and Design	A Product of Sharing: Designing a Culturally Adaptive Exhibit

Poster No.	Presenter	Category	Title of Abstract
38	**Brian Cieslak** Mentor: Dr. Steven D. Kale	Humanities	"The Just War that Never Was": The Franco-Russian Crisis during the Polish Insurrection of 1863
12	**Dillon Cooper** Mentor: Mert Colpan	Molecular, Cellular, and Chemical Biology	Mutations on the Tropomodulin3 Binding Sites Affect Affinity for Tropomyosin
101	**Carissa Corrigan** Mentor: Arron Carter	Applied Sciences	The Falling Number Project
86	**Kayla Cribbin** Mentor: Joanna Kelley	Molecular, Cellular, and Chemical Biology	Sequencing the RNA of the Tropical Gar
42	**Kelsey Reanne Cunningham and Heather Hilliker** Mentor: Richard Lamb	Social Sciences	Girls Game Too: A Comparative Study with Important Implications for Video Games in Education
163	**Ciara Dahm** Mentor: Michael Sanchez	Arts and Design	Asphalt Field to Productive Environment: a Master Plan for the Future
136	**Jordana Dahmen** Mentor: Diane Cook	Arts and Design	Tap
3	**Jared Dean** Mentor: Dybdahl, Mark	Organismal, Population, Ecological, and Evolutionary Biology	A Study of the Ploidy of Potamopyrgus Antipodarum in Relation to Habitat
98	**Cody Dean** Mentor: Scot H. Hulbert, Sowmya Ramachandran	Molecular, Cellular, and Chemical Biology	Screening Wheat Stem Rust Genes for Hypersensitive Response Suppression

Poster No.	Presenter	Category	Title of Abstract
87	**Vanessa Delgado** Mentor: Dr. Julie Kmec	Social Sciences	Who Gets the Money? Collegiate Scholarship Distribution Between Ethnically Rooted Student Organizations and Non-Ethnically Rooted Student Organizations
149	**Adam Denny and Francis Dunn** Mentor: Dene Grigar	Arts and Design	Life Renewed
156	**Molly Diamond** Mentor: Dr. Erica Crespi	Organismal, Population, Ecological, and Evolutionary Biology	The Effects of Road Salts on Wood Frog (Lithobates sylvaticus) Physiology and Behavior
48	**Douglas Dietzel** Mentor: Dr. J. T. Dickinson	Engineering and Physical Sciences	Experiments on the Triboelectric Charge Transfer Between a Metal and a Polymer
60	**Zane Duke** Mentor: Anita Vasavada	Engineering and Physical Sciences	Skeletal Structure for Biomechanical Neck Model
149	**Frankie Dunn and Adam Denny** Mentor: Dene Grigar	Arts and Design	Life Renewed
82	**Kalina Ebling** Mentor: Carol Salusso	Arts and Design	Pumpkin Queen
128	**Wendy Ellison and Melissa Liu** Mentor: Sylvie Cloutier	Organismal, Population, Ecological, and Evolutionary Biology	Cage Environment allowing Expression of Natural Maternal Behavior has Positive Effects on Rat Behavior
71	**Alexander Fabrick** Mentor: Dr. Yuehe Lin	Engineering and Physical Sciences	Dispersal of Palladium Catalyst for Fuel Cells

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96	**Sebastian Fernandez** Mentor: Birgitte Ahring	Applied Sciences	Effect of Methanogens and Acetogens on VFA Production using Mixed Bacterial Cultures
81	**Cherry Fletcher and Alexandra Vaughn** Mentor: Krzysztof Czaja	Molecular, Cellular, and Chemical Biology	Diet-Induced Obesity alters the Gut-Brain Communication and Results in Microglia Activation in the Hindbrain Feeding Centers.
55	**Katelyn Frederick** Mentor: Laurie Smith-Nelson	Social Sciences	Self-Esteem, Attachment Style and Extradyadic Involvement
56	**Katelyn Frederick and Dakota Mauzay** Mentor: Laurie Smith-Nelson	Social Sciences	Sexual Consent: Can Attitudes, Beliefs and Behaviors Change?
72	**Hannah French** Mentor: James K. Pru	Molecular, Cellular, and Chemical Biology	Expression of Inhibitor of DNA Binding Proteins 1-4 during Uterine Decidualization
35	**Brian Gabriel** Mentor: Professor Robert Dillon	Computer Science, Mathematics, Statistics, and Information Sciences	A Mathematical Model for the Microenvironment in Breast Cancer.
80	**Taylor Gale** Mentor: Luke Premo	Social Sciences	Mosaic Evolution in Human Evolution
116	**Kelsey Gallegos** Mentor: Lydia Gerber	Social Sciences	Similarities and Differences between the National College Entrance Exam and the Civil Service Examination
164	**Matthew Galliher** Mentor: Clifford Berkman	Engineering and Physical Sciences	Synthesis of a Potential Prostate Cancer Drug Conjugate

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64	**Ariana Garcia** Mentor: Dr. Kathleen Rodgers	Social Sciences	The Effects of Music Videos on College Students
74	**Michael Gerber** Mentor: Dr. Bernard J. Van Wie	Engineering and Physical Sciences	Investigation of Heat Transfer in a Miniaturized System
145	**Uris Giron** Mentor: Kathleen Ryan	Arts and Design	Learning Through Play | Loose Parts Playscape
93	**Mitchell Go** Mentor: Dr. Brian Kemp	Molecular, Cellular, and Chemical Biology	Designing Universal North American Bird Primers to Identify the Species of Unknown Bird Remains Discovered in Prehistoric Native American Sites
88	**Susie Gomez** Mentor: Kathleen Ryan	Arts and Design	Student Success on Interdisciplinary Design Teams
137	**Floricel Gonzalez** Mentor: Anthony Nicola	Molecular, Cellular, and Chemical Biology	The Effect of Low-pH on the Cellular Attachment of Herpes Simplex Virus
6	**Brandon Graham** Mentor: Dr. Wenji Dong	Molecular, Cellular, and Chemical Biology	Detection of Cardiac Biomarkers with Lateral Flow Immunoassay Techniques
83	**Quinn Graham** Mentor: Amita Mohan	Applied Sciences	Exploring Variation in Wheat Germplasm for Performance under Elevated Temperature
75	**Jake Gray** Mentor: Su Ha	Engineering and Physical Sciences	Alteration of Reaction Kinetics by Application of an Electrical Field Across a Catalyst
144	**Nicholas Greene** Mentor: Dr. Rebecca Craft	Organismal, Population, Ecological, and Evolutionary Biology	Pain-Relieving Effects of JWH-015, a Synthetic Cannabinoid Drug

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94	**Samantha Grover** Mentor: Dmitri Tolkatchev	Molecular, Cellular, and Chemical Biology	Localization of Binding Site for Leiomodin 2 in Striated Muscle Tropomyosin
117	**Ashleigh Gustavson and Irfan Hossain** Mentor: Terri Driessen	Molecular, Cellular, and Chemical Biology	Identification of Neurosignaling Systems Regulated by the Histone Demethylase Kdm6a
18	**Keli Haffner** Mentor: Kathleen Ryan	Arts and Design	Rural Contemporaries
132	**Jacob Hallett** Mentor: Clifford Berkman	Molecular, Cellular, and Chemical Biology	Uses of Non-natural Sugar Epitopes for Immune Mediated Cancer Therapies
9	**Melissa Halley and David Saldivar** Mentor: John M. Hinson, Paul Whitney, Arig Aboulenein	Social Sciences	The Impact of Anxiety on Risky Decisions Requiring Cognitive Flexibility
91	**Alexandra Hemphill and Andelyn Bindon** Mentor: John M. Hinson, Paul Whitney, Cristina Wilson	Social Sciences	Reducing Risky Decision Bias with Feedback in Older and Younger Adults
153	**Daniel Herrera and Joseph Traverso** Mentor: Nikolaos Voulgarakis	Computer Science, Mathematics, Statistics, and Information Sciences	Allostery through Protein-Induced DNA Bubbles
42	**Heather Hilliker and Kelsey Reanne Cunningham** Mentor: Dr. Richard Lamb	Social Sciences	Girls Game Too: A Comparative Study with Important Implications for Video Games in Education

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8	**Meghan Hoiness** Mentor: Kathleen Ryan	Arts and Design	Designing to Enhance the Benefits of Intergenerational Interaction
155	**Ashley Hope** Mentor: Jolie Kaytes	Arts and Design	The Yakima Arboretum: Linking People, Place, and Plants
117	**Irfan Hossain and Ashleigh Gustavson** Mentor: Terri Driessen	Molecular, Cellular, and Chemical Biology	Identification of Neurosignaling Systems Regulated by the Histone Demethylase Kdm6a
99	**Jack Hyder and Bree Berg** Mentor: Jonel Saludes	Molecular, Cellular, and Chemical Biology	The Transmembrane Domain of Prostate Specific Membrane Antigen: Deciphering the Role of the Small-XXX-Small Motif in Oligomerization
119	**Briauna Inglis** Mentor: Caren Goldberg	Organismal, Population, Ecological, and Evolutionary Biology	Conservation Genetics of Oregon Spotted Frogs
103	**Joshua Johnson** Mentor: Dr. Robin Bond	Humanities	De Originibus Rerum: A Comparative Analysis of Ancient Greek and Hebrew Cosmogonies
104	**Mats Johnson** Mentor: Tom Dickinson	Engineering and Physical Sciences	Consequences of Surface Treatments on the Tribocharging of Polytetrafluoroethylene
114	**Cori Jou** Mentor: Kathleen Ryan	Arts and Design	Have You ever Imagined Being in an Office Without a Window? Biophilia Immersion - Embracing Nature in Workplace Designs
118	**Joseph Kabel** Mentor: John McCloy	Engineering and Physical Sciences	Compositional Dependence of Crystallization in Lithium Aluminosilicate Glasses
124	**Sarah Kim** Mentor: Susan L Dexheimer	Engineering and Physical Sciences	X-Ray Absorption Spectroscopy Studies of Molecular Electronic Materials

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151	**Travis King** Mentor: Dr. Daniel Thornton	Organismal, Population, Ecological, and Evolutionary Biology	Use of and Behavior at Ocelot Latrines by Neotropical Mammalia
142	**Emily Koch** Mentor: Lisa Shipley	Organismal, Population, Ecological, and Evolutionary Biology	Growth Rate Comparison of Bottle-Raised Black-Tailed, White-Tailed, and Mule Deer Fawns
97	**Iris Charlotte Koning and Joelle Martin** Mentor: John M. Hinson, Paul Whitney, Cristina Wilson	Social Sciences	Differences in Emotional Processing of Monetary Gains and Losses in Older and Younger Adults.
148	**Alyssa Korinke and Kate Palermini** Mentor: Will Luers	Arts and Design	Innovate Arts
66	**Meredith Kuchera** Mentor: Carolyn F. Ross	Applied Sciences	Consumer Acceptance of a Polyphenol-Enriched Coffee Beverage
140	**Katherine Ladwig** Mentor: David Lin	Engineering and Physical Sciences	Relationship between Physical Activity and Well-Being
107	**Miles Linde and Marina Martin** Mentor: Alan Goodman	Molecular, Cellular, and Chemical Biology	Drosophila Stimulator of Inteferon Genes (dSTING) Mediates an Innate Immune Response Following Intracellular Infection
128	**Melissa Liu and Wendy Ellison** Mentor: Sylvie Cloutier	Organismal, Population, Ecological, and Evolutionary Biology	Cage Environment allowing Expression of Natural Maternal Behavior has Positive Effects on Rat Behavior
47	**Meaghan Logan** Mentor: Rayna Sage	Social Sciences	Child Temperament and Household Responsibilities among School-Aged Children

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36	**Geddie Lojas** Mentor: Gail Oneal	Social Sciences	Characteristics of Commuting Rural-Dwelling Nurses in Eastern Washington
160	**Kristofor Ludvigson** Mentor: Dr. Kevin Murphy	Organismal, Population, Ecological, and Evolutionary Biology	2014 Eggert Organic Family Farm Buckwheat Trial
73	**Rebecca Ly** Mentor: Dr. Doug Hindman	Social Sciences	Utilizing Social Networks to Address Needs of Caregivers of Autistic Individuals
49	**Michaelle Machuca** Mentor: Julia Cassaniti	Social Sciences	Discrimination of the Indigenous Language of Quechua in Cusco, Peru
130	**Devin Marcy** Mentor: Dr. Heping Liu	Engineering and Physical Sciences	Evaporation and Surface Energy Balance Over a Large Reservoir
63	**Christine Mars** Mentor: Brenda Barrio, PhD	Social Sciences	Plurality of Perspectives: Effect of Parent Training on Caregiver Disability Construct
59	**Joseph Martin** Mentor: Dr. Sarah Ullrich-French	Social Sciences	The Wellbeing of University Students: Perceived Wellness, Importance, and Behaviors
97	**Joelle Martin and Charlotte Koning** Mentor: John Hinson, Paul Whitney, Cristina Wilson	Social Sciences	Differences in Emotional Processing of Monetary Gains and Losses in Older and Younger Adults
107	**Marina Martin and Miles Linde** Mentor: Alan Goodman	Molecular, Cellular, and Chemical Biology	Drosophila Stimulator of Inteferon Genes (dSTING) Mediates an Innate Immune Response Following Intracellular Infection
123	**Hannah Matalone** Mentor: Mark VanDam, PhD	Social Sciences	Speech Transcription Accuracy of Typically Developing and Hard of Hearing Preschoolers

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56	**Dakota Mauzay and Katelyn Frederick** Mentor: Dr. Smith-Nelson	Social Sciences	Sexual Consent: Can Attitudes, Beliefs and Behaviors Change?
57	**Dakota Mauzay and Kelsey Phariss** Mentor: Dr. Laurie Smith Nelson	Social Sciences	The Effects of Comprehensive Sexual Education on Rape Myth Acceptance
79	**Miranda McCrory** Mentor: Kathleen Ryan	Arts and Design	Museum As Learning Environment
166	**Alexander McCue** Mentor: Aurora Clark	Engineering and Physical Sciences	Hydrogen Bond Dynamics at the Interface
141	**Joseph McGill** Mentor: Gretchen Rollwagen- Bollens	Organismal, Population, Ecological, and Evolutionary Biology	The Effects of Trout Hatchery Effluent on a Small Stream
77	**Samantha McInally** Mentor: Hector Aguilar-Carreno	Molecular, Cellular, and Chemical Biology	Identification of Optimal Neutralizing Epitopes on Nipah Virus Glycoproteins
70	**John Menard** Mentor: David Stratton	Humanities	The Civilian Conservation Corps: A Case Study of the Fort George Wright District and Camp F-188
68	**Joshua Milnes** Mentor: Dr. Jay Brunner	Organismal, Population, Ecological, and Evolutionary Biology	Identification of Resistance in Malus to Oblique-Banded Leafroller
78	**Victoria Minette** Mentor: Carolyn F. Ross	Applied Sciences	Saliva: Its Influence on the Electronic Tongue's Response Utilizing Singular Tastants

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112	**Scott Mitchell** Mentor: R. Dave Evans, Sarah Anderson	Organismal, Population, Ecological, and Evolutionary Biology	Determining Rate of δ15N Change in Three Common Lichen Species with Shifts in the δ15N of Source Nitrogen
69	**Daniel Mobley** Mentor: Douglas Call	Molecular, Cellular, and Chemical Biology	A Novel Technology Revitalizes Old-Fashioned Chemical Sanitation
33	**Natasha Moffitt** Mentor: Tracie Hanson and Dan Teuteberg	Social Sciences	The Effectiveness of 4-H Camp Activities on Learning and Skill Building Goals For Campers
150	**Angela Morrelli, Brittany Wouden, Stephen Palermin** Mentor: John Barber	Arts and Design	Pop Up Gallery
92	**Victoria Morrow** Mentor: Martin Maquivar	Organismal, Population, Ecological, and Evolutionary Biology	Assessment of Estrus Length, Follicular Dynamics and Pregnancy Rate in Beef Cattle following 5-day CO-Synch + CIDR Estrus Synchronization Program
109	**Jessica Murray** Mentor: Dr. Craig Morris	Applied Sciences	Impact of the Hardness Locus on Milling Properties and Flour Quality of Durum Wheat (Triticum turgidum)
165	**Wanjiru Ndambiri** Mentor: Kathleen Ryan	Arts and Design	Interpreting Culture through Visual Translation
46	**Natalie Nelson** Mentor: James K. Pru	Molecular, Cellular, and Chemical Biology	Evaluation of Dihexa as an Ovoprotectant during Chemotherapy Treatment
108	**Jordan Nelson** Mentor: Raymond M. Quock	Organismal, Population, Ecological, and Evolutionary Biology	Acute Antinociceptive Tolerance to Hyperbaric Oxygen (HBO2) In Opioid-Pretreated Mice

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45	**Daniel Nicoara** Mentor: Dr. Raymond Quock	Organismal, Population, Ecological, and Evolutionary Biology	Hyperbaric Oxygen Treatment Suppresses the Withdrawal Symptoms in Opioid-Dependent Mice
90	**Justin Niedermeyer** Mentor: Vincent Klinkhamer	Engineering and Physical Sciences	Prototype Power Regulation System of Magneto-Optical Microtrap Lasers for Deterministic Preparation of Ultracold Few-Fermionic Systems
62	**Serah Njau** Mentor: Jacqueline Burgher	Engineering and Physical Sciences	Biogasification
147	**Amy Nusbaum** Mentor: Paul Whitney and John Hinson	Social Sciences	The Role of Knowledge Acquisition in Cognitive Flexibility
32	**Marcia Nygaard** Mentor: Dr. Zac Domire	Engineering and Physical Sciences	Using Ultrasound, 3D Motion Capture, and MRI Data in MATLAB to Estimate Triceps Surae Muscle Volume
134	**Anthony Olivos** Mentor: Bala Krishnamoorthy	Computer Science, Mathematics, Statistics, and Information Sciences	Predictive Models for Dysphagia after Spine Surgery
51	**Maria Rebeca Orozco** Mentor: Dr. David Makin	Social Sciences	The Internet, Human Rights, and Concentrated Poverty
148	**Kate Palermini and Alyssa Korinke** Mentor: Will Luers	Arts and Design	Innovate Arts
150	**Stephen Palermini. Brittany Wouden, Angela Morrelli** Mentor: John Barber	Arts and Design	Pop Up Gallery:Neuroscience Collaboration

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84	**James Pappas** Mentor: Dr. Noriko Kawamura	Humanities	The Enemy Within: An Organizational Evaluation of the Japanese Kamikaze Corps
57	**Kelsey Phariss and Dakota Mauzay** Mentor: Laurie Smith-Nelson	Social Sciences	The Effects of Comprehensive Sexual Education on Rape Myth Acceptance
53	**Ashley Powell** Mentor: Dr. Cameron Peace	Molecular, Cellular, and Chemical Biology	The Power of Two: Creating an Informative DNA Test for Apple Tartness
126	**Ashton Powell** Mentor: Dr. Paul D. Benny	Engineering and Physical Sciences	Enhancing the Reprocessing of Spent Nuclear Fuel; Ways to Recycle and Reuse
50	**Hannah Pulcastro** Mentor: Bertrand Tanner	Molecular, Cellular, and Chemical Biology	The Spatial Gradient of Myosin Light Chain Phosphorylation in Cardiac Ventricles from Normal and Hypothyroid Rats
44	**Nicholas Rivera** Mentor: Dean Glawe	Applied Sciences	Saccharomyces Species occur Naturally on Plant Materials in Washington State
102	**Allie Robinson** Mentor: Andrew McCubbin	Molecular, Cellular, and Chemical Biology	The Genetic Basis for Heteromorphic Self-Incompatibility in Primula vulgaris
61	**Angela Rocchi** Mentor: Dr. Joseph Harding	Molecular, Cellular, and Chemical Biology	The Cognitive and Physiological Effects of Chronic Treatment of HGF Activator Dihexa in Normal Rats
135	**Joshua Rood** Mentor: Steven Saunders	Engineering and Physical Sciences	Organic-Aqueous Tunable Solvents for Nanoparticle Catalysis

Poster No.	Presenter	Category	Title of Abstract
76	**Adrian Rus** Mentor: Dr. Lisa Shipley	Organismal, Population, Ecological, and Evolutionary Biology	Nest Survival of Greater Sage-Grouse and Columbian Sharp-Tailed Grouse in Lincoln County, Washington
58	**Mia Ryckman** Mentor: Norman G. Lewis	Molecular, Cellular, and Chemical Biology	Study of (-)-Pinoresinol Forming Dirigent Proteins in Flax Seed
9	**David Saldivar and Melissa Halley** Mentor: John M. Hinson, Paul Whitney, Arig Aboulenein	Social Sciences	The Impact of Anxiety on Risky Decisions Requiring Cognitive Flexibility
113	**Muad Saleh** Mentor: Prof. John McCloy	Engineering and Physical Sciences	Studying the Effects of Heat Treatment of Nuclear Steel on Magnetic Barkhausen Noise
20	**Ashlyn Salzman** Mentor: Dana Lee Baker	Social Sciences	Faith, Science, and Political Events: Examining Trends in Student Beliefs
17	**Austin Sattler and Jianing Zhuo** Mentor: Somayeh Ramezanian	Engineering and Physical Sciences	Shewanella oneidensis MR1 Uptake in a Soil Column
37	**Seth Schneider** Mentor: Dr. Cynthia Haseltine	Molecular, Cellular, and Chemical Biology	The Ability of Ral1 to Dissociate from the RadA-ssDNA Filament through ATP Hydrolysis
39	**Benjamin Schuessler** Mentor: Pui Ching (Amy) Wo	Engineering and Physical Sciences	Influence of Grain Boundaries on Nanomechanical Properties in Cu
115	**Christina Sessoms** Mentor: Dr. Lisa Guerrero	Humanities	The American White Racial Frame Effect on Afro-Cubans' Racial Location in Post-Cuban Revolution Cuba
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129	**Michelle Steele** Mentor: Kathleen Ryan	Arts and Design	Over the River and Through the Falls
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26	**Quinn Sullivan** Mentor: Dr. Ting Chi	Social Sciences	The Impact of Website Quality on Apparel Mobile Commerce Consumer Satisfaction and Intent to Purchase: An Empirical Study of U.S. Consumers
52	**Edward Thomas** Mentor: Dr. Dean Glawe	Organismal, Population, Ecological, and Evolutionary Biology	Powdery Mildews
125	**Claire Thornton** Mentor: Lydia Gerber	Humanities	The GI's of Washington State College
4	**Spencer Tilton** Mentor: Lee A. Hadwiger	Applied Sciences	Increasing the Immunity of Potatoes against Fungal Pathogens
29	**Kayla Titialii** Mentor: Erica Crespi	Organismal, Population, Ecological, and Evolutionary Biology	A Role for Leptin in Mediating Nutrition Dependent Regeneration Rate in Xenopus Laevis
153	**Joseph Traverso and Daniel Herrera** Mentor: Nikolaos Voulgarakis	Computer Science, Mathematics, Statistics, and Information Sciences	Allostery through Protein-Induced DNA Bubbles
154	**Joseph Traverso** Mentor: Nikolaos Voulgarakis	Molecular, Cellular, and Chemical Biology	DNA Allostery through Distortion of the Major Grooves

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30	**Ivan Valdovinos** Mentor: Dr. Nolan L. Cabrera	Social Sciences	The Educational Barriers and Coping Strategies of Latino Male Undergraduates
11	**Alexander Van Dinter** Mentor: Dr. Dana Lee Baker	Social Sciences	Local Government Response to Engage Seniors
41	**Christopher Vasil** Mentor: Jonel P. Saludes	Molecular, Cellular, and Chemical Biology	Cationic Amphipathic Cell Penetrating Peptides from Sugar Amino Acid: A New Class of Drug Delivery Agents for Targeting Cancer Cells
81	**Alexandra Vaughn and Cherry Fletcher** Mentor: Krzysztof Czaja	Molecular, Cellular, and Chemical Biology	Diet-induced Obesity alters the Gut-Brain Communication and Results in Microglia Activation in the Hindbrain Feeding Centers
27	**Alexandra Waddell** Mentor: Dr. Sarah Ullrich-French	Social Sciences	State Mindfulness and Perception of Performance in Novice and Varsity Rowers
85	**Leslie Walker** Mentor: Naidu Rayapati	Organismal, Population, Ecological, and Evolutionary Biology	A New Soil-Born Virus Disease in Washington Vineyards
14	**Kai Wang** Mentor: Dr. Jesse Brunner	Organismal, Population, Ecological, and Evolutionary Biology	Quantitatively Measuring Anti-predator Behaviors in Amphibian Larvae, with Application to Disease Transmission
67	**Noel Wang** Mentor: Dr. Benjamin Belzer	Engineering and Physical Sciences	Analog Circuit Design for Time-Reversal-Division-Multiple-Access Impulse Response Recording

Poster No.	Presenter	Category	Title of Abstract
7	**Ryan Ward** Mentor: Lydia Gerber	Social Sciences	The Influence of Western Education on Chinese Foreign Exchange Students in the United States of America towards Professionalism
19	**Katie Wat** Mentor: Dr. Lisa Shipley	Organismal, Population, Ecological, and Evolutionary Biology	Effects of Succession and Forage Plantings on Nutritional Carrying Capacity and Habitat Selection of Roosevelt Elk
21	**Kieran Weatherspoon** Mentor: Dr. Jonel Saludes	Molecular, Cellular, and Chemical Biology	Conjugation and Characterization of Fluorophore Labeled KLA Peptide
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24	**Halle Weimar** Mentor: Dr. Jun Xu	Molecular, Cellular, and Chemical Biology	Y-Chromosome Linked Haplotypes Affect Aggression and Gene Expression in Mice
54	**Slater Weinstock** Mentor: Jeff Jones	Engineering and Physical Sciences	Analysis of Cynomolgus Monkey as a Model for Human Aldehyde Oxidase
25	**Logan Weyand** Mentor: Meghan J. Camp	Organismal, Population, Ecological, and Evolutionary Biology	How Pygmy Rabbits Trade-Off Food Quality and Proximity to a Refuge
167	**Emily Whitehead** Mentor: Haluk Resat	Molecular, Cellular, and Chemical Biology	Synergistic Regulation of Pro-Survival Responses by IGF-1R and EGFR Signaling

Poster No.	Presenter	Category	Title of Abstract
28	**Alexander Wood** Mentor: Bertrand C.W. Tanner	Molecular, Cellular, and Chemical Biology	The Spatial Pattern of Activation throughout the Sarcomere Influences Force Production in Computational Models of Muscle Contraction
16	**Dayton Wooldridge** Mentor: Alla Kostyukova	Molecular, Cellular, and Chemical Biology	Preparation of Peptides for Localization of Actin Binding Site in Leiomodin 2
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13	**Jan Yochim** Mentor: Dr. Dana Baker	Social Sciences	Zero Tolerance Policies
168	**Jonathan Younce** Mentor: Kathleen Ryan	Social Sciences	Perceptions of Vernacular | Differences in Readings of Grain Storage Structures
143	**Lauren Rachel Young** Mentor: Dr. Lydia Gerber	Social Sciences	The New Wave of Propaganda: The Effects of Video Games on a State's Historical Memory and the Psyche of its Citizenry
17	**Jianing Zhuo and Austin Sattler** Mentor: Somayeh Ramezanian; Nehal Abu-Lail	Engineering and Physical Sciences	Shewanella oneidensis MR1 Uptake in a Soil Column
169	**Zackery Zobrist** Mentor: Gary Cahstagner	Applied Sciences	Efficacy of Soil Steaming to Control Phytophthora Ramorum In Washington Soils.

Poster Number 1

ABSTRACT:

Abstract Title:	**The cCrdiomyopathy Mutation, F72L, in Rat Cardiac Troponin T Attenuates Contractile Force by enhancing Crossbridge Detachment Kinetics**		
Presenter:	Vikram Chandra		
Mentor:	Dr. Murali Chandra	**Campus:**	Pullman
Co-Authors:	Sampath K. Gollapudi, Dr. Murali Chandra		
Major:	Bioengineering		
Category:	Molecular, Cellular, and Chemical Biology		

Healthy pumping actions of the heart dictate that both the magnitude and speed of contraction/relaxation are not only sustained but adjusted adequately on a beat-to-beat basis. Disease-causing mutations in contractile proteins lead to abnormal pump function because mutations alter the architecture of the contractile apparatus. Our study focuses on cardiac troponin T (TnT), which is known to modulate the dynamics of force-bearing crossbridges (XBs). Clinical studies link the F70L mutation in human TnT to hypertrophic cardiomyopathy (HCM), a condition in which the heart muscle hypertrophies abnormally to compensate for the loss of contractile function. However, the molecular mechanism by which the F70L mutation leads to HCM is not understood. Because the F70L mutation lies close to the region in TnT that modulates the dynamics of force-bearing XBs, we hypothesized that F70L alters contractile function by affecting the magnitude and rates of XB recruitment/detachment dynamics. We generated a recombinant rat TnT analog (TnT_{F72L}) of the human HCM mutation, F70L. TnT_{F72L} (mutant) or wild-type rat TnT control (TnT_{WT}) was reconstituted into de-membranated mouse cardiac papillary muscle fibers to measure various indices of contractile function. TnT_{F72L} significantly decreased Ca^{2+}-activated maximal tension by 14% and the magnitude of length-mediated XB recruitment (E_R) by 39%. TnT_{F72L} augmented two kinetic processes that tend to decrease the population of force-bearing XBs. For example, TnT_{F72L} increased the rate of XB detachment (c in s^{-1}; 16.72 for TnT_{WT} and 25.61 for TnT_{F72L}) and the negative impact of strained XBs on the recruitment of new XBs (γ in s^{-1}; 25.34 for TnT_{WT} and 35.27 for TnT_{F72L}) by 53% and 39%, respectively. A net effect of significant increases in c and γ is expected to enhance the detachment of force-bearing XBs, leading to a decrease in both maximal tension and E_R. Attenuation of force translates to a decrease in pressure generated by the heart, which is expected to decrease cardiac output. Chronic stress on the heart — which triggers compensatory mechanisms to offset attenuation of pressure and cardiac output — may lead to pathological cellular responses that eventually culminate in HCM.

Poster Number 2

ABSTRACT:

Abstract Title:	**Housewives and Rationing in World War II**		
Presenter:	Samantha Case		
Mentor:	Lydia Gerber	**Campus:**	Pullman
Co-Authors:			
Major:	History Sociology		
Category:	Humanities		

While much of the research on women during World War II has centered on their contributions to wartime production and the labor force in general**,** housewives also played a significant role in this war. Often these women were the only adult in the household, and were thus much more responsible and independent in daily life than they would have been before the war. Housewives were told that it was their patriotic duty to ration correctly and willingly, and anything else would have been un-American. This paper examines the representation and impact of rationing using a qualitative analysis of sources such as *Ladies' Home Journal*, government publications, and advertisements. It argues that rationing empowered women through activities in women's groups and taking on the role of caretaker and provider of the family. Housewives were also important in keeping normalcy in the household, something accomplished largely by rationing smartly. This was important for the obvious reason that it gave the home a sense of stability, but also because it provided something for soldiers to look forward to coming home to. The significance of this project is to contribute to a better understanding of the diverse experiences of women during World War II.

Poster Number 3

ABSTRACT:

Abstract Title:	**A Study of the Ploidy of Potamopyrgus Antipodarum in Relation to Habitat**		
Presenter:	Jared Dean		
Mentor:	Dybdahl, Mark	**Campus:**	Pullman
Co-Authors:	Dybdahl, Mark; Jenkins, Christina		
Major:	Genetics and Cell Biology		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

The ploidy of an organism has a potentially large effect on its ecology, impacting its adaptability to different habitats, its ecological niche and geographic range. This study investigates a possible correlation between habitat type and the ploidy of the New Zealand mud snail, Potamopyrgus antipodarum, across its native range in New Zealand. The focus of this study was the difference in ploidy between variable and constant environments, under the hypothesis that higher ploidy will be more prevalent when conditions are more variable, such as in stream versus lake habitats, or sites at higher latitude and higher elevation. We found limited support for our hypothesis, although we found that an increase in elevation was associated with an increase in ploidy.

Poster Number 4

ABSTRACT:

Abstract Title:	**Increasing the Immunity of Potatoes against Fungal Pathogens**		
Presenter:	Spencer Tilton		
Mentor:	Lee A. Hadwiger	**Campus:**	Pullman
Co-Authors:	Lee A. Hadwiger		
Major:	Computer Science		
Category:	Applied Sciences		

The potential for crop destruction by *Phytophthora infestans*, the causal agent of the Late Blight of potato has not diminished since its impact led to the Irish potato famine of the 1840s. Potato production generally has required frequent applications of synthetic fungicides to hold this disease in check. As possible alternatives to fungicides, "wild yeast" fungi, were investigated as bio-control agents. Strains of wild yeasts isolated from vineyards within Washington State were assessed for the ability to reduce the effects of *P. infestans* in potato leaf assays. A strain of *Metschnidowia pulcherrima* (Mp) exhibited suppression of growth of plant pathogenic fungi when grown with them on agar culture. This strain applied to potato leaves prior to inoculation with *P. infestans* reduced symptoms by inducing immunity. Mp most effectively suppressed late blight symptoms. This wild yeast strain also induced phytoalexin production in a pea system developed for monitoring nonhost resistance. The progression towards a successful agricultural application of this biocontrol agent requires the verification of the resistance-inducing benefits under field conditions.

The use of microbe-induced disease resistance in plants offers prospects for avoiding the use of direct-contact fungicides. This alternative approach requires induction of defense responses, without causing an accompanying negative effect on the plant or on the plant's commercial product. Yeasts are promising biological control agents in this respect.

Poster Number 5

ABSTRACT:

Abstract Title:	**NO+ as a PTR-MS Reagent Ion**		
Presenter:	Randy Bartoshevich		
Mentor:	Tom Jobson Ph.D.	**Campus:**	Tri-Cities
Co-Authors:	Graham VanderSchelden		
Major:	Civil Engineering		
Category:	Engineering and Physical Sciences		

The Proton Transfer Reaction – Mass Spectrometer (PTR-MS) is a machine used to test for gas phase molecules in any air sample and is most commonly used with H_3O^+ as the reagent ion, but is also capable of using NO^+ and O_2^+. The focus of this study was on adapting the current PTR-MS system to employ NO^+ as a reagent ion. This will enhance the ability of the PTR-MS to identify longer chain alkanes and other organic molecules that are common particulate matter precursors in urban air. Utilizing NO^+ as a reagent ion is expected to expand the analytical product of the PTR-MS by reducing the chances of breaking up these long molecules in the reaction chamber, such as alkanes, and thereby simplifying the analytical data and making individual compounds easier to identify in a more complex mixture such as diesel exhaust.

Poster Number 6

ABSTRACT:

Abstract Title:	**Detection of Cardiac Biomarkers with Lateral Flow Immunoassay Techniques**		
Presenter:	Brandon Graham		
Mentor:	Dr. Wenji Dong	**Campus:**	Pullman
Co-Authors:	Dr. Wenji Dong		
Major:	Bioengineering		
Category:	Molecular, Cellular, and Chemical Biology		

Heart failure (HF) is responsible for billions of dollars in healthcare costs and has a persistently high death rate, with 50% of newly diagnosed patients predicted to die within 5 years. It is increasingly recognized that the pathology must be detected prior to observable symptoms related to HF for medical intervention to be effective. Mounting evidence suggests that reduction in the basal ratio of phosphorylated cardiac Troponin I (p-cTnI) proteins to total cardiac Troponin I (cTnI) proteins in diseased hearts is strongly correlated to the extent of the pathological cardiac remodeling that is the hallmark of heart failure. Due to the labor intensive and costly nature of current detections systems, a cost-effective, rapid and highly-sensitive method for testing is needed for practical clinical applications. Utilizing a detection system based on that created by Joung et al. in 2013, the aim of the project is to ultimately create a system that can detect levels of total cardiac Troponin I (cTnI) proteins in serum samples though methods of affinity purification with the cTnI antibodies. Ultimately, this project will create the practical system for testing the concentration of total cTnI proteins for later calculation of the basal ratio. The system combines enzyme-linked immunoassays (ELISAs) and lateral flow immunochromatographic assays into an enzyme-based strip which captures the antigens (cTnI) on two separate lines. The horseradish peroxidase (HRP) conjugated antibodies allow for a simple detection system that requires less than 10 minutes to analyze though common fluorescence techniques. It is hypothesized that by comparing relative fluorescence of various concentrations of the antigens to an accepted standard, the strip will be able to detect very low concentrations of cTnI depending on the affinity of the antibody used.

Poster Number 7

ABSTRACT:

Abstract Title:	**The Influence of Western Education on Chinese Foreign Exchange Students in the United States of America towards Professionalism**		
Presenter:	Ryan Ward		
Mentor:	Lydia Gerber	**Campus:**	Pullman
Co-Authors:			
Major:	History		
Category:	Social Sciences		

Chinese foreign exchange students who came to the United States to receive an education in the mid-19th century and early 20th century experienced a culture that unlike their own. During the mid-19th to early 20th century, there was a movement in the United States to develop careers in professional fields in order to move away from high labor jobs. Education in the United States began to place additional significance on subjects involving diplomacy, economy, education, science, and technology. The goal of this project is to understand if the Chinese students who studied in the United States were influenced by their education to pursue differing career and life ambitions in comparison to other Chinese students. By interpreting data that compares the career pursuits of Chinese students who studied in the United States and Japan upon their return to China; a trend of the general population of students who studied in the United States can be seen to place emphasis on careers that correlate directly with the movement towards professional careers, while students from Japan placed significance towards politics, military positions, and literature. In order to try to understand individual perspectives of Chinese foreign exchange students who studied in America, the experiences and opinions of three especially accomplished Chinese foreign exchange students were interpreted. The three former students' names were Hu-shi, Tong Shao-Yi, and Rong Hong who is also known as Yung Wing. Each these students were influenced by their education in the United States and held strong opinions on education, politics, and economics. The outcome of this research suggests that Chinese foreign exchange students who studied in the United States were influenced by their education to pursue careers related in professional fields and to form opinions that corresponds with American perspectives.

Poster Number 8

ABSTRACT:

Abstract Title:	**Designing to Enhance the Benefits of Intergenerational Interaction**		
Presenter:	Meghan Hoiness		
Mentor:	Kathleen Ryan	**Campus:**	Pullman
Co-Authors:			
Major:	Interior Design		
Category:	Arts and Design		

GOAL

Through renovating local historic rock houses, a rural town of 318, hopes to provide a place for people of all ages to join in activities, explore opportunities, and learn, all while maintaining the rich history of the original 1930's rock-faced houses (La Crosse, 2015).

Layers, a youth and senior center, is designed based on community members ideas. Basalt forms the 'old' geology of the Palouse and 'new' foundation representing all of the town's history. As a result of community input, a more interconnected "layers" of generations enabled the creation of this 'new' foundation, implementing multiple layers of the basalt rock which depicts layers of: creativity, history, and learning process (Martin, 2012).

METHOD / RESULTS

This process began through a series of community participatory workshops (Sanoff, 2006), and through case study development. Surveys were also conducted with the community focusing on; youth and senior activities, and intergenerational collaboration (Martin & Nakayama, 2012; Robert & Rinehart, 1997). The information was analyzed, then incorporated to respond to community identified needs. This evidence-based research demonstrated that by implementing certain activities, materials and design elements into the space, all generations benefit (Dvorsky , 2014).

CONCLUSION

By obtaining a deeper understanding on factors relevant to each age group and their activity interests, success in intergenerational rapport can be built through strategically selecting shared activities by both generations to implement into the design. Rapport bridges the gap between generations where the design supports intergenerational interaction, and provide an atmosphere for the community that promotes a fun, safe environment.

Poster Number 9

ABSTRACT:

Abstract Title:	**The Impact of Anxiety on Risky Decisions requiring Cognitive Flexibility**		
Presenter:	Melissa Halley and David Saldivar		
Mentor:	John M. Hinson, Paul Whitney, Arig Aboulenein	**Campus:**	Pullman
Co-Authors:			
Major:	Psychology / Zoology		
Category:	Social Sciences		

Chronic high levels of anxiety can interfere with cognitive performance and social adjustment. One way in which anxiety can negatively impact performance is by interfering with decision making. There are two major theories as to how and why anxiety alters decision making. The first is that individuals with high anxiety will be distracted and have difficulty focusing on task-relevant information. The second is that anxiety makes people overly sensitive to potential negative outcomes, which can lead to extreme risk aversion. The present study contrasted these two theories in the context of decisions about risk that required cognitive flexibility, i.e. the ability to make dynamic changes in decision making based on feedback. Cognitive flexibility is often tested in the laboratory using reversal learning tasks. In reversal learning, one choice is rewarded more than another to establish an initial choice preference, but then contingencies are reversed so that the formerly inferior choice becomes the better choice. Healthy young adults who scored either high or low on the Spielberger Trait Anxiety Inventory performed a reversal learning task in which they made choices from computer-simulated decks of cards. Both cards produced hypothetical gains and losses of money, but one deck averaged a $50 gain and the other averaged a $50 loss. After 60 choices the contingencies reversed so that the formerly bad deck became the good deck, after which participants made 40 more choices. In addition, knowledge of the average deck outcomes was assessed after 50 choices of the pre-reversal phase. The results demonstrated that the high anxiety group required more trials to differentiate between the decks and had less accurate knowledge of the outcomes. Post reversal, there was no difference between groups. These findings indicate that high anxiety can slow learning from feedback in a manner consistent with the distraction view of anxiety. However, once contingencies were learned, the high and low anxiety groups showed equivalent cognitive flexibility.

Poster Number 10

ABSTRACT:

Abstract Title:	**Carbon Nanotube Growth Through Modification of Catalyst and Heat Treatment Process Parameters**		
Presenter:	Denise Blohowiak		
Mentor:	David Field	**Campus:**	Pullman
Co-Authors:	Joshah Jennings		
Major:	Materials Science and Engineering		
Category:	Engineering and Physical Sciences		

Inclusion of nanotechnology into structural materials is an area that has been increasing in interest as a mechanism for strengthening materials. The incorporation of carbon nanotubes (CNTs) into structural materials is of particular interest because of their unique properties and potential for applications from composites to electronics. This project looks at methods to achieve controlled carbon nanotube growth. The first method uses physical vapor deposition, or sputtering, to deposit thin films of iron and carbon onto silicon wafers in order to create the catalyst particles that are needed to achieve the growth of the carbon nanotubes. Once a uniform film has been deposited, the wafers are then annealed at high temperature to create "islands" of iron particles, which are the nucleating sites from which the carbon nanotubes grow. At this point, the wafers with the iron particle islands are placed in a heat treatment chamber under an inert argon atmosphere where the wafers are heat treated for the optimal period of time for carbon nanotube growth. The argon atmosphere is used to prevent oxidation of the iron. An alternative approach for nanotube growth is being assessed where the nanotubes are grown from a sol-gel layer spin-coated onto the silicon wafers to create a thin catalyst layer on the surface. Carbon is subsequently sputtered onto the sol-gel coated silicon wafers and the same chemical vapor deposition process takes place to achieve the growth of the nanotubes. In this project, uniform methods for deposition of the thin film coatings, catalyst particles, and subsequent carbon nanotubes are: 1) defined by parameters including physical vapor deposition rate, catalyst particle, and CNT growth rate, and 2) characterized using analytical tools including Scanning Electron Microscopy (SEM) and Zygo Profilometer.

Poster Number 11

ABSTRACT:

Abstract Title:	**Local Government Response to Engage Seniors**		
Presenter:	Alexander Van Dinter		
Mentor:	Dr. Dana Lee Baker	**Campus:**	Vancouver
Co-Authors:			
Major:	Public Affairs		
Category:	Social Sciences		

Over the last few decades there has been an enormous amount of funding put towards studying aging and how to promote aging well. Robert L. Kahn's article on aging well found that there are 3 main principles to aging well minimizing the risk of disease and disability, maintain mental function, and continued engagement. The passing of the Older Americans Act of 1965 allowed for the creation of Retired Seniors Volunteer Program(s) (RSVP) to be run by the cities and funded by the federal government, the Act also allowed for the funding of any projects which would increase civic engagement in the senior population. The purpose of my research was to find out how local governments are implementing RSVP's and if there are other ways in which cities are trying to engage the senior population either through senior trips, like the city of Vancouver, or by creating specific fitness/engagement centers for seniors like the city of Los Angeles. The implications of this research is to compile what many large and small cities are doing across the United States to implement the RSVP through government grants but also to examine what other cities have found successful in engaging the senior population which could help formulate policies across the states to formulate better ways to engage the senior population.

Poster Number 12

ABSTRACT:

Abstract Title:	**Mutations on the Tropomodulin3 Binding Sites Affect Affinity for Tropomyosin**		
Presenter:	Dillon Cooper		
Mentor:	Mert Colpan	**Campus:**	Pullman
Co-Authors:	Mert Colpan and Alla Kostyukova		
Major:	Bioengineering		
Category:	Molecular, Cellular, and Chemical Biology		

Actin is a widely abundant protein found within nearly all eukaryotic cells, polymerizing into filaments to build cytoskeleton structures. Synergetic proteins bind around the actin filament or cap each end to regulate polymerization and degradation. Tropomodulin (Tmod) is the only known capping protein for the slow growing, or pointed, end of actin filaments. There are four isoforms of Tmod: Tmod1-4. The known binding sites of Tmod include two that affix to tropomyosin (TM) molecules, as well as two actin binding sites. One actin binding site resides on the C-terminal domain, while the other actin and TM binding sites are within the N-terminal domain.

In previous studies, mutations were introduced at the TM binding sites of Tmod1 to disrupt interaction. Hydrophobic amino acid residues were replaced with charged residues, disrupting formation of the hydrophobic surface in the amphipathic helix. For this study, PCR was performed to introduce mutations at the homologous residues of Tmod3. Individual plasmids were transformed in Escherichia coli for the expression of Tmod3 L29E and Tmod3 L134D. The expressed Tmod3 mutants were purified using affinity chromatography. Actin was purified from actin-acetone powder of chicken pectoral muscle. Native gel electrophoresis was used to evaluate differences between binding of WT-Tmod3 and mutant Tmods to TM or actin. Each individual mutation that destroyed TM-binding ability of Tmod3 showed a change of interaction between Tmod3 and TM. The TM binding sites of Tmod1 and Tmod3 were found to be homologous.

Poster Number 13

ABSTRACT:

Abstract Title:	**Zero Tolerance Policies**		
Presenter:	Jan Yochim		
Mentor:	Dr. Dana Baker	**Campus:**	Vancouver
Co-Authors:			
Major:	Public Affairs		
Category:	Social Sciences		

Attention to the mental health of school age children is key to a safe learning environment in the public education policy subsystem. One way schools have attempted to ensure a safe learning environment is by adopting zero tolerance discipline policies.
What (if any) consideration of mental health diagnosis is written into zero tolerance policies articulated at the local level? This study will focus on an analysis of zero tolerance policy statements based on stratified random sampling of school districts in the United States. Findings of this study will help with better understanding of school policies related to mental health.

Poster Number 14

ABSTRACT:

Abstract Title:	**Quantitatively Measuring Anti-predator Behaviors in Amphibian Larvae, with Application to Disease Transmission**		
Presenter:	Kai Wang		
Mentor:	Dr. Jesse Brunner	**Campus:**	Pullman
Co-Authors:	Kai Wang, Jesse Brunner		
Major:	Zoology		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Amphibian larvae generally decrease their activity in response to predators, but none of the studies directly quantify the level of activity, and whether such behavior response is ephemeral or enduring is unknown. Here we built a camera system and created mathematical formulas to calculate the 3D positions of animals from recorded footages. With the recording system, we experimentally exposed larvae of Long Toed Salamander, *Ambystoma macrodactylum*, to chemical cues of predator and measured their activity levels and relative positions through time. We found that the larvae exposed to predator cues moved less often and shorter distances, stayed further from the source of the predator cues, and, surprisingly, stayed further apart from one another. Furthermore, we found that the anti-predator behavior is long lasting, persisted through a long time after the original exposure of chemical cues. Thus we suggested that presence of predator might alter disease transmission by limiting movement space and decrease overall level of activity.

Poster Number 15

ABSTRACT:

Abstract Title:	**Social Media and its Influence on Purchasing**		
Presenter:	Kira Bottles		
Mentor:	Carol Salusso	**Campus:**	Pullman
Co-Authors:	Carol Salusso, Quinn Sullivan		
Major:	Apparel Merchandising		
Category:	Social Sciences		

Consumers are rarely aware of the influence from social media. Long thought to be ineffective, subliminal advertising within social media appears to be an influence on the purchasing habits of consumers. Millennials in particular, have turned into the sharing generation. Wielding the power of their social media presence via smartphones, tablets, and laptops, they are using various social media platforms to repeatedly share more about themselves and what types of products they are consuming.

Social media is also thought to be the new word of mouth advertising. Our fellow users or "Friends", in the case of Facebook, are influencing us more then any advertising purchased on social media platforms. Each time a "selfie" is shared, or a product page is "Liked", everyone you are connected with sees it. With over one billion active users on Facebook, and almost a quarter of a million active users on Instagram, we are being *visually* influenced to purchase, by the people we follow.

When asked if they are influenced to purchase items by those that they follow, most survey respondents said "no". However, when asked what influenced their purchases, most respondents said the individuals that they follow. Women respondents in particular within the 18 and 22 age group were influenced a great deal by their fellow social media users.

We believe that they were subconsciously being influenced by what they saw or were being overtly recommended by their influential social media contacts.
We concluded that because social media is driven in great part by images that our hypothesis is correct. Among respondents 83.3% said they were regular users of Facebook; an additional 20% said they were regular users of Instagram. Both of these sites were used primarily by women. Our research shows that these young women were mostly purchasing appearance-enhancing products with a large emphasis on beauty products. Makeup, hair and nail products were by far the majority of beauty products being purchased. Apparel came in a close second with our respondents saying that they purchased many apparel products after first seeing it worn by their friends.

Poster Number 16

ABSTRACT:

Abstract Title:	**Preparation of Peptides for Localization of Actin Binding Site in Leiomodin 2**		
Presenter:	Dayton Wooldridge		
Mentor:	Alla Kostyukova	**Campus:**	Pullman
Co-Authors:	Thu Ly, Dmitri Tolkatchev, Alla Kostyukova		
Major:	Chemical Engineering		
Category:	Molecular, Cellular, and Chemical Biology		

Actin is the monomeric unit that polymerizes and forms thin filaments in muscle sarcomeres. Leiomodin 2 binds to the pointed end of actin filaments and affects actin polymerization. Leiomodin 2 contains three known actin-binding sites and preliminary research suggests an additional actin-binding site in the N-terminal region immediately after the first. The 168 amino acids containing the first binding site and suspected of containing the additional binding site were divided into five overlapping peptide fragments [F1, F2, F3, F4, F5], each fragment approximately 40 amino acids in length. F1 corresponds to the known actin-binding site in Leiomodin 2 and is the positive control. Primers were designed for PCR to clone the five selected fragments of Leiomodin 2. These fragments were ligated into pET-plasmid containing an MFH-6-His tag. The plasmids were replicated by transformation in DH5α E. *coli* cells. The colonies were screened and the plasmids were purified and their sequences confirmed. Expression conditions for BL21(DE3) E. *coli* cells were optimized for each fusion protein. The BL21 cells were lysed and the fusion proteins were purified on Ni-NTA Agarose. The fusion proteins were then cleaved separating the desired fragment from the MFH 6-His tag. The fragments were purified using hydrophobic chromatography followed by HPLC. After the fragments are confirmed by mass spectroscopy they will be analyzed by NMR to detect actin binding.

Poster Number 17

ABSTRACT:

Abstract Title:	**Shewanella Oneidensis MR1 Uptake in a Soil Column**		
Presenter:	Austin Sattler and Jianing Zhuo		
Mentor:	Somayeh Ramezanian	**Campus:**	Pullman
Co-Authors:	Jianing Zhuo, Somayeh Ramezanian, Nehal Abu-Lail		
Major:	Bioengineering / Chemical Enginering		
Category:	Engineering and Physical Sciences		

Biofilms of nonpathogenic bacteria are being explored for their ability to enhance the mechanical properties of various soils. In this study, the transport of *S. oneidensis* MR1 in a soil packed column under variable pH conditions that mimic different soil environments were measured. Prior to running the column experiments, the MR1's growth curve was obtained in a rich growth medium. The growth of bacteria was monitored using optical density measurements at 600 nm wavelength. Bacterial cells were cultivated in the late exponential phase of growth. To quantify bacterial transport, bacterial suspensions in phosphate buffered saline (PBS) solution modified to the pH of interest at an approximate optical density (OD) of 0.050 were pumped in a bottom-up approach to a saturated sand column. The flow of bacterial solution in the column was laminar. The accumulation of bacteria in the column was monitored by collecting effluent samples for ten pore volumes every 30 seconds. Bacterial concentrations were then quantified by combining OD measurements with colony forming units. Our data shows that 90% of the bacteria were retained in the sand column at pH 7. This implies that *S. oneidensis* is a great candidate for improving soil mechanics because of their ability to be retained in soil and form sticky biofilms that hold soil grains together.

Poster Number 18

ABSTRACT:

Abstract Title:	**Rural Contemporaries**		
Presenter:	Keli Haffner		
Mentor:	Kathleen Ryan	**Campus:**	Pullman
Co-Authors:			
Major:	Interior Design		
Category:	Arts and Design		

Basalt rocks can be found throughout the Palouse and on the exterior of abandoned homes of the rural community, LaCrosse, WA. The reuse of the existing structures provided the opportunity to create a new image in the rural community. A space that adheres to both teens and seniors shows there are advantages to creating shared spaces in rural communities, such as, making connections between past, present and future from the community. A design workshop involving LaCrosse community members gave insight as to what the use of the land and rock homes could be; this format led to valuable information and the involvement community members. Visual inspiration for designing spaces were acquired from the ideas generated at the workshop, a compilation of graphical research, and information about LaCrosse, WA. This information was important in understanding the community and how they see themselves in terms of town involvement. (Lawson & McNally, 1995). Reading and analyzing studies about youth and senior centers provided information regarding community involvement, education and social and economic benefits. Program guidelines for the center were developed to meet the needs of both teens and seniors. The space planning reflected the research found on a case-study of a senior, youth and teen centers in the Pacific Northwest. Feedback from LaCrosse on preliminary designs revealed that a multi-functional space was highly desired by the community. Guidelines acquired through student and senior center studies (Rosenberg, 1993) helped to develop the functions of the spaces used by both patrons. Encouraging them to proceed in being active with older generations. This project will extend the sense of community to and between both elders and youth. Through combining together and sharing similar interests, the integration of youth and senior centers is becoming more common. Many benefits come with this type of integration; teens develop social respect for their elders when common interests and similarities are present. A chance for more community involvement and the opportunity of outreaching to the youths can create better connections between current and past generations.

Poster Number 19

ABSTRACT:

Abstract Title:	**Effects of Succession and Forage Plantings on Nutritional Carrying Capacity and Habitat Selection of Roosevelt Elk**		
Presenter:	Katie Wat		
Mentor:	Dr. Lisa Shipley	**Campus:**	Pullman
Co-Authors:	Dr. Lisa Shipley, Elvia Lopez Perez		
Major:	Wildlife Ecology and Conservation		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Low productivity in Roosevelt elk (*Cervus elaphus roosevelti*) populations on the Olympic Peninsula has been linked to low forage quality and loss of forage resources. Northwestern forests have experienced intensive timber management, recreation, and farming activities that may influence the quality and quantity of available forage. As a response, managers have attempted to increase the quality and quantity of forage through managing forest succession and planting forage fields with nutritious grasses and forbs. We compared the nutritional carrying capacity (i.e., the number of elk that can be supported in a given area, NCC) for Roosevelt elk among forest successional stages, habitat types, and planted forage fields across the seasons. In addition, we examined whether female elk responded to NCC of forest stands when selecting habitat. We measured forage biomass across seasons by clipping, drying and weighing understory vegetation on plots within conifer forest stands ranging in succesional stage, riparian areas, and planted forage fields. We determined the digestible energy and protein of major forages, and calculated NCC from the Forage Resource System Evaluation for Habitat model. Finally, we created Resource Selection Function models from radiolocations of 30 female elk over 2 years and random locations. To do this, we detemined the home range for each animal, and overlaid animal and random locations within the home range on map layers for distance to roads, distance between forage and cover, slope, NCC, and habitat type in ArcGIS. We found that NCC was highest in conifer stands 4-15 years old, riparian areas, and planted forage fields. Within their fall-spring home ranges, female elk selected habitats further from roads, closer to forage/forest edges, with lower slopes, and higher NCC. They also selected for forage fields. Our results suggest that stands providing abundant, high-quality forages, whether in early successional forests, riparian areas or planted forage fields, are beneficial to Roosevelt elk.

Poster Number 20

ABSTRACT:

Abstract Title:	**Faith, Science, and Political Events: Examining Trends in Student Beliefs**		
Presenter:	Ashlyn Salzman		
Mentor:	Dana Lee Baker	**Campus:**	Vancouver
Co-Authors:	Dana Baker, Ph.D., Steven Weber, Ph.D.		
Major:	Public Affairs		
Category:	Social Sciences		

Both science- and faith-based beliefs have long, storied histories with political systems. Reliance on either to the exclusion of the other has demonstrated the ability to manifest tragic mistakes within democratic systems. National polls are frequently taken with the goal of discerning what Americans believe between dueling issues testing the peaceful coexistence of science and faith. Results of these polls are used to support theories about how belief levels coincide with events in the American political system. This paper examines eighteen years' worth of survey data on the level of belief which college students in the Pacific Northwestern institution of Washington State University Vancouver have in a variety of scientific and faith-based claims.

Poster Number 21

ABSTRACT:

Abstract Title:	**Conjugation and Characterization of Fluorophore Labeled KLA Peptide**		
Presenter:	Kieran Weatherspoon		
Mentor:	Dr. Jonel Saludes	**Campus:**	Pullman
Co-Authors:	Erickson M. Paragas, I. Abrrey Monreal, and Jonel P. Saludes		
Major:	Zoology, Pre-Medicine; Minor: Music		
Category:	Molecular, Cellular, and Chemical Biology		

Cell penetrating peptides (CPPs) are cationic molecules that have been used as intracellular delivery systems for drugs and other bioactive materials. Amphipathic cell penetrating peptides are CPPs containing both polar cationic (hydrophilic) and non-polar (hydrophobic) amino acid residues. It uses its amphipathicity to translocate efficiently across the cell membrane. KLA is a synthetic amphipathic CPP that consists of 18 amino acid residues (KLALKLALKALKAALKLA). This α-helical peptide shows a strong correlation between its amphipathicity and cellular uptake ability. In this paper, we are reporting on the preparation of KLA using microwave-assisted solid-phase synthesis. Subsequently, KLA was efficiently labeled with a fluorophore using various temperatures under microwave irradiation, followed by purification by HPLC, and characterization by MALDI-TOF mass spectrometry. Finally, the fluorophore labeled KLA was tested for cell permeability against HeLa cells.

Poster Number 22

ABSTRACT:

Abstract Title:	**Noninvasive Blood Glucose Monitor**		
Presenter:	Samuel Byrd		
Mentor:	Howard Davis	**Campus:**	Pullman
Co-Authors:	Zane Duke, Amber Graviet, Qassem Naim		
Major:	Bioengineering		
Category:	Engineering and Physical Sciences		

The ability of skin contact electrodes and minimal signal processing elements to accurately observe and report trends bioelectric signals which correlate to blood glucose levels was investigated. The oscillations in the electrooculogram (EOG) were recorded in healthy individuals over an 80 minute time interval. Each test subject fasted for twelve hours prior to the beginning of the test, consuming 100g of sucrose dissolved in 300mL of water five minutes after the test's beginning. The amplitude of the oscillation of the EOG trended similarly to blood sugar in approximately 70% of data points collected.

Poster Number 23

ABSTRACT:

Abstract Title:	**College Students Perceptions of Intimate Partner Violence in the Media**		
Presenter:	Kaylene Tyndall		
Mentor:	Kathleen Rodgers	**Campus:**	Pullman
Co-Authors:	Stacey Hust, Kathleen Rodgers		
Major:	Human Development		
Category:	Social Sciences		

Patterns of interpersonal violence have been relevant for decades as even the earliest of studies show that an estimated 20 to 48% of college students have experienced dating violence (Makepeace, 1987; Amar & Gennaro, 2005). Among college students, various expressions of intimate partner violence (IPV) are being interpreted in ways that demonstrate victim blaming, diminish interpersonal violence, and ignore the severity of emotional abuse. This study explores the following questions using data from focus groups carried out at Washington State University. Do college students perceive IPV in the media? Do college students relate IPV in the media to representations of their own or friends' lived experiences? How do college students make sense of presentations of IPV in media, particularly in regard to gender roles? Male and female students were recruited from lower level Human Development and Communication courses to participate in four separate three-hour focus groups (12 men in focus group 1, 12 women in focus group 2, 12 women in focus group 3, and 7 men in focus group 4). Using a grounded theory approach I will code the data to see which themes emerge, paying special attention to data that can answer my proposed questions. Although individuals may not have control over what is portrayed through the media, they can develop skills to critically analyze messages in media. The results of this research will identify patterns related to college students' critical analysis of intimate partner violence in the media, and will help to inform ways to encourage media literacy (i.e., critical media awareness) in this age group.

Poster Number 24

ABSTRACT:

Abstract Title:	**Y-Chromosome Linked Haplotypes affect Aggression and Gene Expression in Mice**		
Presenter:	Halle Weimar		
Mentor:	Dr. Jun Xu	**Campus:**	Pullman
Co-Authors:	Kevin Lewallen, Matt Landowski, Jun Xu		
Major:	Neuroscience		
Category:	Molecular, Cellular, and Chemical Biology		

Certain behaviors and disorders are more common in males than females. Y-linked genes are among the potential culprits behind these sex-specific characteristics. Here, we set out to test whether the Y-chromosome has effects on behavior and gene expression in the brain.

Our experiment utilized the Y-consomic mouse model. These test mice share an identical genetic background except for the Y-chromosome, which may belong to one of ten mouse strains. We tested two age groups, young (~2 months) versus older (~7 months) adults, in a series of behavioral tests followed by tissue collection. Any differences in behavior could ultimately be attributed to variation in the Y-chromosome and its gene expression.

Using SNP tests at six Y-linked genes, we divided the Y chromosomes into two haplotypes, Y-A and Y-B. Regardless of age, mice with the Y-B haplotype attacked an intruder mouse in significantly more trials than those with the Y-A haplotype, assessed with the Resident-Intruder paradigm ($p=0.007$; 2-way ANOVA). Among the Y-linked genes, *Kdm5d* was the only one which was differentially expressed between the mice that attacked in all three trials versus those that never attacked ($p<0.05$; t-test), making it a plausible candidate to account for the aggression effect of the Y chromosome. In other tests, the Y-A mice exhibited better motor coordination in the rotarod test. However, only an age effect was detected in tests of fear conditioning, pain perception, and locomotion.

Using RT-qPCR, we found that the more aggressive Y-B mice expressed the GABA receptor gene, Gabra2, much less than Y-A mice in the cortex, cerebellum, brain stem, and spinal cord (t-tests; $p<0.05$ in all cases). Hormone assays did not detect a difference between the two haplotypes in serum or testicular testosterone concentrations.

Our findings indicate that the Y-chromosome indeed regulates behaviors such as aggression and brain gene expression. This supports a role for the Y-chromosome in sexual differentiation of the brain and sex differences in disease prevalence.

Poster Number 25

ABSTRACT:

Abstract Title:	**How Pygmy Rabbits Trade-Off Food Quality and Proximity to a Refuge**		
Presenter:	Logan Weyand		
Mentor:	Meghan J. Camp	**Campus:**	Pullman
Co-Authors:	Meghan J. Camp, Lisa A. Shipley, Miranda M. Crowell, Timothy R. Johnson, Jennifer S. Forbey, Janet L. Rachlow		
Major:	Wildlife Ecology		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Logan K. Weyand*, *School of the Environment, Washington State University, Pullman, WA 99164, USA; lydia.weyand@email.wsu.edu;* Meghan J. Camp, *School of the Environment, Washington State University, Pullman, WA, 99164, USA; meghan.camp@email.wsu.edu;* Lisa A. Shipley, *School of the Environment, Washington State University, Pullman, WA 99164, USA; shipley@wsu.edu*; Miranda M. Crowell, *School of the Environment, Washington State University, Pullman, WA 99164, USA; miranda.crowell@email.wsu.edu;* Timothy R. Johnson, *Department of Statistical Science, University of Idaho, Moscow ID, 83844, USA; trjohns@uidaho.edu;* Jennifer S. Forbey, *Department of Biological Sciences, Boise State University, Boise ID, 83725, USA; jenniferforbey@boisestate.edu;* Janet L. Rachlow, *Department of Fish and Wildlife Sciences, University of Idaho, Moscow, ID, 83844, USA; jrachlow@uidaho.edu*

Animals called ‘central-place foragers’ use burrows as a refuge, and make excursions from their burrows to find food and mates. Over time, the abundance and quality of food may decline near burrows, thus animals must travel further from their burrows to obtain nutritious food. To better understand how animals trade off food quality and distance to a refuge, we conducted a series of double choice feeding trials with captive rabbits, comparing the pygmy rabbit (*Brachylagus* idahoensis), an obligate burrower and central place forager inhabiting sagebrush-steppe landscapes, to the mountain cottontail (*Sylvilagus nuttallii*), a non-obligate burrower and generalist. Rabbits were given a choice between two foraging patches that varied in the amount of fiber in the food (36-50% NDF), and the distance from burrow (1 – 8 m). Using the Method of Paired Comparisons, we determined how distance and fiber influenced the relative risk level at each feeding patch, and, the marginal rate of substitution of distance for fiber. Distance from burrow was a greater risk than high fiber to pygmy rabbits. Distance from burrow was of equal risk as high fiber to mountain cottontails. The marginal rate of substitution of fiber for distance was three times greater for pygmy rabbits than it was for cottontails. Therefore, pygmy rabbits are less likely than mountain cottontails to travel farther distances from their burrows to find higher quality food. This understanding is important for habitat management, and suggests that areas of high sagebrush density and proximity to burrows may be optimal pygmy rabbit habitat.

Poster Number 26

ABSTRACT:

Abstract Title:	**The Impact of Website Quality on Apparel Mobile Commerce Consumer Satisfaction and Intent to Purchase: An Empirical Study of U.S. Consumers**		
Presenter:	Quinn Sullivan		
Mentor:	Dr. Ting Chi	**Campus:**	Pullman
Co-Authors:	Dr. Ting Chi		
Major:	Apparel Merchandising		
Category:	Social Sciences		

Mobile websites have introduced a new channel for consumers who desire convenience throughout the shopping experience. While prior research has indicated a growing market in mobile apparel consumption, current data proves that changes are necessary to encourage greater growth among consumers. This research explored the effect of apparel mobile commerce website quality and consumer satisfaction regarding intent to purchase to predict these changes for future retail success. Website quality was hypothesized as a contributing factor to consumer satisfaction that ultimately determined consumer intent to purchase apparel on mobile websites. Data was collected in an online survey on Amazon Mechanical Turk that targeted United States apparel mobile commerce users. 293 useful responses were received during the first two weeks of January 2015. In addition to the demographic information, survey respondents were asked a variety of questions identifying important website quality variables based on prior interaction with apparel mobile commerce websites. Responses reflected consumer preferences among the variables derived from the WebQual™ scale of consumer website evaluation. Factor analysis, correlation, and multiple regression were applied for data analysis. Figure 1 illustrates the research model with the hypothesis testing results.

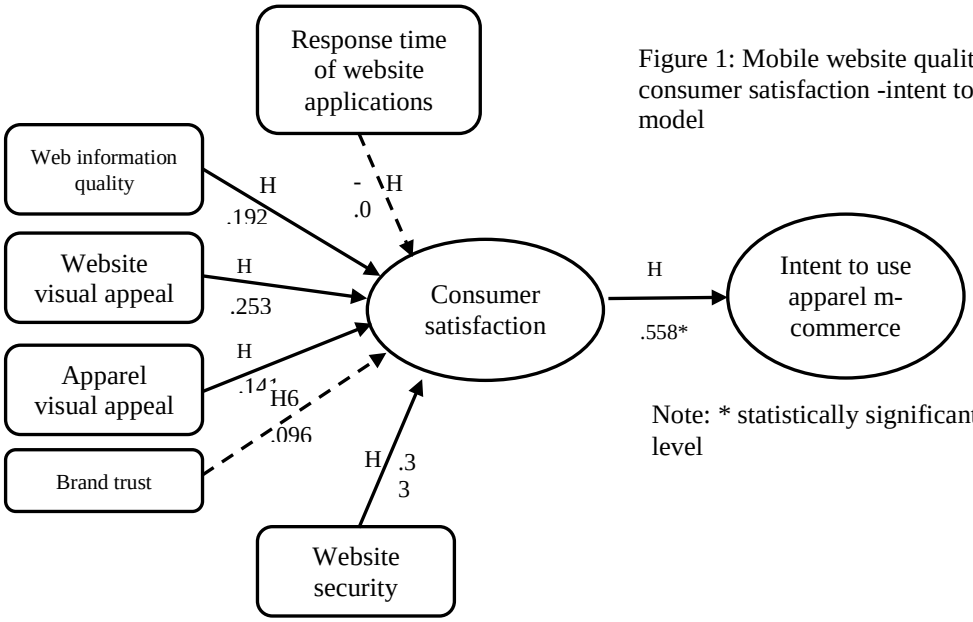

Figure 1: Mobile website quality - consumer satisfaction -intent to purchase model

Note: * statistically significant at p<0.01 level

Results revealed that website information quality, website visual appeal, apparel visual appeal, and website security positively impacted consumer satisfaction on apparel mobile commerce websites. Website response time and brand trust showed insignificant impacts on consumer satisfaction. With higher satisfaction on apparel mobile website, consumers were more likely to purchase apparel through the website. The findings of this study may help guide companies in creating a consumer desired mobile website so as to attract and retain customers and achieve competitive business performance.

Poster Number 27

ABSTRACT:

Abstract Title:	**State Mindfulness and Perception of Performance in Novice and Varsity Rowers**		
Presenter:	Alexandra Waddell		
Mentor:	Dr. Sarah Ullrich-French	**Campus:**	Pullman
Co-Authors:			
Major:	Kinesiology, Psychology		
Category:	Social Sciences		

State mindfulness is the non-judgmental attention and awareness of the present moment. A measure for state mindfulness is the State Mindfulness Survey for Physical Activity (SMS PA). Limited research has looked at state mindfulness and perceptions of performance in physical activity. The current study aims to observe differences between novice and varsity rowers in mindfulness and perceptions of performance at two races during the spring racing season. Novice (n=9) and varsity (n=9) rowers completed a survey immediately following two races. The survey included the SMS PA and questions about their perceived performance of themselves, their crew, and if they improved. After an early season race (time 1), higher state mindfulness related to lower perceptions of novice rowers' own performance ($r=-.64$, $p=.06$). However, for varsity rowers first race, higher state mindfulness related with higher perceptions of one's own performance, the crew's performance and improvement ($r=.74$ to $.96$, $p<.05$). After a late season race (time 2), higher state mindfulness again related with lower perceived crew performance for novice rowers ($r=-.84$, $p<.05$). Although not statistically significant, there is a positive trend towards mindfulness and perceptions of one's own and the crew's performance ($r=.60$ and $.61$, $ps>.05$) for the more experienced varsity athletes in the late season race. Different patterns of correlations emerged for novice and varsity rowers between their perception of performance and state mindfulness. For both novice and varsity rowers, the late season race (PAC-12 final) was more important compared to the early season race. For varsity athletes mindfulness did not appear to facilitate performance perceptions to the same degree as the early season, lower stakes race. Conversely, mindfulness appears to have a stronger negative relationship with performance perceptions for novice athletes in the late season race. The opposite relationship of mindfulness with perceptions of performance between experienced and novice athletes suggests that varsity rowers may be better at attending to relevant technical actions in the race whereas novice rowers, with less experience, may be attending to factors not related to their technique. Further research is necessary to better understand how experience plays a role in how mindfulness associates with athletic performance.

Poster Number 28

ABSTRACT:

Abstract Title:	**The Spatial Pattern of Activation throughout the Sarcomere Influences Force Production in Computational Models of Muscle Contraction**		
Presenter:	Alexander Wood		
Mentor:	Bertrand C.W. Tanner	**Campus:**	Pullman
Co-Authors:	Bertrand C.W. Tanner		
Major:	Computational Neuroscience		
Category:	Molecular, Cellular, and Chemical Biology		

The forces generated by muscle to power contraction are produced at the molecular level by the motor protein myosin and its interactions with another protein, actin. Skeletal and cardiac muscle cells consist of 'sarcomeres', highly-organized units of contraction. Within these sarcomeres, myosin and actin are organized into filaments that interdigitate and slide past each other during muscle shortening and lengthening. Some medical conditions, such as nemaline myopathies, muscle wasting during disease, and atrophy due to spaceflight or aging are associated with microscopic alterations in the structures of these filaments. However, these alterations and their functional impacts are difficult to observe in living and active muscle tissues. While previous studies from our laboratory have investigated the influence of altered myosin filament structure on muscle force production, it is unclear whether changes in the structure of actin filaments could also affect muscle force production.

In this study, we use computational simulations of muscle contraction within a half-sarcomere to determine possible consequences of actin filament loss on muscle function. We compared two types of changes in actin filament structure: inactivation of actin units from the free-end of the filament (termed 'uniform' loss, equivalent to shortening the filament), and inactivation of actin units at random locations along the filaments (termed 'random' loss).

We found that force production decreased in both cases. As might be expected, force declined in proportion to the loss of actin availability for the uniform decreases in filament length. However, force declined less in the random case. These results are consistent with our previous work on analogous losses of myosin along the myosin filaments. Together, these numerical experiments suggest that interactions between nearby units can combine to augment force production, even when actin and myosin interactions are randomly lost throughout the sarcomere. Complete loss of these interactions from the ends of the filaments (and sarcomere), however, could significantly diminish force production. This may underlie weak contractility associated with nemaline myopathies, or muscle wasting associated with cancer or heart failure.

Poster Number 29

ABSTRACT:

Abstract Title:	**A Role for Leptin in Mediating Nutrition Dependent Regeneration Rate in *Xenopus Laevis***		
Presenter:	Kayla Titialii		
Mentor:	Erica Crespi	**Campus:**	Pullman
Co-Authors:	Audrey Parks, Jennifer Cundiff, Erica Crespi		
Major:	Zoology		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Studies of the fat-secreted hormone leptin in amphibians has led to a greater understanding of its role as a modulator of early developmental processes. In amphibians and other vertebrates development rate is positively associated with nutritional condition, and we propose that leptin is a growth factor that signals for limb growth in developing tadpoles. We tested the hypothesis that leptin mediates nutrition-dependent regeneration rates in *Xenopus leavis* tadpoles by applying a recombinant *Xenopus* leptin treatment to tadpoles experiencing high food (fed once a day) or low food (fed every other day) after a limb was amputated. After 15 days, the regenerated area of the limb was measured, as well as the developmental stage of the uncut limb. We found that our food restriction treatment slowed regeneration rate as well as the development of the uncut limb. After accounting for body size of the tadpoles, the level of regeneration was enhanced by leptin injection in the food-restricted group, but regenerated area was not affected by leptin in the high food group. Our findings demonstrate that *X. laevis* tadpoles simultaneously allocate resources to both regeneration and other developmental processes, and given that leptin mRNA expression is positively correlated with nutritional state at this stage of development in *X. laevis*, the ability of leptin to enhance regeneration in low food conditions suggests that this hormone is a nutritional modulator of regeneration processes.

Poster Number 30

ABSTRACT:

Abstract Title:	**The Educational Barriers and Coping Strategies of Latino Male Undergraduates**		
Presenter:	Ivan Valdovinos		
Mentor:	Dr. Nolan L. Cabrera	**Campus:**	Pullman
Co-Authors:	Nolan L. Cabrera, PhD, University of Arizona		
Major:	English Secondary Education Spanish		
Category:	Social Sciences		

The purpose of this study was to analyze the educational barriers and coping strategies of Latino/a undergraduates to better understand why Latino males seek less help than Latina females at the University of Arizona. Latino/a undergraduates participated in in-depths interviews and were selected based on their extensive involvement in Latina/o-based organizations on campus such as Chicano/Hispano Student Affairs, Latina/o Greek life, MECHA, etc. The data was analyzed based on the diverse perspectives of masculinity described by Mirande (1998), Connell (2005), and Abalos (2002). The findings concluded that Latino/a undergraduates at the University of Arizona shared similar educational barriers consisting of lack of one-on-one faculty interaction and lack of sense of belonging. Major differences emerged in the coping strategies and help-seeking behaviors for both genders. All Latina females sought help from family, peers, faculty, and alumni when struggling socially or academically while most Latino male undergraduates did not seek help due to fear, pride, and over-reliance on themselves. Abalos (2002) explains this with his view on masculinity that states that "stories of patriarchy" are told, retold, and reinforced in the Latino culture which inflicts wounds on Latino males because they never question traditional views but instead abide by them. In order for Latino male undergraduates to seek help when struggling academically or socially, a comfortable campus climate and interactions with faculty are essential. A combination of different policies and practices focused on the Latino male can help increase help-seeking behavior, retention rates and degree completion for Latino men in higher education.

Poster Number 31

ABSTRACT:

Abstract Title:	**Sensory and Chemical Analysis of a Grape Pomace Flour-Fortified Coffee Beverage**		
Presenter:	Katie Smoot		
Mentor:	Carolyn F. Ross	**Campus:**	Pullman
Co-Authors:	Allison Baker, Charles Diako, Meredith Kuchera, and Carolyn F. Ross		
Major:	Food Science, Minor: Economics		
Category:	Applied Sciences		

Wine grape pomace (WGP), a rich source of polyphenolic compounds, can have added health benefits if supplemented into a food product. As coffee is widely consumed on a daily basis, development of a coffee beverage fortified with WGP-flour (GPF) is of interest. The objective of this study was to characterize how the addition of GPF would influence the chemical and sensory profile of the coffee. It was predicted that with increasing GPF concentration, perceived intensity of attributes directly affected by phenolic compounds such as bitterness and astringency would also increase. Four coffee treatments were evaluated, containing GPF at varying levels of 0%, 6.25%, 12.5%, and 18.75% (w/w). Coffee-pomace mixtures were brewed with reusable K-cups on the Keurig® coffee machine. Both consumer and experienced panelists evaluated the intensity of sourness, bitterness, and astringency in the coffee beverages. Additionally, the electronic tongue was used to distinguish among the four coffee samples with and without human saliva and correlated with sensory evaluation. Whole saliva was collected from a diverse population and characterized for protein content and enzymatic activity. Results showed the consumer intensity ratings of specific attributes were not positively correlated to GPF concentration. Perceived bitterness for the 0% and 6.25% treatments were significantly higher than the 12.5% and 18.75% GPF ($p<0.05$) for both the consumer and experienced panels. This was attributed to a dilution effect from replacement of GPF. Perception also could have been altered due to polyphenolic compound's ability to bind proteins in saliva. Additionally, the data suggest that saliva plays a role in how these attributes are perceived. The e-tongue showed distinct differences among the taste attributes, as indicated by a high discrimination index for samples with saliva (DI=89%) and those without saliva (DI=93%). For samples analyzed with saliva, PCA showed the 0% and 6.25% GPF were strongly related to bitterness while 12.5% and 18.75% were associated with sourness. High correlations ($r^2>0.84$) were reported between the electronic tongue and sensory evaluation results for sourness, bitterness and astringency. These high correlations show that the electronic tongue can complement sensory evaluation in the development and characterization of a novel beverage.

Poster Number 32

ABSTRACT:

Abstract Title:	**Using Ultrasound, 3D Motion Capture, and MRI Data in MATLAB to Estimate Triceps Surae Muscle Volume**		
Presenter:	Marcia Nygaard		
Mentor:	Dr. Zac Domire	**Campus:**	Pullman
Co-Authors:			
Major:	Bioengineering		
Category:	Engineering and Physical Sciences		

Musculoskeletal modeling is a widely used tool of research that is important for evaluating muscle movement, giving findings relevant to athletics and clinical decision-making, and gaining a better understanding of biomechanics. An integral part of these models involves knowing the appropriate muscle model parameters in order to most accurately depict reality and make models subject-specific. These parameters include cross-sectional area, fiber length, pennation angle, and muscle volume—the focus of this project (Fukunaga et al). This project is comparing two methods of measuring muscle volume— MRI, which is considered the standard for measuring volumes, and ultrasound with 3D motion capture, which is hoped to be proved comparable. One of the biggest obstacles in measuring muscle volume with ultrasound is that the resulting image is dependent on the orientation of the probe at the time of imaging. In order to accurately calculate the volume of the muscle using cross-sections, images must lie in exactly the same plane. However, this causes underestimation of muscle volume due to slight pressure from the ultrasound probe during imaging (Fukumoto et al). When oblique ultrasound images are taken, overestimation of volume will occur from the larger cross-sectional area being represented. To compensate for this problem, motion capture is combined with ultrasound in order to give information about the location of the probe, and therefore the muscle as well. My project focuses on utilizing motion capture data to manipulate ultrasound data in order to find the cross-sectional areas of muscles. The muscles of interest are the gastrocnemius and soleus muscle. MATLAB will be used to then calculate muscle volume. Volumes calculated from these areas in ultrasound are then compared to those from MRI in order to validate the use of ultrasound in the future, as it is far less expensive, invasive, and constricting (Sridevi). Currently, data collection is complete and I am in the data processing phase. It is expected that the computed volumes from motion capture plus ultrasound and the MRI images will be similar.

Poster Number 33

ABSTRACT:

Abstract Title:	**The Effectiveness of 4-H Camp Activities on Learning and Skill Building Goals For Campers**		
Presenter:	Natasha Moffitt		
Mentor:	Tracie Hanson and Dan Teuteberg	**Campus:**	Pullman
Co-Authors:			
Major:	Animal Science		
Category:	Social Sciences		

The purpose of this study is to analyze the effectiveness of the activities being utilized at multiple 4-H summer camps in order to meet certain learning and skill building goals. This information is vital in assisting camp directors and volunteers to improve camp activities in order to meet the learning and skill building goals.

During the first phase, campers answer survey questions regarding specific learning goals and skills, reflecting on their abilities at the beginning of camp and at the end of camp. Younger campers (grades 3-5) receive a survey before camp and a survey after camp because they are not cognitively developed enough to be able to reflect on the past. Older campers (grades 6-12) receive one survey at the end that has the campers compare their skills and knowledge before camp and after camp.

Phase two consists of analyzing the survey data by individually comparing the pre and post answer of each camper, then identifying trends within each category of answers. Finally, by using these results I can assess whether or not each camp is successfully helping campers grow in the desired learning and skill areas. This has the potential to carry on as an annual study, so that each camp may continue to improve in the desired areas.

Poster Number 34

ABSTRACT:

Abstract Title:	**Investigation of Microbial Lipid Accumulation by Lignin Decomposition**		
Presenter:	Yessica Carnley		
Mentor:	Dr. Bin Yang	**Campus:**	Tri-Cities
Co-Authors:	Christopher Smith, Xiaoyun Xue, Dr. Hasan Bugra Coban, Dr. Bin Yang		
Major:	Environmental Science, General Biological Sciences		
Category:	Engineering and Physical Sciences		

In recent times the demand for fuel has increased dramatically due to the limited supply of oil available it has led to the research of alternative forms of fuels known as biofuels. One of the most promising alternative processes of manufacturing biofuels is by using microorganisms that have evolved to break down natural substances like lignin. This project will evaluate the ability of several bacteria strains (*Rhodococcus opacus* PD630, *Rhodococcus jostii* RHA1, and the mutant VanA- bacteria) to produce lipids through microbial degradation of lignin, which can then be used in the production of biofuels. The yield of lignin degradation and the lipid production will be quantitatively measured using GC/MS. Furthermore the potential lignin degradation pathways will be investigated in order to make modifications on microbial genome to increase lipid production. Thereafter, modified strain will be cultured in bench-top bioreactor, where pH can be maintained and continuous air can be supply to further enhance the overall yield in the fermentation.

Poster Number 35

ABSTRACT:

Abstract Title:	**A Mathematical Model for the Microenvironment in Breast Cancer**		
Presenter:	Brian Gabriel		
Mentor:	Professor Robert Dillon	**Campus:**	Pullman
Co-Authors:	Professor Robert Dillon, Jie Zhao, and Partha Gopmandal		
Major:	Bioengineering		
Category:	Computer Science, Mathematics, Statistics, and Information Sciences		

Although there have been many studies of the tumor microenvironment, most are based on partial differential equation where the cells are represented as a continuum or on discrete agent-based methods. We describe a hybrid/cells-based model for the transition from ductal carcinoma in situ (DCIS) to invasive ductal carcinoma (IDC). Here, we focus on the transition of fibroblasts to activated myofibroblasts in the stromal tissue surrounding the breast ducts. This transition is implicated in the shift from DCIS to IDC.

In this model, the cells are represented as discrete entities where the transport of ions and proteins in the stroma is represented by partial differential equations (PDEs) coupled with systems of ordinary differential equations (ODEs) for the intracellular processes. As a starting point, we develop a mathematical model of the autocrine signaling pathways for TGF-beta and SDF-1 based on a study by Kojima et al. (2010) which were shown to be factors in the transition of fibroblasts to myfibroblasts. The mathematical model includes the binding of TGF-beta and SDF-1 to membrane bound receptors, the activation of intracellular signaling factors such as Smad as well as the production and secretion of both TGF-beta and SDF-1 into the stromal environment.

We present preliminary results for the reaction kinetics based for the intracellular ODEs as well as simulations for the whole system with several fibroblast cells based on reaction-diffusion equations for the reaction and transport in the extracellular environment coupled with the intracellular processes represented by the ODEs. We use a second order immersed interface method for the PDEs with appropriate boundary conditions representing the binding and secretion of TGF-beta and SDF-1.

Poster Number 36

ABSTRACT:

Abstract Title:	**Characteristics of Commuting Rural-dwelling Nurses in Eastern Washington**		
Presenter:	Geddie Lojas		
Mentor:	Gail Oneal	**Campus:**	Spokane
Major:	Nursing		
Category:	Social Sciences		

The purpose of this study was to explore the characteristics of rural nurses who commute for work to an urban area. Rural communities often face a lack of healthcare provider access, including lack of access to registered nurses. There is a projected need for 1.2 million more RNs by 2020 in the US. With 40% of hospitals and other healthcare facilities needing more RNs located in rural areas, there is a *critical* need to obtain more information about rural nurse workforce issues. Studies have addressed characteristics and needs of rural RNs who live and work in rural areas and suggested strategies to recruit them. However, a noted gap identified about rural nursing workforce is *lack* of information about RNs who commute to work in urban areas. This descriptive pilot study surveyed 72 rural nurses (21% return rate) from three Eastern Washington counties surrounding Spokane County, using questions adapted from Wyoming Department of Employment Nurse Survey. Survey data were collected using Qualtrics software. Descriptive statistics were used as a first step to determine general characteristics. Next steps compared respondents who commute to those who work in their local rural areas using Chi-square analysis. As is typical of rural nurses, the majority of the respondents were female (84.7%), married (72.2%), and primarily worked in hospitals (65.3%) with approximately 59% commuting to a larger rural or urban area. Differences noted between the commuting and non-commuting nurses included 13.6% of commuters working in administration/management and 11.3% working in advanced practice while none of the non-commuters worked in either area. Commuters were also more satisfied with their current base salary, RN staffing, the amount of paperwork required, their level of personal safety at work, opportunities for advancement, opportunities for continuing education, and feeling that their work is important. This pilot study on characteristics of commuting rural eastern Washington nurses supports the need for further research on rural nursing workforce issues. With the projected increased demand for nurses especially in rural areas, the data can assist in devising better strategies to retain rural nurses in their own communities.

Poster Number 37

ABSTRACT:

Abstract Title:	**The Ability of Ral1 to Dissociate from the RadA-ssDNA Filament through ATP Hydrolysis**		
Presenter:	Seth Schneider		
Mentor:	Dr. Cynthia Haseltine	**Campus:**	Pullman
Co-Authors:	Corey Knadler, Cynthia Haseltine		
Major:	Genetics and Cell Biology		
Category:	Molecular, Cellular, and Chemical Biology		

DNA double-stranded breaks have a detrimental effect on cells and require repair mechanisms to fix. If breaks are repaired erroneously, mutations that may cause cell death or disorders such as cancer can develop. One repair method is homologous recombination (HR), which uses template DNA to repair broken DNA. Eukaryotic HR is not well understood due to high complexity. Archaea use similar HR processes; studying HR in them will provide information on proteins, which will elucidate the role of similar eukaryotic proteins. One protein is the recombinase, which in archaea is RadA. RadA forms a nucleoprotein filament on single stranded DNA (ssDNA) while hydrolyzing adenosine triphosphate (ATP) for energy. RadA also catalyzes strand exchange, late in HR, facilitating DNA repair. The Ral1 protein is a related protein to RadA. Ral1 is also involved in archaeal HR through stabilization of the RadA nucleoprotein filament. This stabilization helps the HR DNA repair process continue. It is not known how Ral1 detaches from this filament during the process. Ral1 can hydrolyze ATP, so one hypothesis is that Ral1 does so to detach from the filament. This could provide a regulatory function for Ral1, controlling the RadA filament formation. In order to test this, mutants will be synthesized that interfere with Ral1's ATP hydrolysis ability. When put into a reaction with ssDNA and RadA, these Ral1 proteins should not be able to detach from the filament if they hydrolyze ATP to do so. The reactions will contain heparin as well, a molecule that traps free proteins in solution. This molecule would have little effect if no molecules can detach from the filament, but if the Ral1 mutant proteins were able to leave the filament, they could bind the heparin and be lost from the reaction. This event would indicate the Ral1 did not hydrolyze ATP to detach from the filament and would result in the absence of a protein complex on a gel. ATPase assays will also be used to measure RadA filament formation in the presence of Ral1 ATPase mutants to assess the role of ATP hydrolysis in Ral1 protein filament stabilization activity.

Poster Number 38

ABSTRACT:

Abstract Title:	**"The Just War that Never Was": The Franco-Russian Crisis during the Polish Insurrection of 1863**		
Presenter:	Brian Cieslak		
Mentor:	Dr. Steven D. Kale	**Campus:**	Pullman
Co-Authors:			
Major:	History, Political Science		
Category:	Humanities		

Principal Topic

The Polish Insurrection has traditionally been portrayed by historians as a simple rebellion that after some difficulty, was put down by the Russians in 1865. Though this narrative presents an accurate summary of the rebellion as a whole, it neglects the brief, but grave diplomatic crisis between France and Russia that the insurrection, along with Napoleon III, created. Utilizing a variety of primary and secondary sources, this study examines the circumstances surrounding Franco-Russian relations at the time of The Polish Insurrection, so that we can know more about why France ultimately chose to remain neutral during the crisis, in order to better understand the complex and contradictory interests and objectives that have historical driven French policy towards Russian aggression in Eastern Europe.

Methodology

The methodology for this study primarily utilizes two major works from the field of Diplomatic history that explore how ideology and power influence the foreign policy of the state. For ideology, it will draw upon historian Michael Hunt's *Ideology and U.S. Foreign Policy*(1987), which asserts that that every regime has set of political values that form the basis of its foreign policy, and that these values can be observed throughout the states diplomatic history. With power, the study derives from Ludwing von Rochau's *The Principles of Realpolitik*(1853, as summarized by historian John Bew). Rochu regarded power, in the context of politics, as a natural law and means to an end, rather than a policy goal. Therefore, states should only pursue policies that increase their power and can be carried out from a position of strength with methods of force and coercion, rather any sort moral appeal. Together, these two works form the theoretical framework that explains Franco-Russian relations during the Polish Insurrection.

Poster Number 39

ABSTRACT:

Abstract Title:	**Influence of Grain Boundaries on Nanomechanical Properties in Cu**		
Presenter:	Benjamin Schuessler		
Mentor:	Pui Ching (Amy) Wo	**Campus:**	Pullman
Co-Authors:	P.C. Wo		
Major:	Materials Science & Engineering		
Category:	Engineering and Physical Sciences		

Mechanical properties of materials have been considered to be deterministic in the macro-scale. However, stochastic hardness and elastic modulus has been observed at smaller length scales measured from nanoindentation, which has now become a standard tool for testing sub-micron scale mechanical testing. In this study, we proposed that the nanomechanical properties variations in materials are related to the microstructure, specifically, grain boundaries of materials.
Using nanoindentation techniques, *H* and *E* were measured at different distances from a grain boundary and within a grain to investigate the influence of grain boundaries on such properties. A well annealed polycrystalline Cu sample was selected as a typical FCC structured material to study. The sample was mechanically and electropolished to obtain a uniform surface finish with minimum defects. Microstructure of the sample before and after nanoindentation was studied using optical and scanning electron microscopy while electron back scatter diffraction (EBSD) was used to determine the crystal orientations. By comparing the nanoindentation results obtained at different distances from a grain boundary, a significant excursion in the displacement during unloading was seen in nanoindentation near a high-angle boundary. This excursion is not observed when indented within a grain. Results from this study will provide better fundamental understanding of material properties in the nanoscale observed from this study is important for the advancing and accelerating materials discovery.

Poster Number 40

ABSTRACT:

Abstract Title:	**The Korean War and the CIA**		
Presenter:	Julia Skow		
Mentor:	Lydia Gerber	**Campus:**	Pullman
Co-Authors:			
Major:	History		
Category:	Social Sciences		

The Korean War as the first American military action during the Cold War, ushered in many changes, which also included the need for a better intelligence gathering system. Just before the Korean War the Central Intelligence Agency was born and their participation during the war affected many choices both for the President and the military leaders on location in Korea. The Cold War era mentality meant that the Soviet Union was assumed to be the force behind everything communist in the world. When China, instead of the USSR, made military advancements toward the Korean border, the United States was blindsided. This project explores the way the experience of the Korean War shaped the newly created CIA and how, on the other hand, the CIA impacted the way the war in Korea was conducted.

Based on a qualitative analysis of daily intelligence reports delivered to President Truman, and other specialty reports, it argues that the Korean War had a significant effect on the CIA and the way in which the agency conducts its business and the reforms it faced as it developed along with the rest of the country at the time. This paper contributes to a better understanding of the Korean War as whole because the conflict had a much more substantial effect on America and the world then most commonly believe. With so many changes in the CIA, America had to adapt as well to the changing world that was becoming more apparent. With the conclusion of the war, or lack thereof, the United States has never been able to become isolationist again as well as the immense defense budget increase. The Korean War generally lacks in-depth study but one can see that its effects can be found everywhere, especially when looking at the Central Intelligence Agency and its development.

Poster Number 41

ABSTRACT:

Abstract Title:	**Cationic Amphipathic Cell Penetrating Peptides from Sugar Amino Acid: A New Class of Drug Delivery Agents for Targeting Cancer Cells**		
Presenter:	Christopher Vasil		
Mentor:	Jonel P. Saludes	**Campus:**	Pullman
Co-Authors:	Erickson M. Paragas, I. Abrrey Monreal, and Jonel P. Saludes		
Major:	Chemistry		
Category:	Molecular, Cellular, and Chemical Biology		

Cell penetrating peptides (CPPs) are molecules that cross the plasma membrane to deliver drugs without bursting the cell. However, natural protein-derived CPPs are unstable in blood plasma and lose their penetrating property before reaching their target. My project attempts to overcome this limitation by using cationic, amphipathic CPPs prepared from the sugar amino acid called Sialic acid (SA). The rationale for using SA monomer as building block is based on prior reports that SA peptides are plasma stable, with half-lives that are 1- to 2-orders of magnitude longer than natural peptides. The importance of a CPP being amphipathic (molecule that contain both polar and nonpolar part) is to impart it with a better ability to penetrate membranes via electrostatic-interactions with negatively-charged phosphates and hydrophobic interactions with phospholipid tails. Ultimately, we may discover SA-derived CPPs that selectively penetrate cancer cells and serve as highly efficient carrier of drugs and radioactive particles for tumor targeting. Herein we report on: (a) Synthesis of SA building block optimized for peptide synthesis and (b) Synthesis of SA peptides and characterization of their membrane permeability to cancer cells. The classical method of preparing SA for peptide synthesis requires eight synthetic and purification steps that take at least two months to complete. Towards our goal of improving synthetic efficiency and kinetics in the preparation of SA monomer, we employed microwave heating that dramatically reduced the reaction times from days to minutes, offering rapid access to chemical manipulations SA. Using this technology, we synthesized gram-scale amounts of SA monomer in less than one week for the preparation of our cationic, amphipathic SA-derived CPP. Our new method drastically improved the synthesis of SA monomer by making it faster, higher yielding and more cost effective. We proceeded to prepare SA-derived cationic amphipathic CPPs via microwave-assisted solid phase peptide synthesis, fluorophore labeling using Cy5 dye, purification by high performance liquid chromatography, and characterization by mass spectrometry. Further, we tested the peptides for their ability to penetrate cells using HeLa cervical cancer cell line as a model. This paper will report on the permeability of these SA-derived CPPs to cancer cells.

Poster Number 42

ABSTRACT:

Abstract Title:	**Girls Game Too: A Comparative Study with Important Implications for Video Games in Education**		
Presenter:	Kelsey Reanne Cunningham and Heather Hilliker		
Mentor:	Richard Lamb	**Campus:**	Pullman
Co-Authors:	Heather Hilliker		
Major:	Spanish Education / Elementary Education		
Category:	Social Sciences		

In this digital age trends in education are to move toward more technologically competent educators and more use of electronic tools in the classroom. But, do all students benefit equally from this shift? Historically females report engaging in leisurely video gaming less frequently than males (Sherry & Kristen, 2004); does this have any implications on how well female students will learn from video or computer-game based activities? This study compares learning outcomes of male and female students after receiving instruction in three different pedagogical approaches: traditional lecture, a lab activity or a computer-game activity. Our hypothesis was that male students would have the highest scores in the video-game category and female students would have the highest scores in the lab-based activity. The lesson was introduced by the teacher, a pretest was taken and then students did one of the three learning activities. A post-test determined students' learning outcomes. The results were that Video Gaming was the most successful pedagogical approach; with students scoring, on average, 3.95 points higher than the Traditional approach and 2.47 points higher than the Lab work approach. Lab work led to average scores 1.8 points higher than the Traditional style. The study found no significant difference between male and female students in terms of learning outcomes for each approach. This means that female students benefited just as much from the serious education game as the male students did.

Poster Number 43

ABSTRACT:

Abstract Title:	**A Product of Sharing: Designing a Culturally Adaptive Exhibit**		
Presenter:	Kyra Christiansen		
Mentor:	Kathleen Ryan	**Campus:**	Pullman
Co-Authors:			
Major:	Interior Design, Construction Management minor		
Category:	Arts and Design		

Historically, North American museums have portrayed Native Americans as dying or extinct cultures with exhibitions that were interpreted by non-indigenous curators and designers (National Museum of the American Indian (U.S.), 2000). This mode of design resulted in cultures bifurcated from their representative artifacts thereby removing their culturally associated meanings. Socio-cultural considerations of the Native Americans are lost in blanket interpretations via Western, thinking. Many museums misrepresented indigenous populations and misinformed museum visitors about the relevant developmental history of Native Americans (Phillips, 2000).

The research and design intent of this project was to collaborate with Nez Perce representatives to create the *Memories of Celilo Falls* exhibit in an academic anthropology museum. The exhibit is based on glass slides that were discovered in an academic library and tell a visual story of Celilo Falls before the Dalles Dam was built and flooded the area (Ullin, ca. 1940s). The slides were labeled with brief, denigrating descriptions of Native Americans and the activities occurring in each picture. They did not give the full story of the events that were to unfold on the Columbia Gorge and how it would change the Native culture in that area forever. Two research methods were employed to discover the content for the exhibit: 1) an in-depth analysis of the slide images to identify the person(s) and what is occurring and 2) interviews of Nez Perce tribal representatives.

Life size reproductions of the slides accompanied by culturally derived graphics were chosen to immerse visitors in the Native experience accompanied by culturally derived graphics to continue the story. Collaboration with Nez Perce representatives and the academic departments in anthropology and design resulted in an exhibit that conveyed the story of Celilo Falls with a living testament by a tribal member who worked the Falls in his youth. Most of the Native Americans pictured on the slides were identified through this work along with their story of day-to-day interactions. This exhibit is a product of sharing the cultural context, rather than the simple displaying of artifacts related to the antiquated perception of a dying or dead culture.

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Poster Number 44

ABSTRACT:

Abstract Title:	**Saccharomyces Species occur Naturally on Plant Materials in Washington State**		
Presenter:	Nicholas Rivera		
Mentor:	Dean Glawe	**Campus:**	Pullman
Co-Authors:			
Major:	Food Science		
Category:	Applied Sciences		

Despite the economic importance of *Saccharomyces cerevisiae* in the wine, brewing, and baking industries, very little is known about its ecology. One common belief is that the fungus has been domesticated and occurs rarely, if at all, outside of wineries and other production facilities where commercial strains are used. In the present study we used an alcohol-enrichment technique to isolate *S. cerevisiae* and other yeasts from a variety of plant materials. We isolated strains from: bark of *Malus, Prunus, Sorbus, Fragaria, Rubus, and Crataegus* in Pullman, WA; grapes sampled from vineyards in two Washington AVA regions (Horse Heaven Hills and Walla Walla); and a pomace pile in the Horse Heaven Hills vineyard. Samples first were incubated before isolation in nutrient broth amended with ethanol or methanol for five weeks. Strains then were isolated by streaking onto PDA amended with streptomycin. Representative strains were determined to species on the basis of rDNA sequences. Non-Saccharomyces species included *Torulaspora delbrueckii, Meyerozyma caribbica, Kluyveromyces lactis, Metschnikowia aff. chrysoperlae, Candida ernobii, Debaryomyces hansenii, Hanseniaspora opuntiae,* and *Pichia kudriavzevii. Saccharomyces paradoxus,* a close relative of *S. cerevisiae,* was isolated from rose hips. *Saccharomyces cerevisiae* was isolated from crab apple (*Malus*) fruits, vineyard-sampled grapes, and pomace. Findings are consistent with the possibility that *S. cerevisiae* is endemic to Washington, and that at least some strains that are active during fermentations originate in vineyards in our region. Furthermore, occurrence of alcohol-tolerant yeasts on various substrates, including grapes and pomace, suggests that vineyard yeast flora includes a variety of species that could persist during fermentation. Developing a holistic understanding of the ecology of yeasts in vineyards, on surrounding vegetation, and in wineries could provide important insights into how to manage microbes more effectively to produce premium Washington wines.

Poster Number 45

ABSTRACT:

Abstract Title:	**Hyperbaric Oxygen Treatment Suppresses the Withdrawal Symptoms in Opioid-Dependent Mice**		
Presenter:	Daniel Nicoara		
Mentor:	Dr. Raymond Quock	**Campus:**	Pullman
Co-Authors:	Daniel Nicoara, Yangmiao Zhang, Jordan T. Nelson, Abigail L. Brewer, Donald Y. Shirachi and Raymond M. Quock		
Major:	Bicohemistry		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Hyperbaric oxygen (HBO_2) therapy has been approved by the US Food and Drug Administration for a limited number of clinical conditions. It has been reported that HBO_2 treatments reduce opioid withdrawal in human subjects. However, no further research has been conducted to investigate the mechanism of HBO_2 in reducing opioid withdrawal. The purpose of this research was to determine whether HBO_2 treatment could suppress signs of withdrawal in opioid-dependent mice and whether nitric oxide might be involved in its mechanism of action. Male NIH Swiss mice received subcutaneous injections of morphine sulfate or saline twice a day for 4 days. The daily dose of morphine sulfate was increased progressively from 50 mg/kg on day 1 to 125 mg/kg on day 4. On day 5, opioid withdrawal was precipitated by intraperitoneal injection of 5.0 mg/kg naloxone. Withdrawal signs in mice, including jumping, forepaw tremor and wet dog shakes, were recorded for 30 min and scored. Sixty min prior to the naloxone injection, different groups of mice received a 30-min or 60-min HBO_2 treatment at 3.5 atmospheres absolute. The results show that HBO_2 treatment caused a dose-dependent reduction in withdrawal jumping, forepaw tremor and wet dog shakes in opioid-dependent mice. Other groups of mice were pretreated with S-methyl-L-thiocitrulline (SMTC) intracerebroventricularly (i.c.v.) 30 minutes prior to HBO_2 treatment and precipitation of withdrawal. Inhibition of neuronal nitric oxide synthase (nNOS) by SMTC inhibited the ability of HBO_2 to suppress opioid withdrawal signs. Based on these results, we conclude that HBO2 can suppress the opioid withdrawal syndrome in mice in an NO-dependent manner.

Keywords: Hyperbaric oxygen; opioid; physical dependence; withdrawal; mice

Poster Number 46

ABSTRACT:

Abstract Title:	**Evaluation of Dihexa as an Ovoprotectant during Chemotherapy Treatment**		
Presenter:	Natalie Nelson		
Mentor:	James K. Pru	**Campus:**	Pullman
Co-Authors:	Cindy A. Pru, Joseph W. Harding, James K. Pru		
Major:	Animal Science		
Category:	Molecular, Cellular, and Chemical Biology		

Approximately 1 in 46 females in the United States will be diagnosed with cancer between birth and 39 years of age in 2015. Beyond surgical debulking, chemotherapy is the most common cancer treatment. An unfortunate side effect of chemotherapy is off-target ovotoxicity and subsequent infertility. This results in premature menopause, which ushers in additional health problems including increased cardiovascular disease, osteoporosis, dementia, and increased risk of developing breast and gynecological cancers. Hepatocyte growth factor (HGF) is expressed in many tissues and is often upregulated in damaged tissues. HGF, which activates its cognate receptor c-MET, stimulates migration and proliferation of several cell types. HGF also provides protection from multiple cellular insults and promotes angiogenesis in damaged tissues. It was hypothesized that activation of the HGF/c-MET system would protect the ovary from the ovotoxic effects of chemotherapy. This pilot project centered on the use of Dihexa, a synthetically-derived mimic of HGF, as a potential ovoprotectant. A mouse model was employed which included 4 treatment groups (n=6-12/treatment): 1) vehicle (saline + dimethyl sulfoxide, given once daily for 5 days); 2) chemotherapy (12 mg/kg busulfan + 100 mg/kg cyclophosphamide, one-time treatment); 3) Dihexa (0.5 mg/kg, given once daily for 5 days); and 4) chemotherapy + Dihexa. Two sets of mice were treated and ovaries were collected 5 or 28 days after treatment with chemotherapy. Study endpoints included ovarian follicle counts and assessments of oocyte genotoxicity and ovarian angiogenesis. At 5 days post-treatment, Dihexa treatment alone did not affect follicle numbers compared with vehicle treatment. Chemotherapy treatment reduced the total number of follicles by 60% ($p=0.0015$). Co-treatment with Dihexa did not attenuate follicle loss in response to chemotherapy treatment. The primordial follicle pool, which is the principal target of chemotherapy action, was reduced by approximately 70% in both the chemotherapy and chemotherapy + Dihexa treatment groups in comparison to the control group. In conclusion, these studies reveal that Dihexa does not protect the ovary from the damaging effects of chemotherapy, at least when evaluating the 5 day treatment group. Ongoing studies are focused on evaluating Dihexa's impact on recovered ovarian function at 28 days post-treatment.

Poster Number 47

ABSTRACT:

Abstract Title:	**Child Temperament and Household Responsibilities among School-Aged Children**		
Presenter:	Meaghan Logan		
Mentor:	Rayna Sage	**Campus:**	Pullman
Co-Authors:	Rayna Sage		
Major:	Psychology		
Category:	Social Sciences		

Most school-aged children have developed skills and strategies for coping with the stressors they experience. The effectiveness of these strategies can be influenced by family-related factors such as parental conflict, parenting strategies, and household responsibilities. The purpose of this study is to evaluate how the coping strategies of children of different cultures are related to differences in parental conflict, parenting style and household responsibilities (such as chores, taking care of siblings, cleaning the house, or preparing meals), with a specific focus on the tendencies of children to display internalizing and externalizing behaviors. Child internalizing behaviors include keeping their feelings and emotions to themselves, rather than using other healthier coping strategies. Child externalizing behaviors include expressing their stress and emotions through anger and impulsivity. To accomplish the objectives of this project, I will survey a diverse group of 50-60 parents with school-aged children (ages 5-12). This study will compare differences in parental conflict, parenting styles, and child household responsibilities and how these correlate with parental reports of children's internalizing and externalizing behaviors by cultural background. This research study will provide additional information on how family and parenting related factors influence stress and coping mechanisms among school-aged children of different cultures.

Poster Number 48

ABSTRACT:

Abstract Title:	**Experiments on the Triboelectric Charge Transfer between a Metal and a Polymer**		
Presenter:	Douglas Dietzel		
Mentor:	Dr. J. T. Dickinson	**Campus:**	Pullman
Co-Authors:	Dr. J. T. Dickinson		
Major:	Physics Materials		
Category:	Engineering and Physical Sciences		

When unlike material surfaces are brought into contact, electrical charge often transfers from one surface to the other. For most combinations of surfaces, shearing the surfaces (motion parallel to the interface) in the presence of a normal force generates a larger quantity of charge transfer than simple separation due to an increase in the contact area between the two materials.

In this study we examine the charge transfer between an interface of a metal (stainless steel) surface and a common polymer polytetrafuoroethylene (PTFE) [known as Teflon®] caused by shear.

Questions we addressed were as follows:

- What was the charge carrier that was transferred and in what direction (e.g., metal to the polymer)?
- What are the consequences of varying the normal force in the quantity of transferred charge during shearing?
- Does mechanical treatment of the PTFE surface before shearing have any effect?

A simple apparatus and appropriate electronics were assembled to carry out the experiments to address these questions. An important feature of our apparatus was the reliable measurement and control of the applied normal force both before and during the shear test.

The results from our measurements include the following:

- Under all conditions studied, electrons were transferred from the metal to the PTFE.
- The quantity of electron transfer to the PTFE increased linearly with normal force.
- The quantity of electron transfer to the PTFE vs. the extent of mechanical is complex due to the latter being difficult to characterize. Nevertheless, there are treatments that significantly increased the charge transfer while others decreased it.

Applications of basic concepts of electricity and mechanics provide plausible explanations for these observations and will be presented in our poster.

Poster Number 49

ABSTRACT:

Abstract Title:	**Discrimination of the Indigenous Language of Quechua in Cusco, Peru**		
Presenter:	Michaelle Machuca		
Mentor:	Julia Cassaniti	**Campus:**	Pullman
Co-Authors:			
Major:	Anthropology		
Category:	Social Sciences		

Studied discrimination of the Quechua language in Cusco, Peru taking into consideration and measuring the effects of multiple variables such as tourism, lingering colonialism, and economic inequality by conducting a cultural experiment through gathering 49 interviews in the field. The research objective was to determine whether or not Quechua speaking families and children suffer from unequal opportunities due to discrimination. Surveys were gathered in the form of a Spanish survey from one private and one public middle school to gain insight on whether or not opportunity and class are operating factors that contribute to thoughts and feelings regarding discrimination. Surveys were taken in order to examine public opinion of the Quechua language as well as the relationship between language and inequality.

Poster Number 50

ABSTRACT:

Abstract Title:	**The Spatial Gradient of Myosin Light Chain Phosphorylation in Cardiac Ventricles from Normal and Hypothyroid Rats**		
Presenter:	Hannah Pulcastro		
Mentor:	Bertrand Tanner	**Campus:**	Pullman
Co-Authors:	Peter O. Awinda, Bertrand C.W. Tanner		
Major:	Neuroscience, Pre-Medicine		
Category:	Molecular, Cellular, and Chemical Biology		

Interactions between the contractile proteins myosin and actin drive skeletal and cardiac muscle contraction. The ventricular myosin regulatory light chain-2 (MLC2v) is thought to play an important role in modulating contraction via phosphorylation of its N-terminus. 6-Propyl-2-thiouracil (PTU) is a drug used to treat hyperthyroidism that elicits a hypothyroid condition in rats. This hypothyroidism affects the ratio of fast versus slow myosin heavy chain isoforms and is a useful model for studying the role of myosin kinetics in cardiac contraction.

We hypothesize MLC2v phosphorylation may vary throughout the heart underlying differences in contractility between the left and right ventricles and in treated and untreated rats. To test this hypothesis we harvested and homogenized heart tissue samples from both PTU-treated and untreated rats. We performed biochemical analyses to separate the dephosphorylated and phosphorylated MLC2v by electrical charge. We analyzed digital images of resulting immunoblots to determine percentage MLC2v phosphorylation of each sample.

In untreated rats (n=8 hearts) phosphorylation varied across the left ventricle wall, being greater ($p<0.05$) in the epicardium (32.42 ± 10.85%) than the endocardium (15.03 ± 4.63). MLC2v phosphorylation in the right ventricle wall (38.88 ± 5.74%) was greater ($p < 0.05$) than the left ventricle wall (21.01 ± 7.88%) and the septum (21.47 ± 4.66%). In PTU treated rats (n=10 hearts) phosphorylation did not vary between the left ventricle epicardium (22.402 ± 7.39%), and endocardium (16.62 ± 1.50%). MLC2v phosphorylation in the right ventricle wall (25.21 ± 4.11%) was not different than in the left ventricle wall, but was greater ($p<0.05$) than in the septum (18.25 ±5.39%).

The PTU treatment appears to diminish phosphorylation in cardiac regions we tested compared to untreated animals. In both treated and untreated animals, the right ventricle wall displayed the greatest MLC2v phosphorylation. This may underlie differences in contractility of the right ventricular wall versus other regions.

Poster Number 51

ABSTRACT:

Abstract Title:	**The Internet, Human Rights, and Concentrated Poverty**		
Presenter:	Maria Rebeca Orozco		
Mentor:	Dr. David Makin	**Campus:**	Pullman
Co-Authors:	Dr. David Makin		
Major:	Criminal Justice, Spanish		
Category:	Social Sciences		

This research explores the relationship between broadband internet access and juvenile crime. Using the theoretical frame of Hampton (2010), this research explores if a relationship exists between broadband internet access and juvenile crime. Prior research suggests that as internet access increases, it has the capacity to minimize local inequalities and concentrated disadvantage. Theoretically, it is offered increasing broadband access (and the ancillary benefits) possess the capacity to reduce crime. Using broadband ranking reports and national crime data, we explore if this relationship exists. Findings suggest that there is no relationship between broadband internet access and juvenile crime. Explanations for this finding, set against current research are discussed, including policy recommendations and future research.

Poster Number 52

ABSTRACT:

Abstract Title:	**Powdery Mildews**		
Presenter:	Edward Thomas		
Mentor:	Dr. Dean Glawe	**Campus:**	Pullman
Co-Authors:			
Major:	Agricultural Biotechnology		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

The Erysiphales (powdery mildew fungi) cause important diseases of many major food crops and ornamental plants grown worldwide. This project assessed the reliability of protocols for inducing host infections by representative powdery mildews under controlled conditions. Trials were made of methods for inducing spore germination on glass slides, to facilitate further research on spore biology, and growing colonies of these obligate parasites on detached leaves. The best results for inducing conidial germination were obtained when conidia were harvested directly from field-grown host plants. A two-layered Petri plate containing a host leaf on the upper plate with petiole submerged in the water in the lower plate was found to be a useful method to grow powdery mildews in the laboratory.

Poster Number 53

ABSTRACT:

Abstract Title:	**The Power of Two: Creating an Informative DNA Test for Apple Tartness**		
Presenter:	Ashley Powell		
Mentor:	Dr. Cameron Peace	**Campus:**	Pullman
Co-Authors:	Paul Sandefur, Dr. Cameron Peace		
Major:	Agricultural Biotechnology		
Category:	Molecular, Cellular, and Chemical Biology		

The tartness, or acidity level, of an apple contributes to its delicious taste. An overall pleasurable eating experience leads to repeat sales, a robust supply industry, and improved health and well-being of consumers. Genetic factors play a large role in providing the differences in tartness that consumers experience, as anyone who has taken a bite of a Granny Smith and a Fuji can attest. The two largest genetic factors are known. The first genomic region ("*Ma*") greatly influences fruit cell storage of malic acid, the major apple fruit acid and was discovered decades ago. At WSU, a DNA test was developed that identifies for any apple variety, selection, or seedling whether it carries zero, one, or two copies of the "high acid" version of *Ma*. The second major tartness-influencing region in the apple genome, "*A*", was recently characterized by WSU graduate student, Sujeet Verma. Together the "*Ma"* and "*A*" account for over 60% of the acidity found in apples. In order to fully obtain acidity DNA information in apples, both genomic regions must be accounted for and a DNA test for "*A*" needed to be developed. A DNA test was developed by looking for a unique spot near "*A*" and informs whether "*A*" carries two "high acid" copies, two "low acid" copies or one of both. By combining this test and the test for "*Ma*", we have now developed a DNA test that combines both major genetic factors. Targeting both *Ma* and *A* to DNA-profile any apple individual for its tartness, five levels of acidity can be identified. The double DNA-testing strategy is a powerful predictive tool helping apple breeders select for desired tartness levels in their new crosses and among their thousands of seedlings. More efficient and accurate selection for desired tartness enables breeders to now focus more of their limited resources on assembling all the other required genetic components of successful new varieties.

In order to identify an animal model with similar metabolic properties to human aldehyde oxidase (EC 1.2.3.1, AO), several species have been identified as possible targets of research. In analyzing the potential of these models, a number of AO substrates were used. One such substrate was O^6-benzyguanine, an antineoplastic agent currently in use in chemotherapy cocktails. To quantify the extent of oxidation of a particular substrate, standard curves were generated from synthetic sources of the AO metabolite. Current methods of generating the metabolite of O^6-benzylguanine include a multi-step synthesis with low final yield. A novel synthetic approach to the synthesis was utilized to form the metabolite, 8-oxo-O^6-benzylguanine, via oxidation by peroxynitrite ($ONOO^-$). Analysis of the generated metabolite by nuclear magnetic resonance spectroscopy (NMR) and infrared spectroscopy (IR) suggested a lack of side products traditionally associated with the accepted free radical mechanism of $ONOO^-$. We proposed two possible two-electron transfer mechanisms. The first features a base-catalyzed oxidative mechanism and the second mechanism utilizes a hydride transfer in a similar fashion to the mechanism of AO. As a proof of concept for the synthesis, we treated a number of known heterocyclic AO substrates with $ONOO^-$ and analyzed by NMR, IR, and mass spectrometry. The desired metabolites were isolated in yields ranging from 50-80% of pure product following recrystallization, and lacked side products expected if peroxynitrite oxidized through a free radical mechanism. Further work on the mechanism is still required, but the readily available source of metabolites allowed us to investigate the intrinsic clearance of the animal models initially proposed. Male cynomolgus monkey liver cytosol was analyzed by tandem HPLC MS/MS in comparison to pooled human liver cytosol. The amount of AO in human and monkey cytosol was quantified and determined to be 0.279 μmol and 0.166 μmol, respectively. Intrinsic clearance values were calculated for human (0.00053±0.00013 μL/min/mg) and monkey (0.00047±0.00015 μL/min/mg). Therefore, cynomolgus monkey can serve as an animal model for intrinsic clearance comparison in humans for the substrate O^6-benzylguanine.

Poster Number 54

ABSTRACT:

Abstract Title:	**Analysis of Cynomolgus Monkey as a Model for Human Aldehyde Oxidase**		
Presenter:	Slater Weinstock		
Mentor:	Jeff Jones	**Campus:**	Pullman
Co-Authors:	Stephanie Conn, Jeff Jones		
Major:	Chemistry, Pre-Medicine		
Category:	Engineering and Physical Sciences		

In order to identify an animal model with similar metabolic properties to human aldehyde oxidase (EC 1.2.3.1, AO), several species have been identified as possible targets of research. In analyzing the potential of these models, a number of AO substrates were used. One such substrate was O^6-benzyguanine, an antineoplastic agent currently in use in chemotherapy cocktails. To quantify the extent of oxidation of a particular substrate, standard curves were generated from synthetic sources of the AO metabolite. Current methods of generating the metabolite of O^6-benzylguanine include a multi-step synthesis with low final yield. A novel synthetic approach to the synthesis was utilized to form the metabolite, 8-oxo-O^6-benzylguanine, via oxidation by peroxynitrite ($ONOO^-$). Analysis of the generated metabolite by nuclear magnetic resonance spectroscopy (NMR) and infrared spectroscopy (IR) suggested a lack of side products traditionally associated with the accepted free radical mechanism of $ONOO^-$. We proposed two possible two-electron transfer mechanisms. The first features a base-catalyzed oxidative mechanism and the second mechanism utilizes a hydride transfer in a similar fashion to the mechanism of AO. As a proof of concept for the synthesis, we treated a number of known heterocyclic AO substrates with $ONOO^-$ and analyzed by NMR, IR, and mass spectrometry. The desired metabolites were isolated in yields ranging from 50-80% of pure product following recrystallization, and lacked side products expected if peroxynitrite oxidized through a free radical mechanism. Further work on the mechanism is still required, but the readily available source of metabolites allowed us to investigate the intrinsic clearance of the animal models initially proposed. Male cynomolgus monkey liver cytosol was analyzed by tandem HPLC MS/MS in comparison to pooled human liver cytosol. The amount of AO in human and monkey cytosol was quantified and determined to be 0.279 μmol and 0.166 μmol, respectively. Intrinsic clearance values were calculated for human (0.00053±0.00013 μL/min/mg) and monkey (0.00047±0.00015 μL/min/mg). Therefore, cynomolgus monkey can serve as an animal model for intrinsic clearance comparison in humans for the substrate O^6-benzylguanine.

Poster Number 55

ABSTRACT:

Abstract Title:	**Self-Esteem, Attachment Style and Extradyadic Involvement**		
Presenter:	Katelyn Frederick		
Mentor:	Laurie Smith-Nelson	**Campus:**	Pullman
Co-Authors:	Laurie Smith-Nelson		
Major:	Psychology		
Category:	Social Sciences		

This study is examining Self-Esteem and Attachment Style in its relation to Extra-Dyadic Involvement. Current research on infidelity and sexual involvement has not yet examined the influence of self-esteem on one's sexual behavior. In interest of inclusion of all forms of infidelity, instead of focusing solely on sexual intercourse as most previous studies do, our study broadens the definition of infidelity to include both physical behaviors and internal thoughts. These thoughts and behaviors are considered "extra-dyadic behaviors". This online study accessed through the Washington State University psychology research portal (SONA) will determine an individual's attachment style, measure the individual's level of self-esteem, then measure how he/she feels about sex and their own sexual behaviors. Once these measures are completed, we are able to determine if self-esteem may mediate the relationship between attachment style and extra-dyadic involvement. Based in part on current attachment research, this study anticipates finding that there is an inverse relationship between self-esteem and extra-dyadic involvement. We predict that lower levels of self-esteem will result in increased extra-dyadic behaviors. This study began collecting data in August of 2014 and will continue to collect data until May 2015. Currently, we have 1,070 participants and will soon begin to run preliminary results. We plan to publish significant results after data collection has concluded.

Poster Number 56

ABSTRACT:

Abstract Title:	**Sexual Consent: Can Attitudes, Beliefs and Behaviors Change?**		
Presenter:	Katelyn Frederick and Dakota Mauzay		
Mentor:	Laurie Smith-Nelson	**Campus:**	Pullman
Co-Authors:	Dakota Mauzay, Laurie Smith-Nelson		
Major:	Psychology / Psychology		
Category:	Social Sciences		

The purpose of this campus-wide intervention study, Sexual Consent: Can Attitudes, Beliefs and Behaviors Change?, is to look at sexual consent experiences among women and men at Washington State University (WSU). This will be a pre/post test utilizing the Sexual Consent Scale and the Sexual Situation Questionnaire; we will be assessing how demographic variables relate to sexual consent. This will be achieved by passing out condom packets (containing condoms, a Quick Response code and link to the online survey) in various locations on the WSU campus. We will be looking at how taking the Psychology/Women's Studies 230 (Human Sexuality) course influences attitudes, beliefs and behaviors about sexual consent, while also looking at the relationship between sexual consent behaviors and/or attitudes of individuals. We will be assessing whether or not the individual has previously taken one or more of the programs offered on WSU's campus that serve to change attitudes, beliefs and behaviors involving sexual consent. Next, during the final phase of this study we will be passing out the same condom packets, but with included information regarding sexual consent. We will be comparing these results to the previous phase to determine if the brief intervention (providing the information regarding sexual consent) impacts sexual consent attitudes, beliefs and behaviors. This information will be used for the future development of the Human Sexuality class, and will be published and presented for other programs for use in their own development as well. This study will begin data collection in March 2015.

Poster Number 57

ABSTRACT:

Abstract Title:	**The Effects of Comprehensive Sexual Education on Rape Myth Acceptance**		
Presenter:	Dakota Mauzay and Kelsey Phariss		
Mentor:	Dr. Laurie Smith Nelson	**Campus:**	Pullman
Co-Authors:	Kelsey Phariss		
Major:	Psychology / Psychology		
Category:	Social Sciences		

Principle Topic: Our study examines the relationship between Psychology/Women's studies 230: Human Sexuality and rape myth acceptance. Furthermore, our study will then examine what factors can potentially mediate this relationship (the specific factors being: racism, sexism, ageism, classism, sexual prejudice, and/or religious intolerance). Previous research suggests that various forms of intolerance are related to overall higher rape myth acceptance levels (Aosved & Long, 2006). Previous research conducted has also demonstrated that education about the topic of rape is related to significant decreases in the belief of rape myths (McMahon, 2010).

Methods/Hypothesis: The hypothesis is that individuals who have taken or are currently enrolled in Human Sexuality will have a lower level of rape myth acceptance than individuals who have not taken and are not currently enrolled in this class. We also predict that one of the previously mentioned intolerant beliefs will mediate the potential relationship. Our data analysis will begin by running correlations in order to determine which constructs are related to one another. After this analysis we will run linear regressions in order to discern whether any of the previously mentioned factors mediate the potential relationship.

Results/Implications: There are notable gaps regarding information pertaining to college samples on how sexuality education impacts levels of rape myth acceptance. In a study that examined the rates of sexism and intolerance among incoming college freshman, the freshmen had a tendency to partake in rape myth acceptance and sexism when they had no previous classes covering sexuality education (McMahon, 2012).This research has important implications because if the hypothesis is supported it can potentially lead to more sections of this class being offered on the Pullman, Washington State University campus.

Poster Number 58

ABSTRACT:

Abstract Title:	**Study of (-)-Pinoresinol Forming Dirigent Proteins in Flax Seed**		
Presenter:	Mia Ryckman		
Mentor:	Norman G. Lewis	**Campus:**	Pullman
Co-Authors:	Kye-Won Kim, Diana L. Bedgar, Laurence B. Davin, Norman G. Lewis		
Major:	Biology, Pre-Physician Assistant		
Category:	Molecular, Cellular, and Chemical Biology		

Flax seeds are commonly known to have significant health benefits, including protecting against the onset of certain malignancies, such as prostate or breast cancers, They confer this protection through their ability to produce and accumulate a class of natural products, the oligomeric lignans, that contain (+)-secoisolariciresinol diglucoside (SDG), as the principal health protective constituent. These oligomeric lignans, in turn, are a major branch of plant phenol natural products. The biosynthetic pathway to the health protecting SDG involves a class of proteins, discovered by us and named dirigent proteins (DPs), that we first found in other plant species, such as *Forsythia intermedia*, *Thuja plicata*, and *Schisandra chinensis*. The DPs in these species control radical radical coupling of the monolignol, coniferyl alcohol, this being the biochemical pathway entry point into this major class of plant natural products. In terms of DP physiological function in these species, they bind and orientate the substrate so that once coupling has occurred, only a particular optical isomer, in this case (+)-pinoresinol, is formed.

In contrast, lignans found in *Arabidopsis thaliana* and in flax seed, are derived from the opposite antipode, (−)-pinoresinol. We have established that homologous genes in these species encode similar DPs that until now have proved very difficult to discover. Recently two dirigent proteins, LuDP5 and LuDP6 found in flaxseed were discovered to engender the formation of (–)-pinoresinol. Further characterization of these proteins and their biochemical properties was attempted. The amino acid residues of these dirigent proteins that may control distinctive formation of the (+)- or (−)-antipode have been examined using site-directed mutagenesis. Localization of SDG at different stages of flax seed development was studied through MALDI-imaging mass spectrometry.

Poster Number 59

ABSTRACT:

Abstract Title:	**The Wellbeing of University Students: Perceived Wellness, Importance, and Behaviors**		
Presenter:	Joseph Martin		
Mentor:	Dr. Sarah Ullrich-French	**Campus:**	Pullman
Co-Authors:			
Major:	Psychology		
Category:	Social Sciences		

A common definition of health (or wellness) tends to solely focus on the body. However, there is much evidence to suggest that health transcends physical conditions, which reveals the importance of portraying it as a balance among several dimensions. Holistic wellbeing refers to this essential balance and dynamic interaction of several dimensions of wellness. A quantitative and qualitative survey explored this notion of holistic wellbeing within the context of the university setting and experience and thus assessed the wellbeing of Washington State University (WSU) students at the Pullman, Tri-Cities, and Vancouver campuses on five dimensions: physical, intellectual, emotional, social, and spiritual health. The wellbeing of university students is of particular interest because its quality affects motivation, performance, and development. The study also examined the relationship between the values and behaviors of an individual concerning these dimensions, the alignment of which indicates holistic wellbeing. In this regard, participants were asked how important a certain type of health is to them and how much they engage in promotional behaviors for that health. Analysis of data would reveal whether or not our WSU student population possesses and exhibits holistic wellbeing and what factors affect their daily living.

Poster Number 60

ABSTRACT:

Abstract Title:	**Skeletal Structure for Biomechanical Neck Model**		
Presenter:	Zane Duke		
Mentor:	Anita Vasavada	**Campus:**	Pullman
Co-Authors:	Steven Monda, Liying Zheng, Anita Vasavada		
Major:	Bioengineering		
Category:	Engineering and Physical Sciences		

Predicting forces within the body is difficult and complex, and a predictive mathematical model is a powerful tool when working in biomechanics. Musculoskeletal models require many different parts, including the skeletal structure to which the muscles will attach and the physical attributes of the muscle tissue. Our lab is developing a new model using data released by the Visible Human Project, for use in biomechanical studies focusing on the muscles and joints of the neck.

Using CT scans of a human neck, we digitized the cervical vertebrae including their relative positions, but in order to define neck movement we needed coordinate systems local to each bone. Bone coordinate systems help to define muscle attachment points and the directions in which forces are applied within the body. A standard method of determining a vertebra's coordinate axes, developed by the International Society of Biomechanics (ISB), uses recognizable points (landmarks) on the bone. A vertebra's geometry, however, can vary greatly from person to person requiring a researcher's personal judgment in imposing coordinate axes with this method. In order to better generalize the creation of a vertebra's axes, I developed an algorithm to determine the bone's mid-plane, and thereby generate a set of coordinate axes and implemented this method in Matlab.

The algorithm used principal component analysis (PCA), a mathematical transformation that fits perpendicular planes to a set of points and can thereby bisect those points. In theory this method can be used to find the mid-plane of a vertebra, but our initial attempt at using PCA on the entire bone did not identify the mid-plane accurately due to the bones' asymmetries. We found that by limiting the points included in the PCA we could achieve better results. The subset of points was determined by forming a sphere around the centroid, with the radius dependent on the posterior-anterior (back-to-front) length of the vertebra. Using this algorithm we could impose a set of coordinate axes symmetric about the vertebral body of each bone with far less personal judgment than was needed with the previous method.

Poster Number 61

ABSTRACT:

Abstract Title:	**The Cognitive and Physiological Effects of Chronic Treatment of HGF Activator Dihexa in Normal Rats**		
Presenter:	Angela Rocchi		
Mentor:	Dr. Joseph Harding	**Campus:**	Pullman
Co-Authors:	Dr. Joseph Harding		
Major:	Neuroscience		
Category:	Molecular, Cellular, and Chemical Biology		

With 4.6 million newly reported cases of dementia a year, neurodegenerative diseases warrant immediate attention. The pharmaceutical, Dihexa, may offer a solution. Dihexa activates a powerful neurotrophic factor, HGF, which encourages the growth of new neurons, stimulates the production of new synapses among existing neurons, and protects said neurons from damage. Consequentially, Dihexa has restored cognitive capabilities in acute and chronic models of dementia as well as recovered motor function in a Parkinson's disease model. With its promising effects on mental acuity and agility, Dihexa is being manufactured despite its research being in its infancy. As a result, further investigation into the drug has become necessary for the public twofold: for those suffering neurodegeneration as well as those taking Dihexa as an illegal stimulant.

In previous studies, animals treated with Dihexa were observed to have noticeable increase in weight. Increased muscle tone and mental acuity were also observed outside of formal investigation. This raises the question: *what physiological effects does the pharmaceutical Dihexa have on normal patients*? With the anecdotes of past studies and the expansive range the HGF pathway has in the body, it is likely that animals chronically treated with Dihexa will have greater mass, larger muscles and higher cognitive ability than rats without treatment. Utilizing 20 Sprague Dawley rats, two groups of animals are being treated for 10 weeks. The drug and neutral vehicle are delivered by subcutaneous injection on alternating days. Weekly tests measure length, weight, body fat, and grip strength while notes are taken regarding temperament. After the 10 weeks of treatment, spatial reasoning tests will assess cognitive capabilities while physical tasks will gauge motor function and muscular ability.

It is expected that the animals treated with Dihexa will be exponentially stronger and more mentally apt than the untreated group. This will be reflected by heightened lean mass percentage and strength measurements over the 10 week period as well as stronger cumulative cognitive testing results. This data will both advance the development of neurodegenerative treatments and educate those preemptively using Dihexa as a neural and physical stimulant.

Poster Number 62

ABSTRACT:

Abstract Title:	**Biogasification**		
Presenter:	Serah Njau		
Mentor:	Jacqueline Burgher	**Campus:**	Pullman
Co-Authors:			
Major:	Chemical Engineering, Chemistry		
Category:	Engineering and Physical Sciences		

Syngas Cleanup System

The objective of this study is to build light weight, low-cost Desktop Learning Modules (DLMs), for biomass conversion to biofuels. However, gasification is highly exothermic resulting in high temperatures that can create high pressure if gases are confined in small spaces. Therefore the biogasifier DLM design requires special considerations and safety specifications so class demonstrations do not pose risks for students and instructors. Considerations include gasifier placement into a polycarbonate shielded container for easy visualization, reducing reactor size to mm-diameter quartz tubes to limit total thermal energy, directed thermal heating through electrical resistance wires, and providing unique conversion measurement means such as a small syringe cylinder unit that expands to read volumes of reaction gases while holding pressures at near atmospheric levels. Syngas cleanup will be accomplished by bubbling products through olive oil to remove remaining tar and cool the gas stream, absorption of acidic CO_2 and H_2S gases in mono-ethanol amine, and collecting final product gas in the syringe. Gas production from specified products will be pre-determined through GC analysis and relating conversion to final gas volumes, after knowing reaction conditions, and nature of side-product removal processes.

Poster Number 63

ABSTRACT:

Abstract Title:	**Plurality of Perspectives: Effect of Parent Training on Caregiver Disability Construct**		
Presenter:	Christine Mars		
Mentor:	Brenda Barrio, PhD	**Campus:**	Pullman
Co-Authors:	Brenda Barrio, PhD		
Major:	Social Sciences		
Category:	Social Sciences		

Under the Individuals with Disabilities in Education Act (IDEA) Part C children birth to three years of age are able to receive intervention services at a pivotal time in their development. Early intervention services increase long-term positive outcomes and aid in the transition to Part B services for children with developmental delays and disabilities. Part B services are provided for children from three to twenty-one years of age. Families from underserved communities (e.g., families from culturally and linguistically diverse backgrounds, families living in poverty and families in rural areas) are less likely to access these vital services due to barriers such as service availability but also parental knowledge or representation of disability. Stigma associated with the term disability in our society impacts caregiver willingness to access intervention services. The effects of parent training in a critical perspective of disability will be explored through a survey administered to participants and semi structured parent interviews will be conducted. This sequential mixed methods study will provide key information regarding parent perspective and perceptions regarding current disability services and practices. Implications for increasing access of early intervention services by caregivers of children with disabilities from marginalized communities will be discussed. Increasing the access of early intervention could improve long-term outcomes for children with disabilities and their families (parent training). In turn, this research can be used to not only address a gap within the literature, but most importantly, aid professionals in developing culturally relevant strategies in their therapeutic approach. Finally, this research could increase caregivers' advocacy skills and confidence in addressing the needs of their child.

Poster Number 64

ABSTRACT:

Abstract Title:	**The Effects of Music Videos on College Students**		
Presenter:	Ariana Garcia		
Mentor:	Dr. Kathleen Rodgers	**Campus:**	Pullman
Co-Authors:			
Major:	Sociology, Social Science		
Category:	Social Sciences		

Sex and violence have become more visible in the media, especially within music videos. With the constant advancement of media, sex, violence and objectification of women are becoming more apparent and normalized. Social cognitive theory suggests that exposing adolescents to sexual content in the media can impact the viewer's attitude and behavior (Bussey & Bandura, 1999). This study is intended to determine if music videos that contain violence prime college students to see images of objectification, powerlessness, and violence. Of those students that see these images, is there an association with perpetrators of violence? Are victims of violence more likely to see this objectification, powerlessness, and violence? This project examines the effects of priming based on student responses from surveys collected from students at Washington State University. College students watched music videos and completed a survey after, each survey asked the participants to answer questions regarding their perception of the video. The participants who have been victims of violence will be more susceptible to seeing the violence and objectification occurring within the music videos. Currently, there is a gap in the literature that examines the role of music videos as priming for college students. Identifying this role could help identify how college students' perceptions can be informed by and can inform their experiences.

Poster Number 65

ABSTRACT:

Abstract Title:	**Pregnancy is Compromised by Conditional Mutagenesis of TCF3 and TCF12 or Over-Expression of ID4 in the Uterus**		
Presenter:	Michelle Chan		
Mentor:	James Pru	**Campus:**	Pullman
Co-Authors:	Brooke K. Compton, Cindy A. Pru, Jon M. Oatley, James K. Pru		
Major:	Animal Science		
Category:	Molecular, Cellular, and Chemical Biology		

About 1 in 10 women between the ages of 15 and 44 experience difficulty in either getting pregnant or maintaining a pregnancy to term. By understanding the molecular mechanisms that regulate reproductive functions, we can develop a better understanding of circumstances when fertility goes awry. Decidualization, a post-natal process essential for the maintenance of pregnancy in invasively implanting species, is a tightly orchestrated process where terminal differentiation of the stromal fibroblasts occurs within the endometrium following expansion of the tissue by proliferation. It is hypothesized that the pro-differentiation transcription factors TCF3 and TCF12, as well as members of the inhibitor of DNA binding (ID) family, which counter TCF3/12 functions, play an essential role in pregnancy. Based on immunohistochemistry, TCF3 and TCF12 are both abundantly expressed and regulated in the gravid uterus. TCF12 protein expression was found to increase, while ID4 expression decreased from day of pregnancy (DOP) 4 to DOP 9. Conditional ablation of TCF3 and TCF12 from mesenchymal tissue of the female reproductive tract using *Amhr2-cre* mice initially caused severe subfertility (mean of 0.67 pups/litter) followed by infertility. Despite normal serum progesterone levels on DOP11.5, TCF3 and TCF12 deficiency resulted in faulty decidualization and vascular hemorrhaging. This was accompanied by a concomitant increase in uterine expression of the pro-thrombolytic enzymes urokinase and tissue plasminogen activators in double conditional knockout (dcKO) mice compared with control mice. Placentas developed abnormally in dcKO female mice with reduced vascular labyrinth and junctional zones. The observed presence of endometrial stromal protrusions into the embryonic chamber may also crowd the embryo as it expands. Interestingly, over-expression of ID4 protein in the female reproductive tract also resulted in subfertility in some female mice and complete infertility in others. ID4 over-expression may prevent complete decidualization of uterine stromal cells. It is concluded that TCF3/TCF12 and ID proteins function as a temporally defined biological rheostat that serves to regulate uterine proliferation and differentiation programs during early gestation.

Poster Number 66

ABSTRACT:

Abstract Title:	**Consumer Acceptance of a Polyphenol-Enriched Coffee Beverage**		
Presenter:	Meredith Kuchera		
Mentor:	Carolyn F. Ross	**Campus:**	Pullman
Co-Authors:	Katie Smoot, Charles Diako, Carolyn Ross		
Major:	Food Science		
Category:	Applied Sciences		

Functional products continue to grow every year and remain the key drivers in health innovations. Grapes pomace, the waste remaining after wine or juice production, is high in polyphenolic compounds, which present various health benefits. The objective of this study was to formulate an acceptable coffee beverage containing Chardonnay grape seed pomace (GSP). Coffee was chosen as the base material for the purpose of creating a single-serve, value added coffee pod that could be commercialized. The hypothesis of this study was that a low to moderate replacement of the coffee with GSP would be acceptable to consumers. Five treatments were tested: 0% (control), 6.25%, 12.50%, 18.75%, and 25.00% GSP replacement (w/w basis). Hand-packed reusable pods were utilized to brew the treatments using Keurig ® single-use coffee machines. Two consumer panels were conducted. The first panel (n=81) involved consumers evaluating the samples black. The second panel (n=67) involved consumers evaluating the samples after "adjusting" the beverage for how they normally consume coffee. In both panels, consumers completed check all that apply (CATA) questionnaires and evaluated the samples for their acceptance of appearance, aroma, taste/flavor, and overall liking using a 9-pt hedonic scale. Data were analyzed using Cochrans Q, two-way analysis of variance (ANOVA) and Tukey's HSD ($p<0.05$). The CATA results from the black coffee and "adjusted" coffee panels showed similar results despite the different treatment parameters. As the GSP concentration increased, the treatments were more frequently described as tan, milky, watery/dilute, and mild. For the acceptance evaluations, in both panels the control (0% GSP) was most accepted while the 25% GSP replacement was least accepted for all attributes. In the black coffee panel, 6.25% GSP replacement was not significantly different from the control except for liking of appearance ($p>0.05$). In the "adjusted" panel, 6.25% GSP replacement was not significantly different from the control for all tested attributes. Based on the findings, the ideal concentration of Chardonnay GSP in a single-serve coffee beverage would be a replacement value of 6.25%. This allows for the current pomace waste stream to become viable for the use as a functional ingredient in coffee.

Poster Number 67

ABSTRACT:

Abstract Title:	**Analog Circuit Design for Time-Reversal-Division-Multiple-Access Impulse Response Recording**		
Presenter:	Noel Wang		
Mentor:	Dr. Benjamin Belzer	**Campus:**	Pullman
Co-Authors:	Dr. Benjamin Belzer		
Major:	Electrical Engineering		
Category:	Engineering and Physical Sciences		

The Network-on-Chip (NoC) is the communication backbone for next-generation multi-core processors with tens of cores on a single chip. Wireless NoCs (WiNoCs), recently proposed by Professor Partha Pande at WSU, employ long-range wireless links between cores; WiNoCs enable power savings and decreased latency compared to conventional NoCs, which use multi-hop wired connections between cores. Initially proposed WiNoCs use area-efficient omni-directional antennas along with a token-passing protocol to allow access to the wireless channel; this causes delays before a network node can transmit its message. We propose a WiNoC that employs Time-Reversal-Multiple-Access (TRMA). TRMA exploits channel reciprocity to temporally and spatially focus all signal energy transmitted from an omni-directional antenna on the desired receiver, thereby reducing the power needed to transmit signals between nodes, decreasing intersymbol interference, and eliminating the need for nodes to wait for a token to transmit. In TRMA, the impulse response from a potential receiver to the transmitter is initially stored by the transmitter, and is then transmitted in time-reversed order during messaging. At WiNoC and indoor cellular-communication time-scales, it can be impractical to digitally record impulse responses due to the high sampling frequencies required. We therefore propose to approximate the impulse response with analog circuits.

Using Matlab, we show that a 60th order Fourier series adequately approximates an indoor cellular impulse response. A time-reversed impulse is obtained by inverting the sine components of the series expansion. To realize the Fourier series approximation, we propose an analog circuit comprising a bank of band pass filters that are highly resonant (high Q) at the fundamental frequency and its harmonics. Passive resonator filter designs rely on inductors, as do many active designs that use amplifiers. But the performance of inductors degrades at higher frequencies, and inductors are significantly larger than other circuit components. Therefore, we employ active inductorless high Q band pass filters to reduce the overall footprint of the proposed analog circuit while maintaining reasonable performance. The analog circuit is simulated using LTSPICE, a widely-used analog circuit simulation software package, to test and verify its performance for WiNoC TRMA applications.

Poster Number 68

ABSTRACT:

Abstract Title:	**Identification of Resistance in Malus to Oblique-Banded Leafroller**		
Presenter:	Joshua Milnes		
Mentor:	Dr. Jay Brunner	**Campus:**	Extension
Co-Authors:	Joseph Schwarz and Dr. Jay Brunner		
Major:	Biology		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Tree fruit is a multi-billion dollar industry in Washington State with apple representing around 70% of the total value. Insect pests, such as the oblique-banded leaf roller (OBLR), *Choristoneura rosaceana*, can impact apple quality and yield and thus are a major concern to apple growers. Due to the threat of OBLR feeding on fruit, and to a lessor extent on foliage, growers apply insecticides to reduce risk of crop loss. However the use of insecticides has led to the development of pesticide-resistance in OBLR and results in the disruption of biocontrol of secondary insects (such as aphids and spider mites). Our lab is interested in identifying and characterizing apple genotypes that confer resistance against OBLR. While working with Dr. Brunner's graduate student, we developed a whole-leaf bioassay for OBLR that revealed phenotypic differences in developmental parameters such as developmental time, pupal weight, fecundity, and mortality. In 2013, we monitored larval growth and development on 16 different apple genotypes through the spring and summer periods. The red delicious cultivar results suggested a level of resistance to OBLR. In 2014, we focused on the red delicious cultivar with similar results. Our goal is that by identifying OBLR resistance in apple this information can be used in the WSU apple breeding program to eventually add insect resistance to leaf chewing pests into new high-quality commercial apple cultivars.

Poster Number 69

ABSTRACT:

Abstract Title:	**A Novel Technology Revitalizes Old-Fashioned Chemical Sanitation**		
Presenter:	Daniel Mobley		
Mentor:	Douglas Call	**Campus:**	Pullman
Co-Authors:	Lisa Orfe, Owen Strom, Sylvia Omulo, Michael Radicone, Douglas Call		
Major:	Biochemistry, PharmD		
Category:	Molecular, Cellular, and Chemical Biology		

Halogens (iodine, chlorine, bromine) have long been used to sanitize water because they are highly reactive, but this property also means that these compounds are rapidly neutralized when they complex with organic materials. To circumvent this challenge we are evaluating a novel iodine delivery system that operates by passing air through a proprietary iodine resin to create an iodine vapor that is introduced into water in the form of iodine-containing micro- or nanometer sized bubbles. This technology has already proven effective in cleaning heat exchangers in United States Navy ships, where bio-fouling is an expensive challenge. Typical treatments result in 300 ppb iodine residue in the water column (well below 2 ppm, which is considered the maximum acceptable concentration for chronic ingestion in humans). Initial tests demonstrated that simply bubbling water (45 ml) for 30 s introduces sufficient iodine into a water column to quickly (<90 s) kill *Escherichia coli* K12, *E. coli* O157:H7, *Salmonella*, and *Enterococcus* (10^6 CFU/mL starting concentration). This post-bubbling bactericidal effect is completely neutralized if the water contains a soil fraction (5 g soil + 50 ml water), consistent with iodine being neutralized through interaction with organic compounds. If, however, the bacteria are present at the time of iodine bubbling, no bacteria can be recovered. Real-time iodine bubbling circumvents neutralization that normally limits the applicability of iodine as a sanitizer. Similarly, passively treating a 24-hour-old *Acinetobacter baumannii* biofilm with bubbled water has no effect on the biofilm community, but subjecting the biofilm to active iodine bubbling for just 90 s resulted in complete eradication. We have also observed complete killing of 24-hour-old *Staphylococcus aureus* (MRSA) biofilm after bubbling iodine for 90 s, while bubbling with only air did not result in any significant loss of MRSA. Bubbled iodine appears to circumvent neutralization of iodine in the presence of organic compounds making this technology a potentially important tool for water and food sanitation, animal husbandry, waste treatment and many other applications.

Poster Number 70

ABSTRACT:

Abstract Title:	**The Civilian Conservation Corps: A Case Study of the Fort George Wright District and Camp F-188**		
Presenter:	John Menard		
Mentor:	David Stratton	**Campus:**	Pullman
Co-Authors:			
Major:	History		
Category:	Humanities		

This case study explores the political, cultural, and social aspects of the Civilian Conservation Corps in the Pacific Northwest, with special attention paid to the CCC's presence in Idaho's St. Joe National Forest. Between 1933 and 1942 hundreds of thousands of impoverished youth joined the Civilian Conservation Corps in order to ease the burdens of the Great Depression. The men stayed in army administered camps where they worked, played and went to school. The CCC engaged in various environmental and ecological projects administered by the government, such as soil erosion control, reforestation, and firefighting. Using a collection of official government documentation, newspaper archives, and various ephemera I chose to study how the CCC served as a positive force for both its members and the local communities which it served. I conclude that the CCC in Idaho was a boon to the Idaho timber industry, fostered goodwill amongst the communities of Idaho, and served to provide educational opportunities to a segment of America's youth which had heretofore not had access to quality education.

Poster Number 71

ABSTRACT:

Abstract Title:	**Dispersal of Palladium Catalyst for Fuel Cells**		
Presenter:	Alexander Fabrick		
Mentor:	Dr. Yuehe Lin	**Campus:**	Pullman
Co-Authors:			
Major:	Material Science & Engineering, Physics		
Category:	Engineering and Physical Sciences		

Palladium is a known catalyst of fuels cells, but it is an expensive material. To improve its efficiency, particles of palladium are dispersed onto carbon nanotubes or graphene before being put into the fuel cell. Dispersion of the palladium makes it more available to oxygen and hydrogen in the fuel cell, so each palladium particle may catalyze more reactions. The benefit is that smaller particles of palladium may be used so that less palladium is used overall. To measure the efficiency of a variety of supported metal catalysts, solutions of Pd-laced carbon nanotubes are dropped onto a sample of fuel cell cathode material, which is then placed into an acid bath. A current should be spontaneously generated, and the amplitude of the current is measured. A more efficient catalyst solution will produce a greater current.

Poster Number 72

ABSTRACT:

Abstract Title:	**Expression of Inhibitor of DNA Binding Proteins 1-4 during Uterine Decidualization**		
Presenter:	Hannah French		
Mentor:	James K. Pru	**Campus:**	Pullman
Co-Authors:	Brooke K. Compton, Cindy A. Pru, Nicole C. Clark, James K. Pru		
Major:	Animal Sciences		
Category:	Molecular, Cellular, and Chemical Biology		

Approximately 15% of reproductive age couples are affected by infertility. Epidemiological and mutant mouse studies clearly show that miscommunication between the implanting embryo and uterus contributes to infertility. We recently determined through mouse mutagenesis that the transcription factors TCF3 and TCF12 are essential for fertility. Female mice lacking expression of these transcription factors in reproductive tissues are completely infertile. TCF3 and TCF12 were found to be necessary for uterine decidualization, a terminal differentiation program of the uterine stromal compartment. TCF3 and TCF12 functional activities are countered by inhibitors of DNA binding (ID) proteins 1-4. The objective of this study was to evaluate the expression of ID proteins in the murine uterus during early pregnancy, as well as in human endometrial stromal cells (HESC) undergoing decidualization *in vitro*. It was revealed by qPCR that *Id1*, *Id3* and *Id4* mRNA expression increased from day of pregnancy (DOP) 4 to DOP 9. Interestingly, *Id2* expression increased ($p<0.05$) during this same time. Immunohistochemistry showed that ID1 and ID3 protein expression mirrored that of corresponding mRNAs. ID2 protein did not appear to change from DOP4 to DOP9. At 70% confluence, HESC were grown in differentiation medium to induce decidualization. *ID1-3* mRNAs exhibited a similar pattern of expression in that levels declined from 0 hours through 3 days, but then became elevated by at least 3-fold by 6 days in culture. This finding suggests that ID1-3 expression declines at a time when HESCs undergo terminal differentiation, but then become elevated once the process is complete. Ongoing efforts are geared toward understanding the functional importance of ID proteins during uterine decidualization. This will be accomplished by over-expressing ID1 protein as HESCs undergo decidualization and to identify ID1-interacting proteins using proteomics approaches. It is concluded that ID1, ID3 and ID4 expression is elevated when endometrial stromal cells are highly proliferative, a time that precedes the terminal differentiation of these cells. It is hypothesized that ID proteins function to inhibit the pro-differentiation functions of TCF3 and TCF12.

Poster Number 73

ABSTRACT:

Abstract Title:	**Utilizing Social Networks to Address Needs of Caregivers of Autistic Individuals**		
Presenter:	Rebecca Ly		
Mentor:	Dr. Doug Hindman	**Campus:**	Pullman
Co-Authors:			
Major:	Management Information Systems		
Category:	Social Sciences		

With an increasing number of Individuals with Intellectual Disorders (IID), there is a rising concern about the amount of resources available for the families affected. The focus of this research is on Autism Spectrum Disorder (ASD). According to the Center for Disease Control, the prevalence rates have nearly doubled within the last century. This study analyzes how caregivers and autistic individuals resort to social networks and observes if there are any trends or similarities in the needs of caregivers of autistic individuals. This study was conducted by observing an online forum through the social network, Facebook and collecting a set of one-hundred randomized posts over a time span of thirty-days. Ten posts were collected each day using a systematic sampling system and one-hundred posts were chosen an online random number generator to be analyzed and recorded. Results concluded that families, especially parents and caregivers, faced risk of psychological damage resulting from isolation and confusion about how to treat the autistic individual in their care as well as how to maintain their daily lives. This research concluded that families are in need of emotional and mental support. Further research can look into what types of resources are currently available for caregivers and what percentage of caregivers face risk of depression, suicide, or psychological trauma. Further research can also look into different methods to assist families with an autistic individual to prevent future psychological mental damage and what methods are most effective in assisting these families.

Poster Number 74

ABSTRACT:

Abstract Title:	**Investigation of Heat Transfer in a Miniaturized System**		
Presenter:	Michael Gerber		
Mentor:	Dr. Bernard J. Van Wie	**Campus:**	Pullman
Co-Authors:	Amber Graviet, Jacqueline Burgher, Dr. Bernard J. Van Wie		
Major:	Chemical Engineering		
Category:	Engineering and Physical Sciences		

Gasification is one of many renewable energy technologies that could be utilized for the production of transportation fuels in the future. Convective and radiative heat loss from a miniaturized gasification reactor was investigated using heat transfer correlations and experimental data. The reactor is designed to be part of a biomass to biofuel desktop scale classroom teaching tool for use in resource-limited environments. To achieve this end, reactor temperatures must reach 550 °C for pyrolysis and 700 °C for gasification. Experiments were performed with and without a radiation shield consisting of a 55% of total area silvered for reflection of radiative energy. Heat transfer correlations predicted convective losses to be greatest up to a reactor temperature of 600 °C, above which radiative heat losses predominated. Experimental testing of the reactor without the shield yielded a peak temperature of 505 °C, while testing with the shield yielded a peak temperature of 705 °C. From this data it was determined that both convective and conductive heat transfer are sources of significant heat loss that must be compensated for in the design of the reactor.

Poster Number 75

ABSTRACT:

Abstract Title:	**Alteration of Reaction Kinetics by Application of an Electrical Field Across a Catalyst**		
Presenter:	Jake Gray		
Mentor:	Su Ha	**Campus:**	Pullman
Co-Authors:			
Major:	Chemical Engineering, Chemistry		
Category:	Engineering and Physical Sciences		

Traditional techniques for altering reaction speeds, such as adding a non-reactive catalyst or by modifying the temperature of the reactor, are limited. After these factors have been considered, there is very little else one can do to further affect the speed of a reaction. As a result, many industrial chemical reactions are slow and expensive processes, or require large amounts of energy to perform. Theoretical work (Fanglin Che, 2014) has shown that applying an electrical field to a solid nickel catalyst can alter reaction pathways and increase product yield without changing temperatures. The focus of my research is to confirm this work experimentally. In particular I am looking at the effects of applying an electric field to a nickel catalyst during the steam reformation of methane, an important process which produces ~95% of the world's hydrogen. Replacing traditional energy-expensive heating processes with a low-power electrical field supplied by renewable sources will remove additional hurdles facing the sustainability of hydrogen fuel cells.

A specialty reactor has been designed in which voltage may be applied to a porous nickel foam pellet while methane gas and water vapor are passed over the catalyst at a constant temperature of 800°C. Hydrogen gas production is monitored using gas chromatography. Application of low electrical potentials (between -10 and 10 volts) appears to have no effect on hydrogen production. It is hypothesized that using higher potentials will generate observable differences in hydrogen yield, and efforts are currently being made to test this.

Poster Number 76

ABSTRACT:

Abstract Title:	**Nest Survival of Greater Sage-Grouse and Columbian Sharp-Tailed Grouse in Lincoln County, Washington**		
Presenter:	Adrian Rus		
Mentor:	Dr. Lisa Shipley	**Campus:**	Pullman
Co-Authors:	Dr. Lisa Shipley, Kourtney Stonehouse		
Major:	Wildlife Ecology and Conservation		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Columbian sharp-tailed grouse (*Tympanucus phasianellus columbianus*) and greater sage-grouse (*Centrocercus urophasianus*) were once widely distributed throughout much of the shrub-steppe habitat in eastern Washington. In the last century, their historic range has been significantly reduced due to the conversion of shrub-steppe to cropland. Today, their population remains scattered throughout the state in small shrub-steppe patches, remnants of once a larger intact habitat. To better understand the population dynamics and habitat quality of grouse, it is important to determine the factors that influence nest survival. In this study, we examined the effects of habitat, demographic, and climatic factors on the daily nest survival of sympatric and translocated Columbian sharp-tailed grouse and greater sage grouse. We measured the nest vegetation characteristics of 31 sharp-tailed grouse and 40 sage-grouse at the Swanson Lakes wildlife area in eastern Washington. We also used geospatial analysis software (ArcGIS) to extract climate and habitat data at each nest location from data rasters provided by PRISM Climate Group and Bureau of Land Management. We estimated the daily nest survival rate and assessed the effects of environmental factors using statistical software (Program MARK and R). We found that the nest survival of sage-grouse was positively associated with average height of perennial bunchgrasses. Nests of adult grouse had a greater survival than those of juveniles, and the probability of nest survival decreased with time since initiation. The nest survival of sharp-tailed grouse was positively associated with distance to trees, and similarly, the probability of sage-grouse nest survival decreased with time since initiation. Our models may aid in the recovery of Columbian sharp-tailed grouse and greater sage-grouse in Washington, guiding habitat management and translocations of the grouse species.

Poster Number 77

ABSTRACT:

Abstract Title:	**Identification of Optimal Neutralizing Epitopes on Nipah Virus Glycoproteins**		
Presenter:	Samantha McInally		
Mentor:	Hector Aguilar-Carreno	**Campus:**	Pullman
Co-Authors:	Hector Aguilar-Carreno		
Major:	Microbiology		
Category:	Molecular, Cellular, and Chemical Biology		

Nipah Virus (NiV) is a lethal pathogen that causes acute encephalitis in humans and some animal species, and has a ~75% mortality rate in humans. Despite the lethality of this virus, there is currently no effective treatment or vaccine for a NiV infection. However, given the Ebola outbreak occurring in West Africa, it is obvious that the scientific community needs to work on effective vaccines and treatments for these emerging lethal pathogens. In this study, different NiV and Hendra virus (HeV) antigens were examined to determine which NiV or HeV antigens elicited the greatest neutralizing response and prevented the virus from entering into the cell. Using a luciferase-based infection assay, we determined that NiV and HeV antigens that had been codon-optimized produced the most effective neutralizing antibodies. In addition, we showed that there is some cross-reactivity between NiV and HeV antigens (two closely related viruses), which suggests the possibility that a vaccine containing antigens from one of these viruses could effectively protect against NiV, HeV, and possibly other related viruses within the *Paramyxoviridae* family. The ultimate goal of this project was to identify specific antigens that could be included in a future NiV vaccine.

Poster Number 78

ABSTRACT:

Abstract Title:	**Saliva: Its Influence on the Electronic Tongue's Response Utilizing Singular Tastants**		
Presenter:	Victoria Minette		
Mentor:	Carolyn F. Ross	**Campus:**	Pullman
Co-Authors:	Charles Diako, Allison Baker and Carolyn F. Ross		
Major:	Food Science		
Category:	Applied Sciences		

Sensory evaluation is used for a wide range of fields, from marketing to product development; the ultimate goal is to obtain accurate and reliable data (Meilgaard and Civille). Sensory evaluation provides valuable information, however it has limitations, including variability and cost. The electronic tongue (e-tongue) can complement sensory evaluation and overcome some limitations. Because the e-tongue is intended to mimic the non-specific response of the human tongue, the effect of saliva becomes an important aspect to consider. The present study sought to determine the influence of saliva on the response of the e-tongue. The alpha-MOS e-tongue contains seven sensors, including sensors for sweet, sour, salty, bitter, umami, metallic and spicy. To test the response of the e-tongue, tastant solutions were prepared to represent each of the sensors. The samples used in testing were prepared under three conditions: 1) a control, only the standard solutions, 2) a diluted condition with a 1:6 water dilution, to represent the dilution effect of the saliva, and 3) a saliva condition at a 1:5 dilution (saliva: tastant solution). There was a significant difference between the three conditions. When all three conditions were analyzed using PCA, the e-tongue had a -0.2-discrimination index, caused by overlap in the water-diluted and the control samples. This implied there was a failure to differentiate between the control and water-dilution samples. The e-tongue distinguished between the water-diluted and saliva-diluted treatments with a discrimination index of 95%. These results indicated that the e-tongue registered these two sample conditions differently, with saliva having an effect on the response of the e-tongue. In this experiment the e-tongue was unable to match the standard solutions to the appropriate taste sensors. The sensors are cross-discriminatory, indicating a singular tastant may not produce the necessary chemical combination to identify that tastant with individual sensors. This study builds upon previously published research. No studies have yet examined the influence of saliva on the e-tongue. This research will ultimately allow more accurate predictions between how a panelist might respond to a particular sample and the response of the e-tongue.

Poster Number 79

ABSTRACT:

Abstract Title:	**Museum As Learning Environment**		
Presenter:	Miranda McCrory		
Mentor:	Kathleen Ryan	**Campus:**	Pullman
Co-Authors:	Kathleen Ryan		
Major:	Interior Design		
Category:	Arts and Design		

A rural farmhouse stands in Genesee, Idaho, filled to the brim with materials from another time. The goal for the farmhouse is to transform the spaces into a livable heritage museum, while still providing areas for research and learning. In order to achieve this, an archive building and museum provides the best design solution. The archive building incorporates storage and multi-use exhibit areas to promote informal learning, like museums, which offer a growing potential for sharing social and cultural ideas and information.

Design is audience driven, where visitors construct their own interpretation from cultural experiences within the museum/exhibit. “Cultural institutions become a place where visitors can create, share, and connect with each other around context“(Simon, 2010). Exhibit context helps promote active user engagement by presenting multiple stories and voices and gives the visitor the opportunity to investigate personal interest and the ability to make and do, rather than just watch and observe. An active approach to the design process includes participatory design; a dynamic and active approach to design where all partners contributes to the design process (Black, 2005).

Design students worked closely with museum staff to better understand the long-term needs for the museum. Museum staff and students collaborated to propose an archive building as a functional design solution. Preliminary research was conducted prior to design proposals. Students interviewed University Library Services and Archives to better understand requirements for an archival space. Research in the form of literature reviews on exhibits was conducted and case studies were created on archive buildings and museum exhibits that helped inform the proposed archival research museum exteriors and interiors.

The final project responded to the need for material and display organization and storage, quality of visitor experience (Simon, 2010) and the strong need for shaping a “big idea” or overall message through exhibit design strategies (Williams, Jagger, 2005). Students used the surrounding buildings to inform the newly proposed archive building exterior and design. The archival museum promotes user engagement (Simon, 2010), active learning (Simon, 2010) and visitor immersion (Simon, 2010).

Poster Number 80

ABSTRACT:

Abstract Title:	**Mosaic Evolution in Human Evolution**		
Presenter:	Taylor Gale		
Mentor:	Luke Premo	**Campus:**	Pullman
Co-Authors:	Luke Premo		
Major:	Speech and Hearing Sciences, Psychology		
Category:	Social Sciences		

Mosaic evolution refers to different traits or characters evolving at different rates through time. An organism can be thought of as a "mosaic" of more-or-less independently evolving characters rather than a suite of traits that evolve in lockstep with each other. When viewing organisms through the lens of mosaic evolution, all species are "transitional" forms.

I hypothesize that the human lineage would also be marked by mosaic evolution. To test this I collected metric data from hominin fossil casts in the Department of Anthropology's teaching cast collection. I targeted two traits that satisfied the following conditions: (1) present on many of the specimens, (2) relatively easy to measure, and (3) unlikely to be linked to one another. I collected data on the length and width of the eye orbits and the length of width of the third molar from 23 hominin specimens. The metric data were plotted against the mid-point of the temporal range or (if possible) the date associated with the specimen for each species measured. Different rates of change in the eye orbits and the molars serve as evidence of mosaic evolution. My results suggest that these characters show evidence of mosaic evolution in hominins, but how can this be explained?

Eye orbit size and shape may have been affected by the well-documented change in the size and shape of the face and braincase through evolutionary time. Over the course of the 4.5 million years represented by my sample, brain size increased from roughly 350cc to roughly 1350cc and the face became much flatter. But these changes are unlikely to have directly affected length and width of the third molar, traits that are more tightly constrained by selective pressures related to diet. While the size of the third molar generally decreases through evolutionary time in hominins, the rate and direction of changes in molar size vary—as best illustrated by the now-extinct branch of our family tree containing the robust Australopithecines. My results show mosaic evolution in human evolution and highlight how different selective pressures have shaped two different hominin traits at different rates.

Poster Number 81

ABSTRACT:

Abstract Title:	**Diet-Induced Obesity alters the Gut-Brain Communication and Results in Microglia Activation in the Hindbrain Feeding Centers**		
Presenter:	Cherry Fletcher and Alexandra Vaughn		
Mentor:	Krzysztof Czaja	**Campus:**	Pullman
Co-Authors:	Alexandra Vaughn, Lindsay Ballsmider, Patricia DiLorenzo, Krzysztof Czaja		
Major:	Neuroscience / Neuroscience		
Category:	Molecular, Cellular, and Chemical Biology		

According to the recent report (Ng et al. 2014), 37% of adults worldwide are overweight or obese, a 27.5% increase since 1980 with obesity accounting for 3.4 million deaths/yr. in the USA. Despite these alarming statistics, there are gaping holes in our knowledge of the etiology and biological consequences of obesity. Gastrointestinal signals that inform the brain of the quantity and quality of food being consumed during ongoing meals are important controllers of food intake (Ritter 2004). The nucleus of the solitary tract (NTS) in the caudal brain stem is the site at which the vagal sensory afferent fibers transmit gastrointestinal (GI) signals and make their central synapses (Peters et al. 2013). While, GI-projecting motor neurons are located at the dorsal motor nucleus of the vagus (DMV). It is now established that obesity itself is considered to be a state of chronic inflammation (Cox et al. 2014). An array of inflammatory cytokines are increased in obese tissues, including interleukin (IL)-6, IL-1β, CCL2, and others (Berg et al. 2005; Shoelson et al. 2006). In addition, while predominant, adipose tissue is not the only site of such cytokine expression in obesity. It has been reported that liver (Sun et al. 2012), pancreas (Esser et al. 2014) and the brain (Cazettes et al. 2011; Purkayastha et al. 2013; Spielman et al. 2014) all experience an increase in inflammatory exposure in the obese state. Excess pro-inflammatory mediators may trigger neuro-inflammation, which subsequently exacerbates neurodegeneration. Degeneration of neural circuits in the hindbrain feeding centers may alter gut-brain communication, leading to even higher fat tissue accumulation.

Therefore, the goal of our study was to determine whether diet-induced obesity (DIO) alters the gut-brain communication and results in microglia activation in the hindbrain feeding centers.

Poster Number 82

ABSTRACT:

Abstract Title:	**Pumpkin Queen**		
Presenter:	Kalina Ebling		
Mentor:	Carol Salusso	**Campus:**	Pullman
Co-Authors:			
Major:	Apparel, Merchandising, Design, and Textiles		
Category:	Arts and Design		

Inspiration: The inspiration for my design came from mythology. Ancient Norse mythology depicted by in the movie Thor represents Loki as complex character through his costume with strips of crisscrossing leather highlighted with plates of gold and bronze armor. A second myth came from the more modern Halloween fan version of *Jack the Pumpkin King* where Jack The version of Jack plays a strong and fearsome warrior.

Approach: The goals for this design were to experiment with the versatility of ribbon-work and to demonstrate how this technique could be used in apparel design to give a striking look to darker fabrics. Before implementing the ribbon-work, the design, an original pattern was created through a combination of draping the upper body area and flat patterning modifications to a block pant pattern. Materials included a combination of knit and woven fabrics that provided both stability and stretch in areas of the garment. The colors of the Halloween myth were used to give the outfit a dark, strong, earthy appearance. The complexity of the crisscrossing leather on Loki's outfit inspired the intricacy of the orange ribbon work. The gold pieces on his outfit inspired the bronze rings and gold beads used to stabilize and highlight the delicate orange ribbons. Ribbons were chosen to create the crisscross designs instead of leather to give the outfit a more feminine look.

Contribution: This original design contributes to development of ribbon-work techniques in apparel design and was selected for international exhibition November 2014.

Poster Number 83

ABSTRACT:

Abstract Title:	**Exploring Variation in Wheat Germplasm for Performance Under Elevated Temperature**		
Presenter:	Quinn Graham		
Mentor:	Amita Mohan	**Campus:**	Pullman
Co-Authors:	Amita Mohan, Kanwardeep Singh, Dr. Kulvinder Gill		
Major:	Psychology Criminal Justice		
Category:	Applied Sciences		

As time passes, the issue of global warming only seems to worsen. This increase in temperature around the globe will have severe side effects in our near future. In order to assure that we have solutions for these problems when they arise, we need to start preparing today. Common wheat is one of the important cereals grown across globe and elevated temperature during vegetative and flowering time affects its performance. In an effort to identify wheat plants capable of combating global warming, we collected wheat lines from across the globe (USA, Africa, Iraq and Iran). We assumed that natural variation exist between wheat lines originating from different parts of world that can be exploited to select temperature resilient wheat. A collection of 650 different lines was planted in two replicates randomized throughout the greenhouse to remove treatment bias. All seeds were watered using automated watering system to ensure that seeds received same amount of nutrient and water as well as received it at same time. Once our seeds started to germinate and reached two-leaf stage, we had the greenhouse temperature profile set so that at noon temperature would reach 40 degrees Celsius. Throughout this process, seeds were checked on regular basis for effect of elevated temperature on growth of wheat like leaf size, color, tiller number, flowering time and other observations. If the plants had yellowing around the leaves, or if tiller number was severely affected, we deemed these were not optimal to grow under elevated temperature. We also selected plants, which were healthiest in our experiment by selecting plants that were green, sturdy and showed no effect on flowering time. Collecting data on productive tiller number of plants that were healthy during stress helped us in monitoring effect of high temperature on grain yield. Plants that didn't set any seed were also scored, which highlights effect of elevated temperature on seed setting capacity or pollen viability of wheat plants. Our experiment shows that wheat plants get affected by increased temperature stress, but enough natural variation exist between wheat germplasm that can be exploited to develop a climate resilient wheat.

Poster Number 84

ABSTRACT:

Abstract Title:	**The Enemy within: an Organizational Evaluation of the Japanese Kamikaze Corps**		
Presenter:	James Pappas		
Mentor:	Dr. Noriko Kawamura	**Campus:**	Pullman
Co-Authors:			
Major:	History, Humanities		
Category:	Humanities		

Popular conceptions of kamikaze pilots tend to cast them as fanatic ultra-nationalist volunteers or as hapless sacrifices, victims of inescapable consequence. In historical fact, however, they were both—an impetuous mixture of "volunteer crusaders" and "volunteered conscripts." Some were true volunteers. Others true victims. However, no historical publication addresses the kamikaze pilots as a coexistent *both* and sets out to offer an explanation of how their duality affected the kamikaze pilot corps organizationally. The principle objective of my research is twofold: (1) to demonstrate that the kamikaze pilot corps was a complex organization whose defining characteristic was an inherent duality reflecting the conflict between volunteer crusader and volunteered conscript type pilots; and (2) to show that a shifting imbalance from volunteer crusader-type majority to a volunteered conscript-type majority set in motion an inexorable progression of failure and the inevitability of defeat.

By examining the kamikaze corps through an organizational lens, I demonstrate that the kamikaze corps was a far more complicated and dynamic organization that evolved over time and not the static stereotypical portrayal that has been often placed into the context of a particular historical narrative. My research employed two major research strategies: (1) the qualitative analysis of existing historiography including primary and secondary sources on kamikaze pilots and operations and (2) quantitative analysis of kamikaze operations data from its inception in October 1944 to the end of the war in August 1945, with special emphasis on the *Kikusui* operations between April 6 and June 22, 1945. This research paper is important because it challenges the ad hoc belief that the failure of the kamikaze corps was due chiefly to Japanese military inferiority. Furthermore my research demonstrates that a careful examination of kamikaze historiography reveals seven observable sets of characteristics attributable to kamikaze pilot duality and is the ostensible factors in the failure of the kamikaze corps. My research adds to existing historiography by further questioning the sources and assumptions about the Japanese kamikaze pilot corps and encourages future scholars of World War II history in the Pacific to focus outside the confines of stereotypical characterization.

Poster Number 85

ABSTRACT:

Abstract Title:	**A New Soil-Born Virus Disease in Washington Vineyards**		
Presenter:	Leslie Walker		
Mentor:	Naidu Rayapati	**Campus:**	Tri-Cities
Co-Authors:	Basavaraj Bagewadi, Prashant Swamy, Andrew Schultz and Naidu Rayapati		
Major:	Viticulture and Enology		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

A vineyard block planted with a red-fruited wine grape cultivar was observed with vines showing 'fanleaf-like' symptoms, consisting of leaf distortion, short canes with reduced internodes and overall stunting of vines. Symptomatic vines produced smaller clusters with small and poor quality berries compared to clusters and berries from non-symptomatic vines. Leaf samples from symptomatic vines were tested for nematode-transmitted viruses known to infect grapevines. The samples were positive only for *Tobacco ring spot virus* (TRSV). Total nucleic acids extracted from symptomatic and non-symptomatic leaves were tested by RT-PCR using primers specific to the coat protein of TRSV. The virus-specific DNA fragment amplified only from symptomatic samples was cloned and nucleotide sequence determined. A comparison of nucleotide sequences with corresponding sequences available in public databases confirmed the presence of TRSV. To our knowledge this is the first report of the occurrence of TRSV in Washington vineyards. To test if TRSV came through planting material or spread by soil-inhabiting nematodes to new plantings, cucumber seedlings were planted in the vineyard block as a bait near the symptomatic vines. By end of the growing season, samples from five of the six cucumber plants were tested positive for TRSV, indicating spread of the virus to cucumber plants by soil-inhabiting nematodes. These findings call for additional research on incidence and spread of soil-borne virus diseases in Washington vineyards. Growers are advised to test soils for nematode vectors before establishing vineyards, especially if the previous crop was one of the hosts of TRSV.

Poster Number 86

ABSTRACT:

Abstract Title:	**Sequencing the RNA of the Tropical Gar**		
Presenter:	Kayla Cribbin		
Mentor:	Joanna Kelley	**Campus:**	Pullman
Co-Authors:			
Major:	Zoology, Pre-Medicine		
Category:	Molecular, Cellular, and Chemical Biology		

The tropical gar fish (*Atractosteus tropicus*) is one of seven species of gars (Family Lepisosteidae) that belong to two genera, *Lepisosteus* and *Atractosteus*. In Mexico and South America, the population is caught from the wild as a major food source and is one of five main fisheries resources. While some past studies have used molecular data to determine phylogenetic relationships among living gar species and to examine the mitochondrial DNA of the tropical gar, the genetics of most gars are unknown. Very little research has been done on the tropical gar, despite being important to the regional aquaculture and increasing concerns about overexploitation by fisheries and habitat degradation. In order to gain a better understand of gene expression in the tropical gar fish, the RNA from multiple tissue samples from male and female tropical gar fish were sequenced and compared. This was done by extracting the RNA from the brain, muscle, and gonad tissues of multiple male and female tropical gar fish. The mRNA was isolated and used to synthesize cDNA for sequencing on Illumina sequencing technology. The transcriptome was assembled using de novo assembly computational methods and the male and female tissues will be compared back to this reference transcriptome to identify transcripts being differentially expressed between the males and females. The assembled transcriptome will be compared to a database of well-annotated proteins, SwissProt, to identify which proteins are being expressed. The assembled transcriptome will also be compared to the already annotated transcriptome of the spotted gar, *Lepisosteus oculatus*, to compare proteins being expressed to identify proteins that may have arisen by common ancestry and to validate already estimated divergence time between the two fishes. This research will determine what genes are being expressed differently in male and female tropical gar and to determine if the current divergence time of 100 million years between the two gar genera is accurate. Assembling a transcriptome for the tropical gar will allow for future research into the tropical gar and its genetic relationship to other organisms.

Poster Number 87

ABSTRACT:

Abstract Title:	**Who Gets the Money? Collegiate Scholarship Distribution Between Ethnically Rooted Student Organizations and Non-Ethnically Rooted Student Organizations**		
Presenter:	Vanessa Delgado		
Mentor:	Dr. Julie Kmec	**Campus:**	Pullman
Co-Authors:			
Major:	Sociology		
Category:	Social Sciences		

This study seeks to dispel a myth among the distribution of scholarships. With the rise of students of color in community colleges and universities, many individuals firmly believe that grants, scholarships and even financial aid gives preference to students of color over Caucasian students. This problematic myth asserts that students of color have an 'upper edge' in financial resources to fund their education. The reality is that Caucasian students are 40% more likely to receive merit scholarships and grants over students of color. More specifically, Whites are 71.5% of the recipients of scholarships but comprise 61.8% of the total United States college population. Evidently, scholarships adhere towards White students, however the myth that students of color earn all the scholarships still permeates our institutions of education. Latinos earn 8.1% of all scholarships and tend to come from impoverished communities as well as be first generation college students. Latinos are now the largest minority in the United States and therefore it is important to understand how this community is funding their education. Homosocial reproduction is the process in which individuals select others based on similar background or those who share common characteristics. In this study, an audit study was used to test whether homosocial reproduction is present in the distribution of scholarships that emphasize organizational affiliation. More specifically, it was tested to see if membership in an ethnic organization is deemed differently than membership in a predominantly Caucasian one. In this presentation I will be discussing the results of comparing a fictional Latino applicant and a fictional Caucasian applicant for the same scholarship.

Poster Number 88

ABSTRACT:

Abstract Title:	**Student Success on Interdisciplinary Design Teams**		
Presenter:	Susie Gomez		
Mentor:	Kathleen Ryan	**Campus:**	Pullman
Major:	Landscape Architecture		
Category:	Arts and Design		

Problem
Students in design disciplines must learn to collaborate in order to successfully adapt to design practice where a variety of professionals, researchers, and stakeholders (Sanders and Stappers, 2008) work together. The interdisciplinary process of a participatory design is new to the academic setting and must be developed for students to be successful in future work environments. Students of architecture, landscape architecture, and interior design collaborated for the first time on a participatory project to redesign a library. Guidelines to facilitate teamwork, communication, and interdisciplinary interactions help organize students through the design process. As higher education strives for interdisciplinary projects to reflect the practice in the "real world", guidelines provide a foundation for future projects.

Methods
Students were asked during the library project to rank themselves and their teammates' performance based on elements of collaboration. Performance criteria was divided into decision making, cooperation, ability to handle conflict, balance of participation, focus/on schedule, communication, support, and team spirit. Guidelines were re-configured from previous examples of studies concerning participatory tactics (Lee, 2008) in a design process. Interdisciplinary design process (Spinuzzi, 2005) and basic teamwork development criteria (Johnson, 1994) were used to develop guidelines.

Results
Students were asked to rank elements of collaboration on a Likert scale of 1 – 5 (Five being the best experience possible). These rankings were then averaged. Each element surveyed averaged between 3.5 and 4.0, with the exception of balance of participation. Student reflection on balance of participation was lower at an average 2.9.

Conclusion
Evaluation forms designed to facilitate balance of participation were developed to better understand group work. Analyzing individual group dynamics led to other guidelines, which are now being implemented for students include: groups chosen randomly with an even distribution of disciplines, groups being no larger than 5 (Johnson, 1994), weekly communication with client, and multiple site visits. Guidelines for facilitators are to provide more evaluations throughout the process and timesheets to track the interactions and locations of group meetings. The results of this study can be used as a baseline for future interdisciplinary projects that will incorporate these new guidelines.

Poster Number 89

ABSTRACT:

Abstract Title:	**Myosin Regulatory Light Chain Phosphorylation: A Potential Cardiac Coping Mechanism in Heart Failure**		
Presenter:	Jason Breithaupt		
Mentor:	Bertrand C.W. Tanner	**Campus:**	Pullman
Co-Authors:	Peter O. Awinda, Bertrand C.W. Tanner		
Major:	Neuroscience, Pre-Med/Dent Option; Basic Medical Sciences Plan A		
Category:	Molecular, Cellular, and Chemical Biology		

During exercise or heart failure the heart must attempt to increase the volume of blood it pumps (cardiac output). Myosin and actin are proteins that interact with one another to generate the force necessary for muscle to contract. Muscle contraction is driven by myosin hydrolyzing the energy rich molecule ATP and releasing its hydrolysis products ADP and phosphate. Another protein, myosin regulatory light chain (RLC), associates with myosin. It is thought that RLC modulates the myosin-actin interaction when a phosphate group is attached to RLC (RLC phosphorylation via myosin light chain kinase). We hypothesized that myosin attachment duration may increase with RLC phosphorylation, which could influence cardiac output. We tested this idea using rat papillary muscle strips and altering RLC phosphorylation via myosin light chain kinase treatment. Data from these strips was compared to non-treatment (control) strips. We measured myosin attachment duration as ATP concentration varied from 0.05-5 mM at a controlled muscle length, allowing us to calculate myosin's rate of ADP release and ATP binding. As ATP concentration increased myosin-actin attachment duration decreased for both the treatment and control groups, but attachment duration was ~30% longer for the treatment vs. control group at 5 mM ATP concentration (21.5 ± 3.1 vs. 16.4 ± 2.2 ms, $p<0.05$). Consistently, ADP release rate decreased ~30% with treatment (65.7 ± 8.8 s^{-1} vs. 47.8 ± 11.9 s^{-1}, $p<0.05$), and ATP attachment rate also reduced ~40% with treatment (489.5 ± 154.8 mM^{-1} s^{-1} vs. 288.1 ± 94 mM^{-1} s^{-1}, $p<0.05$). These decreases indicate an increase in overall time required for ADP dissociation and ATP association with myosin. These results support the hypothesis that RLC phosphorylation increases myosin-actin attachment duration which could be a molecular mechanism to increase cardiac output when needed.

Poster Number 90

ABSTRACT:

Abstract Title:	**Prototype Power Regulation System of Magneto-Optical Microtrap Lasers for Deterministic Preparation of Ultracold Few-Fermionic Systems**		
Presenter:	Justin Niedermeyer		
Mentor:	Vincent Klinkhamer	**Campus:**	Pullman
Co-Authors:	Vincent Klinkhamer*, Simon Murmann*, Andrea Bergschneider*, and Selim Jochim* (*Physikalisches Institut, Ruprecht-Karls-UniversitÃ¤t, 69120 Heidelberg, Germany)		
Major:	B.S. Physics, B.A. Music,and B.A. German for Professionals		
Category:	Engineering and Physical Sciences		

Recently developed technology allows for the preparation of systems consisting of a few interacting ultracold fermionic particles (such as Rubidium-87). This allows for the study of a few-body quantum system of which the ground state systems consisting of one to ten particles with ~90% fidelity by creating magneto-optical microtraps with narrowly separated, tightly focused lasers. However, the components of the research apparatus undergo thermal drifts when exposed to the laser light, as well as power fluctuations when varying the output of multiple microtraps. To correct this, a prototype control-loop system using a CCD camera sensor and a LabVIEW controlled analog voltage card was created, and the proof of its concept was demonstrated. This prototype system was able to correct power fluctuations on the order of 500 Hz, and continuing development with higher-quality equipment will bring the system to a desired fluctuation correction on the order of 1 kHz. Once this threshold is achieved, new systems of multiple microtraps will become feasible. This will allow for the highly accurate study of systems which may further the understanding of high-temperature superconductors and may lead to the realization of quantum computing and spintronics.

This work was completed as part of the German Academic Exchange Service's (DAAD's) Research Internships in Science and Engineering (RISE) Program, and was funded by the DAAD, the Physkalisches Institut der Universität Heidelberg, the Heidelberg Center for Quantum Dynamics, and the Honors College of Washington State University.

Poster Number 91

ABSTRACT:

Abstract Title:	**Reducing Risky Decision Bias with Feedback in Older and Younger Adults**		
Presenter:	Andelyn Bindon and Alexandra Hemphill		
Mentor:	John M. Hinson, Paul Whitney, Cristina Wilson	**Campus:**	Pullman
Major:	Psychology / Psychology, Human Development		
Category:	Social Sciences		

People of all ages are susceptible to biases in decision making, especially when the decision outcomes are uncertain or risky. Feedback from decision outcomes can reduce uncertainty and help to clarify risk, suggesting that providing outcome feedback may be effective in reducing bias in decision making. However, people of different ages may respond to feedback in different ways. For example, some research indicates that age-related changes in memory and learning could impair older adults' ability to use feedback. Other research suggests that older adults may have an enhanced emotional responsiveness to feedback, which could make feedback more effective. The goal of the current study was to assess the effectiveness of feedback in reducing framing bias, one of the most pervasive forms of decision making bias, in a risky decision making task. In addition, we were interested in determining whether feedback was equally effective in improving decisions for older and younger adults. We used the Framed Gambling Task (FGT), a computerized gambling game, to provide hypothetical risky choices. The FGT offers risky choices in the context of a framing bias and provides choice outcome feedback. During the FGT people can learn which choices are advantageous and which choices are disadvantageous and thereby reduce the impact of the pre-existing framing bias. In addition to actual choices made, the effectiveness of feedback was assessed through self-report estimations of average choice outcomes, reflecting what people had learned and remembered about their choices. Emotional responses to feedback were measured using skin conductance response (SCR), a simple and direct physiological measure of emotional arousal. Results showed that older adults were less able to use feedback to overcome framing bias, as demonstrated by their lower proportion of advantageous choices compared to younger adults. Older adults also had less accurate estimations of choice outcomes. SCR data showed that older and younger adults had similar emotional responses to good outcomes, but younger adults had increased responsiveness to loss. Findings from this study suggest older adults are not as efficient as younger adults in using feedback to reduce the impact of framing bias in risky decision making.

Poster Number 92

ABSTRACT:

Abstract Title:	**Assessment of Estrus Length, Follicular Dynamics and Pregnancy Rate in Beef Cattle following 5-day CO-Synch + CIDR Estrus Synchronization Program**		
Presenter:	Victoria Morrow		
Mentor:	Martin Maquivar	**Campus:**	Pullman
Co-Authors:	Edwards S., Allodi G., Webb S., Hemmer J., Bouland J., Parish S., and Maquivar M		
Major:	Animal Sciences		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

The development of estrus synchronization protocols that facilitate fixed time artificial insemination (FTAI) in beef cattle has resulted in variable pregnancy rates. This variability has been attributed to different factors such as expression of sexual behavior, and follicular dynamics. The objective of the present study was to evaluate the onset of estrus response, follicular growth and fertility using the synchronization program: 5 day-CO-Synch + CIDR protocol. The experiment was designed to test the hypothesis that pregnancy rate after FTAI may be improved by the expression of heat, follicular growth and follicle size at FTAI. One hundred and three females (81 mature cows and 22 heifers) averaging 601 ± 122 kg were synchronized with an intramuscular administration of 100 µg of GnRH and a controlled internal drug release (CIDR) at day 0. At day 5, the CIDR was withdrawn and two doses of PGF2α (25 mg) were administered via IM 6 hours apart. Animals were observed continuously after 24 hours from CIDR removal for any behavioral signs of heat, until 72 hours (day 8) when they were submitted to FTAI concomitantly with an administration of 100 µg of GnRH. Cows were evaluated through ultrasound at day 60 to diagnose pregnancy. Results were analyzed by ANOVA using a 2 x 2 factorial arrangement (Pregnancy status, either pregnant or not and expression of heat, either yes or no). The proportion of animals showing sexual behavior was 45% (46/103), and out of these 46 animals, 22% (10/46) did not get pregnant and 78% (36/46) resulted pregnant. The remaining 57 animals that did not show heat, 28% (16/57) were not pregnant and 72% (41/57) were pregnant. The length and the onset of estrus were similar among pregnant and open animals (~6 hours and ~33 hours respectively Non pregnant animals without estrus expression had the smallest follicle size at AI (P=0.04), however no differences were observed in follicular growth. In conclusion, the lack of response in cows submitted to a synchronization program can be related to a reduction in follicular size at FTAI and absence of estrus behavior.

Poster Number 93

ABSTRACT:

Abstract Title:	**Designing Universal North American Bird Primers to Identify the Species of Unknown Bird Remains Discovered in Prehistoric Native American Sites**		
Presenter:	Mitchell Go		
Mentor:	Dr. Brian Kemp	**Campus:**	Pullman
Co-Authors:	Dr. Brian Kemp, Dr. Christine Parents		
Major:	Biochemistry		
Category:	Molecular, Cellular, and Chemical Biology		

One of the quickest and easiest ways to identify faunal remains is through morphology. However, it is not always possible to use morphology alone to distinguish remains down to the species level. Such difficulties could be due to fragmentation of remains, alterations made to them in the past to make tools or art, or the remains could represent a deceased juvenile that has yet to developed species distinguishable morphological features. When this is the case, DNA barcoding may be a useful alternative tool for species identification. DNA barcoding is the idea that each species has its own, short, unique DNA sequence that can be used for identification. Using known North American bird cytochrome oxidase I (COI) sequences, our goal is to identify sequences of bird remains found in Native American sites.

Unfortunately, DNA from recovered ancient specimens will have undergone damage and degradation, resulting in short strand lengths. We designed an approach to be able to still utilize DNA barcoding to identify the species of the specimens. Using GenBank's library of bird COI sequences, we identified short regions (about 120 to 160 bps long) that had high variability between species of North American birds. Thus, four primer sets were designed (about 20 bps long) to flank both ends of these target regions. Unlike the target region, the primers should be designed to anneal to a region that had low variability between these same species. To design these primers, the three most common haplotypes of possible primer sequences were used to design a single primer set by conserving identical nucleotides at the same position, and using ambiguous nucleotides for sites that differed. For example, if ATC, ACC and ATC were the three most common sequences, the resulting sequence used would be AYC. Laboratory based experiments demonstrate that our approach works and combined with the extensive database of bird COI sequences, theoretically we can identify up to 80% of North American birds to the species level.

There are many applications for using this ancient DNA barcoding tool such as reconstructing site seasonality of prehistoric Native American tribes, forensic applications, or conservational purposes.

Poster Number 94

ABSTRACT:

Abstract Title:	**Localization of Binding Site for Leiomodin 2 in Striated Muscle Tropomyosin**		
Presenter:	Samantha Grover		
Mentor:	Dmitri Tolkatchev	**Campus:**	Pullman
Co-Authors:	Greg Helms, Alla Kostyukova, Dmitri Tolkatchev		
Major:	Bioengineering		
Category:	Molecular, Cellular, and Chemical Biology		

Leiomodin is a protein from the tropomodulin family that binds at the pointed (slow-growing) end of actin filaments. Leiomodin binding at the pointed end depends on the presence of tropomyosin. Tropomyosin is a coiled coil protein that binds and stabilizes actin filaments. N-terminal residues 1-14 of tropomyosin have been confirmed to interact with leiomodin 2, but we have data suggesting that the binding site includes more residues. To understand the molecular mechanism of leiomodin function, we need to determine the structure of the binding interface between tropomyosin and leiomodin. To solve the structure by NMR we use fragments containing the entire binding site. Tropomyosin fragments of various lengths have been subcloned and expressed in *E. coli*. These fragments of tropomyosin contain residues 1-14, 1-17, 1-21, 1-24, and 1-28. They have been purified using affinity and reversed phase chromatography. Identification of tropomyosin fragments was first done by native gel electrophoresis, and then confirmed by mass spectroscopy. The purified fragments have been used in NMR experiments.

Poster Number 95

ABSTRACT:

Abstract Title:	**Marxism and Stalinist Russia: Ideology, Practice, and Global Reception**		
Presenter:	Cooper Turberville		
Mentor:	Dr. Clif Stratton	**Campus:**	Pullman
Co-Authors:	Clif Stratton		
Major:	History, Political Science		
Category:	Humanities		

In “Marxism and Stalinist Russia: Ideology, Practice, and Global Reception,” Cooper Turberville argues that Josef Stalin’s quest to consolidate his political power and to transform largely agrarian Russia into a workers’ utopia styled after Marx’s vision of an industrial workers’ revolution not only failed in practice from the late 1920s through the early 1950s, but also significantly obscured and undermined the ideological credibility of Marx, Vladimir Lenin, and Red Army leader Leon Trotsky. The damage to the reputation of Communism occurred not just among many Soviets suffering under the bureaucratic collectivist policies of Stalin, but also on a global scale. In Western Europe and in the United States, as trade union’s reached zeniths of power during the global depression of the 1930s, corporate interests mobilized an all-out assault on labor. As press, government, and both academic and public intellectual accounts reveal, Stalinism became one of their most potent examples of the perceived dangers of socialism, even though the two were not equivalent. The totalitarian and imperialistic nature of Stalin’s rule further entrenched and gave salience to arguments about the dangers that government regulation and trade unions posed to democratic ideals and institutions. Even the American Socialist Party registered public critiques of Soviet Communism and of Stalin. Turberville reveals that despite the rise of détente in the 1970s and the collapse of the Soviet Union in the early 1990s, the legacies of Stalinism run deep in the American political psyche.

Poster Number 96

ABSTRACT:

Abstract Title:	**Effect of Methanogens and Acetogens on VFA Production using Mixed Bacterial Cultures**		
Presenter:	Sebastian Fernandez		
Mentor:	Birgitte Ahring	**Campus:**	Tri-Cities
Co-Authors:	Nanditha Murali & Birgitte Ahring		
Major:	General Biology		
Category:	Applied Sciences		

As the world's supply of fossil fuels dwindles, renewable forms of energy are becoming a necessity. These VFAs serve as important platform molecules, which can be catalytically upgraded to produce biofuels. In this study, we compared the effect of methanogens and acetogens on VFA production using mixed bacterial cultures on lignocellulosic biomass. Lignocellulosic biomass is an inexpensive, abundantly available renewable resource, which can be used for the production of VFAs by fermentation using rumen bacteria. A continuous fermentation system was set up to study the VFA yield was compared for both pretreated and non – pretreated biomass as substrates. Two different conditions were tested against the control. The control reactor contained all the bacterial consortia present in the rumen and to the second and third set of reactors, 2 – Bromo ethane sulfonic acid (BES) was added to selectively inhibit the methanogens while a homoacetogen *Acetitomaculum ruminis* was added only to the third reactor. Daily analysis including HPLC was done to assess the VFA yields and stability of the reactors. The reactor which contained *A.ruminis* yielded 0.6g of total VFA per gram of VS and the reactors without methanogens produced 0.4g of total VFA per gram of VS, when compared to the control which produced only 0.2g of total VFA per gram VS. This study showed that by inhibiting the methanogens in rumen fermentation, VFA yields can be increased, if the excess carbon and hydrogen can be channeled towards higher VFA production. Since the need for renewable energy is increasing, commercial production of volatile fatty acids from lignocellulosic biomass, can pave way for increased biofuel or jet fuel production for lower production costs.

Poster Number 97

ABSTRACT:

Abstract Title:	**Differences in Emotional Processing of Monetary Gains and Losses in Older and Younger Adults.**		
Presenter:	Iris Charlotte Koning and Joelle Martin		
Mentor:	John M. Hinson, Paul Whitney, Cristina Wilson	**Campus:**	Pullman
Co-Authors:			
Major:	Psychology / Neuroscience		
Category:	Social Sciences		

Previous research indicates that older adults may process emotional information differently than younger adults in many contexts. For example, older adults often show a positivity effect, i.e., enhanced responsiveness for positive emotional stimuli and decreased responsiveness for negative emotion stimuli. Much work on this topic has used the Monetary Incentive Delay (MID) task, which is designed to analyze distinct psychological components of the experience of gains and losses of money. On each trial of the MID people are presented with a cue detailing a hypothetical amount of money they can win or lose, and are later given a target which requires a speeded response to either win the amount of money or avoid losing the amount of money specified by the prior cue. On different trials people are asked to rate emotional arousal or rate emotional valence associated with the gain or loss. Furthermore, people are sometimes asked to make a rating before the gain or loss occurs, and sometimes after the gain or loss occurs. Thus, the MID provides direct ratings of emotional arousal and emotional valence associated with the anticipation of gains and losses and with the outcomes of gains and losses. However, the MID has never been used in concert with a direct, physiological measure of emotion. The purpose of our study was to examine results from the MID task in older adults and younger adults while also measuring skin conductance response (SCR), a simple and direct measure of emotional responsiveness. Our MID results with older and younger adults were comparable to those from prior research. That is, relative to younger adults, older adults had decreased cue ratings and had lower ratings of loss outcomes compared with gain outcomes. SCR results showed that younger adults had strong affective responsiveness to both trial cues and outcomes, while older adults showed limited affective responsiveness to cues and a biased affective responsiveness to outcomes that were gains. The alignment of MID ratings and SCR measures of emotional responsiveness supports the conclusion that older adults and younger adults process emotional information differently in the experience of monetary gains and losses.

Poster Number 98

ABSTRACT:

Abstract Title:	**Screening Wheat Stem Rust Genes for Hypersensitive Response Suppression**		
Presenter:	Cody Dean		
Mentor:	Scot H. Hulbert, Sowmya Ramachandran	**Campus:**	Pullman
Co-Authors:			
Major:	Agricultural Biotechnology		
Category:	Molecular, Cellular, and Chemical Biology		

Stem rust (*Puccinia graminis*) is a devastating fungus that infects wheat, barley, and barberry plants, which results in large sums of lost revenue due to a reduction in cereal crop yields. Since *P. graminis* only infects living organisms, it can be hypothesized that the fungus carries proteins that overcome the plant's natural defense mechanisms. Using *Agrobacterium tumefaciens* and techniques of molecular genetics, *P. graminis* genes were screened for the ability to suppress an induced hypersensitive response (HR) in tobacco plants. This HR normally occurs during infection as a natural host plant defense mechanism. The typical HR plants undergo is programmed cell death to stop further colonization of the pathogen. The proteins that act as HR suppressors are necessary for fungal infection, because of how they contribute to the suppression of the host immune response. A strain of *A. tumefaciens* containing the ability to induce a HR in plants provided the capability of screening for *P. graminis* proteins that are able to suppress such a defense response. The screening method used in this study illustrated the specific P. *graminis* proteins responsible for the HR suppression observed during infection. However, additional studies need to be conducted to validate the results. Twenty-nine largely uncharacterized proteins that are produced by *P. graminis* were selected from the Broad Institute *P. graminis* database. Of the twenty-nine selected proteins, eight were successfully transformed into *A. tumefaciens* in the form of DNA containing genes. Five of the eight *P. graminis* genes that were able to be screened showed suppression of a HR in tobacco leaves when the HR was induced twenty-four hours after the *P. graminis* gene were transformed into the leaf tissue. However, zero of the twelve genes transformed into *A. tumefaciens* showed suppression when simultaneously introduced with the HR causing *A. tumefaciens,* rather than waiting twenty-four hours to induce the HR. If the *P. graminis* proteins/genes responsible for the suppression of the host HR can be identified, methods of interrupting their function can be implemented to hinder fungal colonization and help control the detrimental wheat rust disease.

Poster Number 99

ABSTRACT:

Abstract Title:	**The Transmembrane Domain of Prostate Specific Membrane Antigen: Deciphering the Role of the Small-XXX-Small Motif in Oligomerization**		
Presenter:	Brianna Berg and Jack Hyder		
Mentor:	Dr. Jonel Saludes	**Campus:**	Pullman
Co-Authors:	Jack Hyder		
Major:	Biochemistry / General Biological Sciences		
Category:	Molecular, Cellular, and Chemical Biology		

Prostate cancer (PCa) is the second leading cause of cancer-related deaths among males in the United States. The prevalence of this disease and the benefits associated with early detection and treatment call for closer investigation into potential biomarkers and therapeutics targets. The high expression of the integral membrane protein called prostate specific membrane antigen (PSMA, EC 3.4.17.21) is implicated in PCa invasiveness as well as neovasculature metastasis of nonprostatic solid tumors. Little is known about the exact role of PSMA in PCa progression albeit it is one of the most validated biomarker for the diagnosis and detection of PCa. We have demonstrated that the isolated PSMA transmembrane domain (TMD) is capable of oligomerization under reducing gel electrophoresis conditions, interacting independently of extracellular domain dimerization. Following this discovery, we proceeded to determine the factor(s) responsible for its oligomerization. Since it is known that certain motifs are critical for TMD oligomerization of many transmembrane proteins, we hypothesized that the *Small*-XXX-*Small* motif in PSMA TMD may play a role in the oligomerization of PSMA. Thus, to gain insight into the assembly of PSMA and the factors responsible for this assembly, we investigated if mutations at this TM motif will disrupt TM oligomerization. Our initial studies revealed that PSMA TMD has two repeat units of the *Small*-XXX-*Small* motif shown as bolded letters: WLCAG**ALVLA**GGFFLL**GFLFG**WFI. This motif is known to be crucial in inducing a strong peptide self-assembly, analogous to the bitopic protein Glycophorin A. Also examined was the cysteine residue, which was mutated to alanine, because of its potential to form a disulfide crosslink. We synthesized the PSMA TMD mutant peptides using Biotage Alstra microwave peptide synthesizer, purified by high performance liquid chromatography, and characterized by MALDI-TOF mass spectrometry to establish homogeneity. An SDS-PAGE gel shift assay was then performed to profile the oligomerization propensity of these mutant TMD peptides.

Poster Number 100

ABSTRACT:

Abstract Title:	**Learning at Home: Socio-Demographic Differences in the Home Learning Environment and its Influence on Academic Achievement at the Beginning of Head Start**		
Presenter:	Colleen Chalmers		
Mentor:	Dr. Brittany Rhoades Cooper	**Campus:**	Pullman
Co-Authors:			
Major:	Psychology, Human Development		
Category:	Social Sciences		

Research shows that the home learning environment is associated with children's academic outcomes; however, less research has been conducted about how the relationship between the home learning environment and children's academic achievement differs by various socio-demographic variables including ethnicity, language spoken at home, and maternal education. Through my research I learned which socio-demographic variables have the largest influence on the relationship between the home learning environment and a child's academic achievement. The data set I used for my research is the FACES (Family and Children's Experiences Study) 2009 cohort study, which includes a sample of 3,400 children and their families from across the country who attended Head Start programs. By using data from Head Start students, I have eliminated the impact of poverty status, as all students in the sample are from a low-income family.

First, using t-tests and chi-squares, I examined if there were differences between socio-demographic subgroups in the home learning environment. I found that three of the four socio-demographic variables measured were significantly related to at least 13 of the 16 variables measuring the home learning environment. A series of hierarchical multiple regression models were then run to examine the unique contributions of the home learning environment in predicting academic outcomes, above and beyond the influence of the socio-demographic variables. Overall, the results showed that two out of the seven measured home learning environment variables were significantly related to five of the six measured academic outcome variables. Finally, to test for which socio-demographic variables moderated this association, I added the interactions between home learning environment and each of the socio-demographic variables as predictors of academic outcomes. I found significant interactions for the time spent reading/being read to and the mother's level of education, the time spent reading/being read to and the mother's race/ethnicity, and the number of children's books in the household and the mother's race/ethnicity. Results suggest that the association between these aspects of the home learning environment and academic outcomes differed by race/ethnicity and education level of the mother.

Poster Number 101

ABSTRACT:

Abstract Title:	**The Falling Number Project**		
Presenter:	Carissa Corrigan		
Mentor:	Arron Carter	**Campus:**	Pullman
Co-Authors:	Dr. Arron H. Carter, Dr. Michael O. Pumphrey, Dr. Camille M. Steber		
Major:	Agriculture Education		
Category:	Applied Sciences		

Alpha amylase activity in wheat flour can cause starch damage in wheat cultivars. The purpose of this project was to assess levels of sprout damage within wheat varieties in specific locations. Results allow producers to make educated decisions when choosing varieties to combat sprout damage. The process of gaining the "falling number" of a flour sample consists of several steps. The flour sample is made into a slurry with water within a test tube, the sample is shaken until thoroughly mixed, a stirrer is inserted into the tube and the sample is placed into the falling number machine. The number of seconds it takes for the stirrer to reach the bottom of the now gelatinous slurry is the falling number. A sample resulting in a falling number of 300 is ideal while a sample below 300 can result in producers receiving discounts per bushel at the grain elevator when selling their product. Rain induced falling number problem locations within winter wheat include Fairfield, Pullman, St. John, Reardon and Lamont. Within spring wheat, problem locations include Fairfield and St. John.

Poster Number 102

ABSTRACT:

Abstract Title:	**The Genetic Basis for Heteromorphic Self-Incompatibility in Primula Vulgaris**		
Presenter:	Allie Robinson		
Mentor:	Andrew McCubbin	**Campus:**	Pullman
Co-Authors:	Andrew McCubbin, Benjamin Burrows		
Major:	Biology		
Category:	Molecular, Cellular, and Chemical Biology		

The goal of this project was to find the genetic basis for heteromorphic self-incompatibility in a flower called *Primula vulgaris*. Heteromorphic means that there are differing flower types, and in this case, they will be called male, or thrum, and female, or pin. Self-incompatibility means only differing flower types can produce offspring. The research was done in two ways. The first approach was screening regions of DNA called introns for length differences between the male and female plants. All regions were found to be similar lengths, so the research shifted to a different strategy. The second approach was SNP screening. SNPs are Single Nucleotide Polymorphisms, single base pairs of DNA in certain locations that have changed or mutated. These specific SNPs seemed linked to the genomic region responsible for heteromorphic self-incompatibility in *Primula* based on computer analysis. One SNP in particular was tested and found to be inherited only in male plants, indicating that it may be in an important region of DNA for the maleness trait. A Bacterial Artificial Chromosome library, an organized system for keeping sections of a genome safe over a long period of time so they can be reused, was then screened for DNA near the SNP's location. The screening was successful and sections of DNA were found that cover an estimated 50,000 base pairs, all of which may be linked to heteromorphic self-incompatibility in *Primula vulgaris*. Further testing is needed to ascertain whether these regions are linked, but these results make an appreciable contribution toward discovering the genetic basis for heteromorphic self-incompatibility in *Primula vulgaris.*

Poster Number 103

ABSTRACT:

Abstract Title:	**De Originibus Rerum: A Comparative Analysis of Ancient Greek and Hebrew Cosmogonies**		
Presenter:	Joshua Johnson		
Mentor:	Dr. Robin Bond	**Campus:**	Pullman
Co-Authors:			
Major:	History, General Certificate in Organic Agriculture		
Category:	Humanities		

This project is a comparative analysis of ancient texts written in Hebrew and in Greek about the origins of the world. These texts are cosmogonic in nature, that is, they contain narratives of the origins of the cosmos. The Greek texts under consideration are the poems of the ancient Greek epic poet Hesiod (*c*. 750 – 650 BCE), specifically his poems *Theogony* and *Works and Days*. The Hebrew texts under consideration are the initial chapters of the Book of Genesis, which was later collected and canonized into the Hebrew/Jewish Scriptures, the *Tanakh*. For centuries, the study of these texts—Genesis and Hesiod's poems—have been relegated to separate disciplines, Biblical studies (or Near Eastern studies, depending on how the scholar classifies the biblical texts) and Classical studies, respectively. The present analysis builds on the recent work of Classical scholar Carolina López-Ruiz, who argues that "archaic Greek cosmogony and myth can no longer be understood in isolation from their Near Eastern counterparts."

The project consists of examining these works for similarities and differences in their descriptions of how the world first came to be – in particular, their narrative organization, mythological themes and motifs, and functional purposes, among other things. The texts will be analyzed through a close reading in their original languages, Hebrew and ancient Greek, with English translations of cited passages. The historical background of the respective works will be discussed using secondary scholarship and will help explain the differences and the similarities between the Greek and Hebrew cosmogonies. Hypotheses for thematic similarities include a common cultural background of the texts, transfer of ideas from one culture to another, or coincidence, while explanations of differences include the unique cultural milieu to which each text belonged and the purposes of their respective composition. The significance of this project is to further the recent efforts by scholars such as López-Ruiz who seek to advance an academic bridge between these disciplines that have for centuries been viewed as disparate. The project not only analyzes the works in depth, but provides an historical explanation for the findings.

Poster Number 104

ABSTRACT:

Abstract Title:	**Consequences of Surface Treatments on the Tribocharging of Polytetrafluoroethylene**		
Presenter:	Mats Johnson		
Mentor:	Tom Dickinson	**Campus:**	Pullman
Co-Authors:	J T Dickinson		
Major:	Mathematics, Physics		
Category:	Engineering and Physical Sciences		

Contact electrification is a well-known effect. It is commonly experienced on a day to day basis and can be seen in "party tricks" such as sticking balloons to walls. Tribology, the science of friction, is an area that has been extensively studied through the years because of numerous applications (e.g., your tires on the road). Triboelectric charging involves the transfer of charge between two surfaces due to contact and rubbing. Our efforts focused on the effect surface treatment and composition has on the acquisition and retention of charge introduced by triboelectric charging in the common insulating polymer, Teflon [polytetrafluoroethylene (PTFE)]. To this end, we compared the magnitude of charge between various surfaces and surface compositions of PTFE. Of particular interest is:

- Identification of the relevant charge carrier transferred to the polymer surface
- how the surface treatments influence the magnitude of charge transfer
- the retention of charge vs. time
- the sensitivity of neutralization of the surface to exposure to ultraviolet light,
- and finally, the influence of extreme plastic deformation of PTFE films on the intensity of the observed tribocharging.

In brief, all of these factors significantly influenced the uptake and removal of charge from the PTFE surfaces. Explanations of the observed dependencies involving the charging sites created by bond breaking and changes in the contact area will be presented.

Poster Number 105

ABSTRACT:

Abstract Title:	**A New Iron-Enhanced Compost for Stormwater Treatment**		
Presenter:	Jonathan Abarca		
Mentor:	Zhenqing Shi	**Campus:**	Pullman
Co-Authors:	Zhenqing Shi, Jeff Boyle, James Harsh		
Major:	Fruit and Vegetable Management, Biology		
Category:	Engineering and Physical Sciences		

Both lead and phosphates in stormwater water can have detrimental effects to humans and the aquatic life. Phosphates can accumulate in stormwater from the breakdown of pesticides and runoff from farms. Heavy rainfall can further stimulate phosphates to wash from farm soils into waters. Lead can be released from old lead-paint, old plumbing systems and PVC pipes which can lead to fatigue, nerve and kidney damage, and anemia. In this study we evaluated an innovative iron-compost for the treatment of lead and phosphorous by adsorbing the contaminants and thus preventing them from leaching to the water. To accurately assess the kinetics of the contaminant adsorption to the Fe-compost, stir flow experiments were conducted with varying concentrations of contaminants and flow rates. All results demonstrated that Fe-compost has a high Pb adsorption capability. We also assessed the capability of various Fe-compost samples in adsorbing the contaminates. Overall, the Fe-compost samples demonstrated superior adsorption capability and can possibly be used as a bioretention media for stormwater treatment.

Poster Number 106

ABSTRACT:

Abstract Title:	**The Influence of Perceived Parental Support for Higher Education on Confidence and Success in Higher Education**		
Presenter:	Crysta Cady		
Mentor:	Joyce Ehrlinger	**Campus:**	Pullman
Co-Authors:	Joyce Ehrlinger		
Major:	Psychology		
Category:	Social Sciences		

The present research aims to explore how student's perceptions of their parents' attitudes towards higher education influences their confidence their abilities to succeed in higher education. This study focuses on two main groups: minority college students versus non-minority college students. For this study, minority students are defined as both students of color and first-generation students. First-generation students are those whose parents did not attend college or obtain a college degree. A descriptive survey methodology was used. The survey was administered online through a university database. The survey was designed to measure areas such as adjustment to college, perception of parental support, household information, confidence in abilities, and overall college experience. It is predicted that non-minority students would perceive themselves as having higher parental support in their education compared to minority students, thus having higher confidence in their abilities, which in turn would lead to a more positive college experience. It is also predicted that non-minority students would perceive having less parental support causing a more negative college experience due to the lack of knowledge that their parents have about the process of higher education.

Poster Number 107

ABSTRACT:

Abstract Title:	**Drosophila Stimulator of Inteferon Genes (dSTING) Mediates an Innate Immune Response Following Intracellular Infection**		
Presenter:	Miles Linde and Marina Martin		
Mentor:	Alan Goodman	**Campus:**	Pullman
Co-Authors:	Aoi Hiroyasu, Alan Goodman		
Major:	Biochemistry (Molecular Biology), Philosophy / Biochemistry (Molecular Biology), Pre- Medicine		
Category:	Molecular, Cellular, and Chemical Biology		

Drosophila melanogaster, better known as the fruit fly, has an innate immune system that lends itself to studying the growth of bacteria over time. They are a "powerful model organism for biological research" (Roote J and Prokop A, 2013). In this study, *Listeria monocytogenes*, an invasive Gram-positive bacterium, was used to study bacterial growth and replication following thoracic injection of *Drosophila*. This bacteria is an intracellular microbe that causes food borne diseases, including Listeriosis, and is a pathogenic within the human population (Zébré AC, 2015). During *Listeria* infection, cyclic dinucleotides are secreted as part of the life cycle (Burdette DL, et al, 2011). These molecules are sensed by STING (stimulator of interferon genes), which is responsible for interferon induction following infection with DNA pathogens such as *Listeria* or viruses (Ishikawa H, et al, 2009). While STING was discovered in mammals and shown to be a critical signaling component of the innate immune response, we have identified a homolog in *Drosophila* (termed dSTING). We hypothesize that this evolutionarily conserved protein plays a role in the *Drosophila* innate immune response. Deletion of dSTING promoter regions elements been generated to confirm the role of dSTING in regulating the production of antimicrobial peptides in response to intracellular infection. qRT-PCR and Western Blot analysis reveal diminished transcript levels of the dSTING gene and reduced dSTING protein in these deletion lines. It is postulated that *Listeria* infection of these flies will result in markedly reduced survival and thus elucidate the essential role of dSTING in the regulating the innate immune response to intracellular infection through production of antimicrobial peptides.

Poster Number 108

ABSTRACT:

Abstract Title:	**Acute Antinociceptive Tolerance to Hyperbaric Oxygen (HBO2) In Opioid-Pretreated Mice**		
Presenter:	Jordan Nelson		
Mentor:	Raymond M. Quock	**Campus:**	Pullman
Co-Authors:	Yangmiao Zhang, Donald Y. Shirachi, Raymond M. Quock		
Major:	General Medical Sciences, PharmD		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Hyperbaric oxygen (HBO_2) therapy produces analgesia in various painful conditions in humans and antinociception in a series of animal models of pain. We have previously demonstrated that a non-selective opioid receptor antagonist naloxone antagonized the acute antinociceptive effect of 11-min HBO_2 treatment [Ohgami *et al*., *NeuroReport*, 2009], the prolonged antinociceptive effect of a single 60-min HBO_2 treatment [Zelinski *et al*., *J Pain*, 2009]. Recently, we showed evidence that mice rendered tolerant to opioids were cross-tolerant to HBO_2 [Zhang *et al.*, *Euro J Pain*, 2014]. These findings indicated the activation of the opioid receptors in HBO_2 antinociceptive mechanism. The aim of this study was to determine whether mice pretreated with opioid agonists would exhibit an acute reduction of antinociceptive responses to HBO_2. Male NIH Swiss mice received a subcutaneous injection of the -opioid receptor agonist fentanyl or an intraperitoneal injection of the -opioid receptor agonist (-)-U50488H as the pretreatment. Mice receiving saline injection served as vehicle control group. Four hours later, mice received either an analgesic dose of fentanyl or (-)-U50488H, or a 30-min HBO_2 treatment at 3.5 ATA. Sixty min after the completion of HBO_2 treatment, the antinociception was then assessed by 0.6 % acetic acid-induced abdominal constriction assay. The results showed that mice receiving fentanyl or (-)-U50488H pretreatment exhibited reduced antinociceptive responses to fentanyl or (-)-U50488H respectively, indicating the development of acute tolerance to opioid agonists shortly after a single pretreatment. Mice receiving fentanyl pretreatment also showed reduced antinociceptive response to HBO_2, suggesting acute cross tolerance. However, mice receiving (-)-U50488H pretreatment did not exhibit reduced antinociceptive response to HBO_2, suggesting that mice were not acutely cross tolerant to HBO_2. These results indicated that both - and -opioid actions are involved in the mechanism of HBO_2-induced antinociception, but the acute pretreatments of -opioid agonist has a different effect on HBO_2 mechanism than the chronic pretreatment or -opioid agonist. (This research was supported by NIH Grant AT-007222 and the Allen I. White Distinguished Professorship at Washington State University.)

Poster Number 109

ABSTRACT:

Abstract Title:	**Impact of the Hardness Locus on Milling Properties and Flour Quality of Durum Wheat (*Triticum Turgidum*)**		
Presenter:	Jessica Murray		
Mentor:	Dr. Craig Morris	**Campus:**	Pullman
Co-Authors:	Alecia Kiszonas, Craig Morris		
Major:	Food Science, Hospitality Business Management		
Category:	Applied Sciences		

Humans have been consuming wheat (*Triticum aestivum*) for more than 17,000 years, and it is still one of the most important food crops in the world. In 2013, 713 million metric tons of wheat were produced worldwide. Durum wheat (*Triticum turgidum*) produced only 35 million metric tons, and is predominately milled into semolina. Semolina, lacking the versatility of traditional flour, is used primarily in the production of pasta. Durum is milled into semolina due to the extreme hardness of the kernels. The puroindoline genes, responsible for kernel softness in common wheat, were introduced into two different varieties of durum, via non-GMO means. The resulting varieties, Soft Svevo and Soft Alzada, were milled into flour on three separate mills and at different temper levels. Samples of Svevo, a durum wheat, Xerpha, a soft white winter wheat, and Expresso, a hard red spring wheat, were included in the study as comparisons. Soft Svevo and Soft Alzada exhibited hardness ratings lower than that of the durum variety, Svevo, as well as the common soft wheat, Xerpha. The objective was to determine what impact the introgression of the softness genes had on the milling properties of these soft durum varieties. The flour produced from Soft Svevo and Soft Alzada was subsequently evaluated for milling and flour quality. Break flour is of a higher quality than subsequent reduction flour produced, making a high break flour yield desirable. Soft Svevo and Soft Alzada had high break flour yields similar to the common wheat samples and greater than the durum sample. The quantity of damaged starch is related to the water absorption of the flour, as well as the ability of enzymes to act on the starch. Lower starch damage values are desired in cookies and pastry products whereas slightly greater starch damage is acceptable in bread flours. The percentage of damaged starch was lower for Soft Svevo and Soft Alzada than in the common wheat varieties, for every treatment. Overall, Soft Svevo and Soft Alzada were exhibited milling properties and flour quality comparable, if not superior, to that of common soft wheat.

Poster Number 110

ABSTRACT:

Abstract Title:	**Lessons Learned: Implementing and Evaluating Rural Summer Robotics Camps**		
Presenter:	Michelle Burns		
Mentor:	Janet Schmidt	**Campus:**	Pullman
Co-Authors:	Janet Schmidt, Jaymie Vandagriff and Rayna Sage		
Major:	Agricultural Education		
Category:	Social Sciences		

While designing, implementing and evaluating rural robotics camps, our interdisciplinary team made it a point to reflect throughout the process. This program delivery paper was borne of our reflections and observations, and therefore will center on ideas that worked. The four areas that will be addressed are facilitators, campers, camp and curriculum.
With two undergraduate facilitators from different disciplines, our team was able to critically reflect on observations made. When students were unable to achieve tasks, a human development intern might ask “Is this a developmentally appropriate task for them?” while an education intern might wonder “Would scaffolding the learning better enable students to be more successful?” These diverse perspectives informed a great deal of the successes identified.
Campers previous experiences factored into their ability to work and collaborate as a team. Teamwork was smoother for groups who had experience with each other and with similar tasks requiring teamwork. Furthermore, age was observed as having a significant impact on camper’s success. Students who were developmentally below their peer struggled to contribute to the team in a meaningful way but thrived in their ability to attempt unique ideas and work one-on-one with adult mentors. While incorporating younger students into these camps was not a detriment to them, all campers would benefit from engaging with students who are developmentally similar in their mental capacity.
Characteristics of camp delivery that promoted success included preparing facilitators ahead of time for campers’ demographics, utilizing small groups of 2-3, and separating the work space from the snack and evaluation space.
To improve future camps, program designers and facilitators should work closely to construct learning activities that closely align with the stakeholders’ goals and program objectives. Taking great care in constructing the curriculum will allow for more effective program delivery and program evaluation. Opportunities for experiencing success early in the process will help develop student buy in and should be included in all future camps.

Poster Number 111

ABSTRACT:

Abstract Title:	**Evaluation of Efficacy of Avian Egg-yolk Derived Antibodies (IgY) against *C. jejuni* Colonization of Human Intestinal Epithelial Cells**		
Presenter:	Zachary Bailey		
Mentor:	Devendra Shah	**Campus:**	Pullman
Co-Authors:	Devendra Shah		
Major:	Zoology		
Category:	Molecular, Cellular, and Chemical Biology		

Hypothesis: My hypothesis for this study is that avian egg-yolk derived anti-*Campylobacter jejuni* colonization-associated proteins (CAP) will be efficacious in reducing the ability of *C. jejuni* to adhere to and internalize in human intestinal cells.

Abstract:

Campylobacter jejuni is an important cause of food-borne gastroenteritis in human causing >1 million cases each year in the United States alone. Infection is generally characterized by either mild self-limiting diarrhea or in some cases haemorrhagic diarrhea. Severe cases are generally treated with antibiotics. However, antibiotic resistance has become increasingly common in *C. jejuni*. With the increasing trend in antibiotic resistance in bacterial pathogens, non-antibiotic alternative treatment or prevention methods for bacterial infectious diseases are of interest and could be of value to treat food-borne infections such as campylobacteriosis. In the last two decades, researchers have identified several *C. jejuni* proteins, also known as colonization associated proteins or CAPs, that are important for intestinal colonization, i.e. binding and internalization of *C. jejuni* in intestinal cells. To test above hypothesis, I will use anti-*C. jejuni* colonization-associated protein (CAPs)-specific antibodies (IgY) that were produced previously by hyperimmunizing hens with seven different recombinant CAPs. The purpose of this study is to evaluate if these anti-*C. jejuni* antibodies derived from highly-immunized egg-yolk product will effectively reduce or neutralize the ability of *C. jejuni* to adhere to and/or internalize in human intestinal cells. I will conduct series of experiments using cultured human intestinal epithelial cells (Caco-2 cells). Caco-2 cells will be grown using standard cell culture media whereas *C. jejuni* will be grown in nutrient rich laboratory media. Caco-2 cells will be treated with individual and combination of seven different IgYs before or after infection with *C. jejuni* and tested for binding and internalization. One group of cells will serve as a positive control, receiving bacteria but no treatment; one group of cells will be a negative control receiving the media without bacteria and one group of cells will receive non-specific IgY (treatment control). I expect to see a significant reduction in the mean colonization of human cells treated with IgY derived from highly immunized egg-yolk product versus those not treated. A statistically significant reduction in colonization would suggest that these antibodies could be useful as a treatment or preventative measure against *C. jejuni* infection in human.

Poster Number 112

ABSTRACT:

Abstract Title:	**Determining Rate of δ15N Change in Three Common Lichen Species with Shifts in the δ15N of Source Nitrogen**		
Presenter:	Scott Mitchell		
Mentor:	R. Dave Evans, Sarah Anderson	**Campus:**	Pullman
Co-Authors:	Sarah Anderson, R. Dave Evans		
Major:	Biology (Ecology and Evolutionary Biology Option)		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Nitrogen deposition in forested areas has significant consequences on ecosystem health. Since lichens do not have a cuticle, they readily assimilate atmospheric nitrogen and have been used as a reliable bioindicator of total nitrogen deposition. Although total nitrogen concentration in lichens is a good indicator of atmospheric nitrogen, it lacks the ability to distinguish between sources of nitrogen pollution. Nitrogen isotope composition ($\delta^{15}N$) can reveal sources of N deposition since urban and agricultural sources differ in their isotope values. Our hypothesis was that lichen species would rapidly reflect changes in source $\delta^{15}N$ values. We used aqueous solutions containing both ammonium (NH_4^+) and nitrate (NO_3) where one of the N species was labelled with ^{15}N in order to determine the rate at which $\delta^{15}N$ values for the lichen tissues will reflect changes when $\delta^{15}N$ of source nitrogen is changed. Treatments were applied to samples of three lichen species: *Alectoria sarmentosa*, *Letharia vulpina*, and *Platismatia glauca*, in a misted spray. The control group was only sprayed with nanopure deionized water. After one week, treatment groups sprayed with labelled N showed significant increases in their $\delta^{15}N$ values. *A. sarmentosa* showed an average increase of +21‰ (P=0.003) when treated with labelled NH_4^+ and an increase of +57‰ (P=0.02) when treated with NO_3^-. The reduced treatment of *L. vulpina* showed increases of +20 (P=0.005), and *P. glauca* showed increases of +22‰ (p=0.02) in the oxidized treatment and +45‰ (P=0.02) for reduced treatments. The only treatment group to show an insignificant increase was the oxidized treatment of *L. vulpina* with an increase of +20‰ (P=0.1). All of the control groups showed no significant changes in $\delta^{15}N$. This suggests that lichens will reflect changes in nitrogen deposition in a particular area relatively rapidly, increasing their value as bioindicators. The different responses of lichen species to reduced and oxidized nitrogen could be used to more finely track sources of nitrogen deposition in remote areas, and increase the accuracy of deposition models.

Poster Number 113

ABSTRACT:

Abstract Title:	**Studying the Effects of Heat Treatment of Nuclear Steel on Magnetic Barkhausen Noise**		
Presenter:	Muad Saleh		
Mentor:	Prof. John McCloy	**Campus:**	Pullman
Co-Authors:	Prof. John McCloy		
Major:	Materials Science and Engineering		
Category:	Engineering and Physical Sciences		

Non-destructive evaluation (NDE) methods are needed to ensure the integrity of new and existing nuclear reactors. One such method of interest to the nuclear industry due to its potential to be used for real-time and low cost NDE is known as Magnetic Barkhausen Noise (MBN). MBN measurements have the potential to detect irradiation-induced degradation, such as embitterment, corrosion, and cracking, in nuclear reactor structural materials before they become catastrophic failures. Further, MBN can be related to mechanical properties such as hardness. MBN methods are used to inspect ferromagnetic materials, such as iron and steel, consisting of domains where the atomic poles are aligned in the same direction. In the process of being magnetized, these materials undergo a process where boundaries between domains, called walls, move through the material and store the magnetic field energy in their configuration. This magnetization process is not smooth, but rather discontinuous, as defects in the material inhibit domain walls from moving until a critical magnetic field causes them to break free. This results in a release of energy which can be measured using a coil wrapped around the sample. The magnetization change results in an induced an electrical signal in the wire, which provides the signal for the MBN.

In this work, a system was developed to measure the MBN on steel samples. The measurement procedure and post-processing of MBN is discussed for two steel compositions. The first steel system inspected was Fe-1% Cu, and MBN measurements were performed on samples heat treated using different conditions. The MBN results are then related to mechanical hardness and magnetic hysteresis measurements, in order to study the effect of Cu precipitate size and distribution on the MBN. The second steel system was HT-9 steel which is a high Cr ferritic/ martensitic alloy that is of interest to the nuclear industry. HT-9 samples heat treated at different condition were measured with the developed sensor to study the effect of heat treatment and martensitic microstructure on MBN.

Poster Number 114

ABSTRACT:

Abstract Title:	**Have You Ever Imagined being in an Office Without a Window? Biophilia Immersion - Embracing Nature in Workplace Designs**		
Presenter:	Cori Jou		
Mentor:	Kathleen Ryan	**Campus:**	Pullman
Co-Authors:			
Major:	Interior Design		
Category:	Arts and Design		

Problem statement
An office atrium space provided daylight but was closed due to a building expansion. The construction left an empty, somber view from the office windows. The atrium formerly provided a view reflecting weather and seasons—this experience, allowed people to regenerate and contribute to their productivity (Wilson, 1984; interview-survey, 2013). The design challenge was to bring the space to life again by creating a common area for innovation and collaboration.

Background
Two theories of human behavior are applicable to this situation; biophilia and Attention Restoration Theory. E.O. Wilson hypothesized biophilia as, "the innately emotional affiliation of human beings to other living organisms" (Wilson, 1993, 31). Attention Restoration theory indicates that mental fatigue occurs when working with intense concentration (Kaplan, 1995, 2001). Several studies have shown that window views of nature highly contribute to employees well-being, restorative ratings, and overall life satisfaction (Furmkin, 2001; Lottrup et al, 2013). View of nature has been identified as a stress reducer (Kaplan, 1993). This literature strengthens the importance of connecting workplace designs to biophilia.

Method
Atrium office users answered 19 open-ended questions related to preferences of office setting and previous atrium experiences. The interviews provided a deeper understanding of how each occupant felt about the building changes, and how it affected their productivity. A majority of the respondents who experienced the transition from a natural view to darkness reported a desire for daylight.

Discussion
The design proposal reflected the atrium's previous access to nature. The proposed design incorporated a symbolic natural environment to compensate for biophilic deficiency. The simulation of weather and seasonal changes was provided through ceiling panels that mimics cloudy skies, and emulates the passing of time from morning to night. The proposed atrium will serve as a common space where elements associated with nature provide inspiration and refreshment.

Conclusion
Designs considering biophilia brought the feeling of nature back into the atrium space and created a connection to the outdoors. Office users will have a view of an animated naturescape to look at. There are great opportunities for people to collaborate in this space and seek inspiration from biophilic experiences.

Poster Number 115

ABSTRACT:

Abstract Title:	**The American White Racial Frame Effect on Afro-Cubans' Racial Location in Post-Cuban Revolution Cuba**		
Presenter:	Christina Sessoms		
Mentor:	Dr. Lisa Guerrero	**Campus:**	Pullman
Co-Authors:			
Major:	Comparative Ethnic Studies		
Category:	Humanities		

This article examines the effect of the white racial frame emitted through American diplomacy in the Cuban Revolution and how it affects the racial location of Afro-Cubans in Cuba. With a two-tier racial system, whiteness is placed at the top of the racial hierarchy, prompting a white elitist sector of Cuban society to oppress Afro-Cubans. It is argued that Afro-Cubans experience racism and discrimination through institutionalized racism that became established post-Cuban Revolution despite efforts by Fidel Castro's attempts to declare the eradication of racism.

Since the end of the Cold War era, the United States has consistently been a dominate actor in state-building, striving to democratize developing nations due to the embedded fear of failed states being a security concern. A failed state is one that is considered to not fulfill the basic responsibilities of a sovereign government by not providing for its people through social resources, having a minimal economy, and high corruption within multiple ranks in government (Cottam). Through the act of state-building in the Latin country of Cuba, United States' diplomatic officials employ the traditional American system, which Feagin has criticized as a predominantly white racial frame given the vast majority and power of whiteness in American politics (Feagin 158). This frame has heavily influenced Cuban society where Afro-Cubans, who had first arrived through the transatlantic slave trade of the 16th-19th centuries, are viewed as "unattractive, dirty, prone to criminal activities, inefficient, or [have a] lack of manners and education" (de la Fuente 32). Correlated with American diplomatic intervention and its' usage of the engrained white racial frame, the Cuban Revolution was a catalyst in the structuring of the current racial order, causing the social location of Afro-Cubans to be almost identical to those of America's African-Americans.

Poster Number 116

ABSTRACT:

Abstract Title:	**Similarities and Differences between the National College Entrance Exam and the Civil Service Examination**		
Presenter:	Kelsey Gallegos		
Mentor:	Lydia Gerber	**Campus:**	Pullman
Co-Authors:			
Major:	Chinese Language and Culture, Anthropology		
Category:	Social Sciences		

The Civil Service Examination (CSE) was a series of tests that lasted over a thousand years in China to help select government officials. Once a candidate passed test one, they could try to pass test two. This culminated in a test given by the emperor himself. Although the test spanned centuries, the content remained roughly the same and the number of positions likewise remained the same. The National College Entrance Exam (NCEE) can be called the CSE's modern incarnation. Graduating high school seniors take a three day test that will determine if they are accepted into higher education, and if they are which school they will be attending. This paper attempts to explain the similarities and differences between two tests that have shaped Chinese culture. Based on an exploration of peer reviewed articles and news articles available in English, this paper argues that both examinations share similarities, including the attitude of Chinese that the test is the only way to a good life. Repeating the test is a common occurrence and happens in both modern times and in the past. There is also the issue of creativity, which both tests are thought to stifle. There are also issues of the effects to test takers. This includes a serious impact on their mental health and self-esteem. Although this work attempts to be all encompassing with its exploration, it is difficult to find modern and recent information that is not written in Chinese. This language barrier is felt the worst when discussing potential mental illness problems, as the English information is sparse and a reliance on online news sources is a final resort. Despite these limitations, enough reliable information was found to create strong correlations between the two tests. It is the hope that this paper will contribute to the understanding of change and continuity in Chinese Culture.

Poster Number 117

ABSTRACT:

Abstract Title:	**Identification of Neurosignaling Systems Regulated by the Histone Demethylase Kdm6a**		
Presenter:	Ashleigh Gustavson and Irfan Hossain		
Mentor:	Terri Driessen	**Campus:**	Pullman
Co-Authors:	Irfan Hossain		
Major:	Biochemistry / Computer Engineering, Neuroscience (General)		
Category:	Molecular, Cellular, and Chemical Biology		

Kdm6a is a chromatin modifying enzyme that removes methyl groups from H3 lysine 27 (H3K27) to activate transcription of potentially hundreds of genes. Aberrant H3K27 methylation has been linked to disorders such as major depressive disorder, mutations in Kdm6a have been linked to Kabuki Syndrome. Behavioral data already collected in this lab using whole brain $Kdm6a^{KO}$ male mice identified significant reductions in motor coordination and resiliency to learned despair, consistent with psychomotor deficits in Kabuki syndrome and results from murine models of depression, respectively. The purpose of the present study was to investigate which neurosignaling systems have altered mRNA expression in Kdm6aKO males compared to wild-type littermates. This research will allow us to understand what transcriptional alterations are caused by removing functional Kdm6a, and identify candidate neurotransmitters that may contribute to motor deficits and anti-depressant behavior seen in Kdm6aKO males. RNA-sequencing was used to identify differential gene expression across the transcriptome. mRNA was extracted from brain and an RNA library was generated and sequenced by the Tufts Genomics Core. We used TopHat to align RNA-seq reads to the mouse genome using the short-read aligner Bowtie. After incorporating annotation data, we examined differential gene expression using the Bioconductor package DESeq. Subsequent analysis using NIH DAVID will identify which neurosignaling systems are more prevalent in significant RNA-seq data. We expect to see down-regulation of glutamatergic receptors in the Kdm6aKO males, consistent with preliminary real time quantitative PCR (RT-qPCR) which has identified down-regulation of NMDA receptor 3b (Grin3b) in the cerebellum of Kdm6aKO males. The Modular Single Set Enrichment Tool (MSET), determines if genes related to mental health disorders are disproportionately represented in the significant RNA-seq gene list. We expect to see enrichment for genes linked to depression and motor coordination in the significant RNA-seq gene list. Finally, altered expression in genes of interest will be confirmed using RT-qPCR in the prefrontal cortex, which is linked to depression, and the cerebellum, which is associated with motor coordination. Collectively, this research is important for understanding transcriptional alterations that occur when Kdm6a is inhibited, and on identifying new therapeutic targets for Kabuki Syndrome and depression.

Poster Number 118

ABSTRACT:

Abstract Title:	**Compositional Dependence of Crystallization in Lithium Aluminosilicate Glasses**		
Presenter:	Joseph Kabel		
Mentor:	John McCloy	**Campus:**	Pullman
Co-Authors:			
Major:	Materials Science and Engineering		
Category:	Engineering and Physical Sciences		

This study investigated the crystalline phases that evolved out of eight chemically substituted lithium aluminosilicate compositions of empirical stoichiometry $Li_{1-x}\ Na_x\ Al_{1-y}\ B_y\ SiO_4$. The samples were batched using powder precursors, and thermally synthesized at 1500° in a glass melting furnace. Each composition was air-quenched (Q), heat treated (HT), and analyzed via X-ray diffraction (XRD). XRD scans revealed an amorphous structure in all eight Q samples. Six of eight HT samples were analyzed, and revealed an amorphous structure for all boron containing compositions, suggesting that B was an inhibitor for crystallization. HT samples without boron showed significant signs of nepheline and β-eucryptite crystallization.

Poster Number 119

ABSTRACT:

Abstract Title:	**Conservation Genetics of Oregon Spotted Frogs**		
Presenter:	Briauna Inglis		
Mentor:	Caren Goldberg	**Campus:**	Pullman
Co-Authors:	Caren Goldberg, Michaela Brinkmeyer		
Major:	Wildlife Ecology		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Amphibian populations around the world are declining at a drastic rate. One of the species that is being affected is the Oregon spotted frog (*Rana pretiosa*). This species is facing threats including extensive habitat loss from development, introduction of nonnative species, and agriculture. With only three known localities in Washington, roughly 30 percent of this species distribution remains. To better inform management decisions for the population in western Washington, our understanding of genetic connectivity and diversity of these populations needs to be updated. This study focused on the western Washington population, located in the Puget Sound lowlands near Olympia, WA, which is surrounded by residential neighborhoods and agricultural fields. This population is in need of assessment in order to know if this species is in danger of extirpation from the area in the near future. I extracted DNA from 238 Oregon spotted frog eggs from 6 locations and analyzed the DNA using PCR and capillary electrophoresis at 7 microsatellite markers. Of these samples, I reran 37 percent; results were consistent, indicating that the data were high quality. I used these data to investigate the genetic diversity, genetic structure, and effective population size for this Oregon spotted frog population. The analysis derived from these data can be used to help managers maintain Oregon spotted frog populations and other amphibian populations that are located in high land-use areas.

Poster Number 120

ABSTRACT:

Abstract Title:	**Effects of Oat Fiber Particle Sizes and Levels of Inclusion on Expansion of Regular Corn Starch during Extrusion Processing.**		
Presenter:	Jake Blaylock		
Mentor:	Dr. Girish Ganjyal	**Campus:**	Pullman
Co-Authors:	Ryan Kowalski, Bhim Thapa		
Major:	Food Science, Viticulture		
Category:	Applied Sciences		

Principal Topic

Particle size and enriching ingredient formulations are important aspects of extrusion to study because of the wide spread use of corn starch for extrusion cooking. This understanding will allow for further modification of ingredients to meet the public's growing demand for healthier, more fortified RTE food products.

Method/Hypotheses/Techniques

It has been shown that inclusion of fiber increases bulk density of direct expanded extruded products. Small amounts of fiber inclusions helps to increase the expansion. There is a gap in the understanding of the optimum levels of the fiber inclusion as relating to the quantity of the fiber as well as the size of the fiber particles.

For this study, oat fiber at varying particle size and inclusion level were incorporated with standard native corn starch, and extruded at constant temperature (140^{o}F) and moisture content (16% wb). The extruded products were examined for expansion ratio, bulk density, input energy, water absorption and water solubility to determine the impact of oat fiber.

Results/Implications

Expansion increased most with extra-fine (firm) fiber at 10-15% inclusion. There was a slight increase in expansion for all samples of firm fibers at a 10-15% inclusion. The coarse (soft) fiber experienced a decrease in expansion and collapsed with the most aggregation. All of the firm fibers performed similarly with expansion increasing in response to the increase in screw speed. Conversely, for the soft fiber expansion ratio decreased as the screw speed increased. Bulk density showed inverse effects in comparison to expansion. For water absorption index (WAI), the fine (firm) fiber showed higher water absorption due to more surface area, in comparison to the coarse (firm and soft) fiber samples. The effects of screw speed on water absorption showed that as the speed was increased, more mechanical energy was available to break down starch polymer and increase the absorption sites. Generally, water solubility index (WSI) increased both with higher inclusion level of fiber and with increasing screw speed.

Poster Number 121

ABSTRACT:

Abstract Title:	**Analysis of Structural Changes in Developing Hearts Due to Hyperglycemia**		
Presenter:	Megan Caruso		
Mentor:	Monica Hinds	**Campus:**	Pullman
Co-Authors:	Teresa Lawson, Monica Hinds		
Major:	Bioengineering		
Category:	Molecular, Cellular, and Chemical Biology		

Elevated glucose levels in the developing embryo of a diabetic mother increase risk of cardiac malformations at birth. In the developing heart, the outflow tract (OFT) is frequently used to investigate cardiac malformations because it later forms the aorta, pulmonary trunk, interventricular septum, and semilunar valves, all of which are commonly involved with heart defects. Differences in OFT structure at day 4 of incubation were noticed under a sustained model of hyperglycemia in which glucose is injected into the yolk at embryonic day 0. Further investigation of these structural differences may help elucidate the structural origins of the cardiac defects observed during late gestation under hyperglycemic conditions.

Prior to incubation, D-glucose, L-glucose (osmotic control), or saline water (control), was injected into the yolk of fertilized chicken eggs. This glucose injection has been shown to maintain elevated glucose levels in the embryo until the time of imaging. Eggs were then incubated at 38°C until Hamburger-Hamilton (HH) stage 18 (day 3 of development) and the OFT was imaged using optical coherence tomography (OCT). The result was a 2-dimensional longitudinal structural image of the OFT. The outer wall, inner wall, and center line positions of the OFT were generated using a custom MATLAB program that allowed the user to manually outline the outer and inner walls and then automatically calculate the center line. Each line was fit to a polynomial and the leading coefficients were compared.

The OFT inner wall of D-glucose-treated eggs showed the most change from controls. No significant differences in curvatures between treatments were found in the inner walls between the D-glucose and saline controls. While no difference was quantified in the hearts at day 3 after injection of glucose, former analyses of day 4 hyperglycemic hearts indicated significant structural changes. This indicates that hyperglycemia-induced differences in heart OFT structure must first occur between stages HH18 and HH24 of embryonic development.

Poster Number 122

ABSTRACT:

Abstract Title:	**The Influence of Number of Siblings on Family Talk Dynamics**		
Presenter:	Casey Stoddard		
Mentor:	Mark VanDam (EWU)	**Campus:**	Spokane
Co-Authors:	Hannah Matalone, Tracy Bookhout, Kellie Carns		
Major:	Speech and Hearing Sciences		
Category:	Social Sciences		

The effect of family members on a child's language development is an issue not yet fully understood. This study looks at language samples collected from families with preschoolers. A small, body-worn audio recorder designed for children (LENA; LENA Research Foundation, Boulder, CO) was used to collect whole-day audio recordings in a naturalistic, family environment. Using LENA's automatic speech recognition (ASR) software and custom software developed for this project, 15 minutes of high conversational activity was extracted from each of the 43 whole-day recordings. Each recording was analyzed by the ASR software to count the number of words and conversational turns by each family member. Using this data, we asked the following three research questions: First, what is the relationship between the number of siblings in the household and the quantity of conversational turns between a parent and the preschooler wearing the recording device? Second, does the number of siblings similarly influence quantity of words by mothers and fathers? Third, is there a relationship between number of siblings and overall child volubility?

Results indicate that there was no difference in overall adult word count, overall child volubility, or conversational turn count in relation to the number of siblings. However, the number of siblings was positively correlated with the quantity of words spoken by the mother, indicating that mothers tend to talk more when there are more children in the household. By contrast, the number of siblings was negatively correlated with the quantity of words spoken by the father, indicating that fathers tend to talk less when there are more children in the household. Results may be important for better understanding the impact that family members have on a preschooler's speech and language development.

Poster Number 123

ABSTRACT:

Abstract Title:	**Speech Transcription Accuracy of Typically Developing and Hard of Hearing Preschoolers**		
Presenter:	Hannah Matalone		
Mentor:	Mark VanDam, PhD	**Campus:**	Spokane
Co-Authors:	Casey Stoddard, Tracy Bookhout, Kellie Carns		
Major:	Speech and Hearing Sciences		
Category:	Social Sciences		

An enduring concern of developmental speech research is accuracy of language transcriptions. This concern is further compounded for children who are younger and for children with developmental delays or disorders. This study looks at language samples collected from families with preschoolers with mild- to severe hearing loss (HH group) and a control group of families with typically-developing preschoolers (TD group). This research asks how transcriptions vary between HH and TD families. We hypothesize that transcription accuracy will decrease in HH families.

A small, body-worn audio recorder designed for children (LENA; LENA Research Foundation, Boulder, CO) was used to collect whole-day audio recordings in a naturalistic, family environment. Using the LENA's automatic speech recognition (ASR) software and custom software developed for this project, 15 minutes of high conversational activity was extracted from each of 43 whole-day recordings, 14 from HH families and 29 from TD families. Each recording was then assessed by trained transcribers and similarity scores among transcriptions were calculated to determine transcription accuracy. Results indicate slightly higher variability among transcribers for the HH group as compared to the TD group, but differences may be influenced by certain linguistic constructions or individual differences within or between groups.

Overall, findings suggest some differences between the ability to transcribe TD and HH speech, but the differences are relatively small. Further, individual differences and a larger, more diverse dataset may serve to clarify comparison between the populations examined here. Finally, this project demonstrates the application of ASR, in combination with manual transcription, as an important tool for developmental speech research.

Poster Number 124

ABSTRACT:

Abstract Title:	**X-Ray Absorption Spectroscopy Studies of Molecular Electronic Materials**		
Presenter:	Sarah Kim		
Mentor:	Susan L Dexheimer	**Campus:**	Pullman
Co-Authors:	Nathan A Turner James A Brozik Susan L Dexheimer		
Major:	Mathematics, Bioengineering		
Category:	Engineering and Physical Sciences		

This project involves the application of x-ray absorption spectroscopy (XAS) to study the structure and electronic properties of platinum-halide organometallic polymers. These materials are of interest because their electronic properties can be systematically varied by changing their chemical composition, making them useful model systems to understanding the nature of electronic states in molecular electronic materials.

XAS is the measurement of the x-ray absorption of a material as a function of x-ray energy. XAS consists of two distinct regions: x-ray absorption near edge structure (XANES), which is sensitive to the electronic state and local symmetry of the absorbing atom, and extended x-ray absorption fine structure (EXAFS), which is sensitive to bond lengths, disorder and the photoelectron threshold energy. This project focuses on the analysis of EXAFS data collected at the Advanced Light Source synchrotron facility. EXAFS analysis has been performed for the Pt L_{III}-edge on oriented single crystals of three platinum-halide materials in which the bridging halide ion is Cl, Br or I.

The goal of the analysis is to verify the structure previously determined by x-ray diffraction and to determine the photoelectron threshold energy, scattering paths, and mean-square relative displacement disorder parameters, which will be used in future modeling of the XANES response of the ground states and excited electronic states. The results were successfully determined for all three platinum-halide materials. We find that the single and forward scattering paths, electron threshold energy and mean-square relative displacement disorder parameters vary systematically with each bridging halide ion.

Poster Number 125

ABSTRACT:

Abstract Title:	**The GI's of Washington State College**		
Presenter:	Claire Thornton		
Mentor:	Lydia Gerber	**Campus:**	Pullman
Co-Authors:			
Major:	History		
Category:	Humanities		

This project will assess the impact the GI Bill on Washington State University and its students during the years of 1945-1950. These years were a truly unique moment in time, with a significant portion of the student population being older both in years and in experiences than the typical college students. Additionally, the administration was presented with the challenge of accommodating a massive boom in enrollment, as numbers rose from 4,000 to 7,000 in just a few years. These years brought many changes to the college, from new construction to shifts in campus culture and attitudes. This project provides a multifaceted look into the effects of the GI Bill, including perspectives of veterans, nonveterans, faculty, and administration. Both quantitative and qualitative analysis of archival materials at Washington State University, including oral interviews, university publications, and surveys provide the basis for this project. These sources revealed that the transition for both veterans and administration, the two parties who had to make the most changes, was remarkably successful. Veterans were found to be serious and driven in their studies, enriching the classroom experience. They were generally good-natured and patient with some of the unfavorable conditions they had to endure, particularly overcrowded classrooms and housing. Because they were older and more mature than other students, they were uninterested and at times intolerant of some juvenile or superfluous traditions and practices, but as a whole successfully integrated into the student population through numerous extracurricular activities. The administration responded by allowing unprecedented freedom and lenience, particularly in rules and regulations. The post-World War II era at WSU (then Washington State College) is truly fascinating as, due to its unique population, campus culture was different than any other time preceding or that would follow. Yet noteworthy changes were made during this time as well that impacted even today's generation of students. Thus, this project contributes to an in-depth understanding of WSU history, regional history, and studies of the GI Bill's impact.

Poster Number 126

ABSTRACT:

Abstract Title:	**Enhancing the Reprocessing of Spent Nuclear Fuel; Ways to Recycle and Reuse**		
Presenter:	Ashton Powell		
Mentor:	Dr. Paul D. Benny	**Campus:**	Pullman
Co-Authors:	Dr. Paul D. Benny		
Major:	Chemistry		
Category:	Engineering and Physical Sciences		

Nuclear power provides one of the cleanest energy sources for the United States, capable of supporting the ever-increasing demand for electricity. Fission byproducts remaining in spent nuclear fuel after electricity generation have potential applications if they can be recycled from the fuel elements. Found in appreciable amounts, the platinum group metals (e.g., Pt, Ag, Pd, Ir, Ru, Rh) can be reclaimed for applications in catalysts, solar cells, electronics, batteries, etc. In this work, the coordination chemistry and the extraction of Rh was investigated with a new tridentate meridinal ligand with soft donors (SNS). Using a $RhCl_3$ precursor, the complex *mer*-$Rh(SNS)Cl_3$ was formed in good yields. Single crystal x-ray diffraction confirmed the meridinal orientation of SNS ligand. Complexation kinetics were conducted to determine the rate of complexation for the Rh(III) center. Liquid-liquid extractions were also performed to ascertain the amount of Rh(III) extracted from the aqueous phase into the organic phase as measured by ICP-OES analysis.

Poster Number 127

ABSTRACT:

Abstract Title:	**Histone Demethylase Kdm6a Regulates Depression-like Behaviors (in Mice)**		
Presenter:	Caroline Baer		
Mentor:	Jun Xu	**Campus:**	Pullman
Co-Authors:	Terri Driessen, Matt Landowski, Jun Xu		
Major:	Animal Science, Spanish		
Category:	Molecular, Cellular, and Chemical Biology		

Kdm6a is a chromatin modifying enzyme that removes methyl groups from histone H3 lysine 27 (H3K27) to transcriptionally activate genes. Emerging evidence indicates that Kdm6a contributes to the manifestation of depressive-like behaviors and is thus a candidate for depression research. (a) In murine models for depression H3K27 methylation, the enzymatic substrate of Kdm6a, is found to be altered at various genes; (b) Kdm6a, an X-linked gene, is expressed more highly in women who are twice as likely to be diagnosed with depression as men; and (c) repressive H3K27 methyl marks are found on many genes linked to depression.

We generated neuron-specific Kdm6a knockout ($Kdm6a^{KO}$) mice to determine if removal of functional Kdm6a leads to changes in depression-like behavior. In $Kdm6a^{KO}$ males, exon 24 is removed by a Cre recombinase, rendering Kdm6a protein non-functional. Genotyping confirmed this deletion mutation in the cortex, striatum, hypothalamus, hippocampus, cerebellum, and spinal cord, indicating that the $Kdm6a^{KO}$ males are truly a whole-brain knockout. Depression-like behavior was assessed in juvenile males using tail-suspension, a common test for anti-depressant efficacy in drug development. $Kdm6a^{KO}$ males were more resilient to the depression-inducing effect of tail-suspension, with reduced total time immobile (t-test, $p < 0.001$), and longer latency to immobility ($p < 0.05$). Altered dopamine and serotonin signaling in the prefrontal cortex have been identified in murine models for depression. However, we did not detect any change between $Kdm6a^{KO}$ and wild-types in mRNA expression of the dopamine receptor 1a and serotonin receptor 1a gene, using real time quantitative PCR. We are currently conducting RNA-sequencing to identify the neurotransmitter systems that are altered in $Kdm6a^{KO}$ males and thus possibly mediate this anti-depressive phenotype.

Collectively, our findings validated the importance of epigenetic chromatin remodeling, H3K27 methylation in particular, in affective behaviors such as depression, as well as the implication of histone demethylase Kdm6a in these behavioral processes. The higher levels of Kdm6a in females make this gene a candidate mechanism for the gender difference in depression prevalence.

Poster Number 128

ABSTRACT:

Abstract Title:	**Cage Environment allowing Expression of Natural Maternal Behavior has Positive effects on Rat Behavior**		
Presenter:	Wendy Ellison and Melissa Liu		
Mentor:	Sylvie Cloutier	**Campus:**	Pullman
Co-Authors:	Sylvie Cloutier		
Major:	Zoology / Animal Science, Basic Medical Science		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

The intrinsic behaviors of rat mothers is to spend time by themselves away from their offspring. Current laboratory cages prevent the expression of this physical behavior because of limited space availability. The purpose of this experiment is to compare two cage environments on the behavior and the quality of mother-litter relationship. We hypothesize that a cage environment with an area not easily accessible to the pups will allow the mother to express natural maternal behavior. We used Long-Evans female rats and their pups. Nine mother-litter groups were housed in standard cages with access to a loft, while seven were housed in cages (double-decker) with an upper level not easily accessible to younger pups. Mother and pups behaviors were observed using scan sampling every 5 min over a 24-hour period days 5, 10, 15 and 20 after parturition. Mothers location (up/down) and maternal behavior (grooming, nursing) were recorded. The time spent inactive in the upper level (loft or deck) was significantly different in the double decker cage than the standard. Although more time was spent away from the pups, the mothers in double decker cages were more attentive to their pups needs, based on their nursing and grooming behaviors. Our results show that using a cage environment allowing the mother to spend time away from the pups can improve maternal behavior for multiple generations. Thus, it could improve animal welfare, quality of animal models, and reduce outlying results of experiments.

Poster Number 129

ABSTRACT:

Abstract Title:	**Over the River and Through the Falls**		
Presenter:	Michelle Steele		
Mentor:	Kathleen Ryan	**Campus:**	Pullman
Co-Authors:			
Major:	Interior Design		
Category:	Arts and Design		

Celilo Falls was a traditional tribal fishing area in Washington and Oregon on the Columbia River, created by a series of waterfalls. It was once a prime fishing area for many species of salmon, and Pacific Northwest tribal members used dipnets and spears to harvest fish (MASC, OSU). The construction of the Dalles Dam submerged the falls in 1957, eliminating a rich resource for the native population. None of the platforms remain today; although there are historic slides from Manuscripts, Archives, & Special Collections (MASC), Clark County Oregon Historical Museum Photos (OSU), National Park Service (NPS) and Nez Perce Historic Images Collection.

This project was developed to bring the memory of Celilo Falls to the public. People pay more attention to an exhibit with a realistic immersion experience (Hughes, 2010). Fabricating a life size wooden fishing platform for the exhibit would recreate the experience of being closer to the river in order to fish. The goal of the exhibit was to create an engaging informal learning exhibit (Hughes, 2010) with an interpreted platform as the focal point, while accurately portraying the appearance and size of a Celilo Falls fishing platform.

Research included library and database searches to locate historic images of the platforms and Celilo Falls (MASC, OSU). The photos were then analyzed through sketches to determine construction methods used to build the platform. This created a data-base of drawings that identified details in the construction. In the exhibit it was also important to show the context of the fishing platform. This was accomplished through a mosaic approach of printed slide images of the falls and rock as the background of the exhibit. This emphasized that this was a designer interpretation of the real site. The platform was created using forced perspective and a 3D approach that is realistic and lifelike. Salvaged materials were used to give the platform a weathered look, to mimic it being through many years of use. Using salvaged materials also demonstrates resourcefulness of the original fishing platforms makers. The full immersion experience helped to engage the audience with the exhibit, and learn through understanding.

Poster Number 130

ABSTRACT:

Abstract Title:	**Evaporation and Surface Energy Balance Over a Large Reservoir**		
Presenter:	Devin Marcy		
Mentor:	Dr. Heping Liu	**Campus:**	Pullman
Co-Authors:	Heping Liu, Zhongming Gao, Eric Russell		
Major:	Civil Engineering, Mathematics minor		
Category:	Engineering and Physical Sciences		

Understanding water-air interactions of inland water bodies (e.g., lakes, reservoirs, etc.) are important in analyzing the role they have in affecting local and regional weather and climates, as well as the impact on hydrological balance. Eddy covariance data and other meteorological datasets from the Ross Barnett Reservoir
(32° 26'N, 90° 02'W) in central Mississippi for the year 2008 were analyzed to better understand how meteorological variables affect evaporation and surface energy balance. To understand the surface energy budget, heat storage in water is a key component in regulating energy in and out of the reservoir. Our analysis showed that the time lag for energy transferred between different layers of water was not a matter of minutes or hours, but rather, weeks, months, or intraseasonal. Analysis of net radiation (Rn), sensible heat (H) fluxes, and latent heat (λE) fluxes showed that the reservoir stored energy during the warmer seasons (Feb-August) and released energy during the colder seasons (Sept- Jan). An in-depth analysis of heat storage and surface energy balance closure results for 2008 will be presented. Flux data and other meteorological datasets were also analyzed for days with wind speeds above 5 meters per second ($m\ s^{-1}$) and days with wind speed closer to $1m\ s^{-1}$ to study how different variables regulated evaporation and energy fluxes for these two cases.

Poster Number 131

ABSTRACT:

Abstract Title:	**The Role of Hope in Perseverance in Higher Education among Ethnic Minority Students**		
Presenter:	Maira Birrueta		
Mentor:	Paul Kwon	**Campus:**	Pullman
Co-Authors:	Paul Kwon		
Major:	Psychology, Spanish		
Category:	Social Sciences		

The present study examines how hope serves as a buffer against ethnic minority stress among students in higher education. This is an important topic to address because of the dropout rates due to the negative effect of minority stress (Liang, Li, & Kim, 2004). Investigating the effects of hope serving as a buffer against minority stress and status can potentially increase the retention rates of minority students. Little research has been done to address moderators or buffers against minority stress in higher education. To address this gap, this research will examine whether levels of hope in undergraduate ethnic minority students buffers the negative impact of minority stress on academic perseverance. Participants (N=60) will complete the Hope Scale (Snyder et al., 1991), the Minority Student Stress Scale (Smedely et al., 1993), and the College Persistence Scale (Davidson et al., 2009). A multiple regression analysis will be conducted to examine the ability of hope to moderate the impact of minority stress on various aspects of educational perseverance after controlling for indices of academic ability. Based on the literature, my first working hypothesis is that ethnic minorities who have high levels of hope will report greater intentions to persevere through hypothetical educational obstacles, compared to ethnic minorities with low levels of hope. My second working hypothesis is that hope will mediate the exposure to minority stress, which will lower the amount of minority stress.

Poster Number 132

ABSTRACT:

Abstract Title:	**Uses of Non-natural Sugar Epitopes for Immune Mediated Cancer Therapies**		
Presenter:	Jacob Hallett		
Mentor:	Clifford Berkman	**Campus:**	Pullman
Co-Authors:	Brian Backer, Clifford Berkman		
Major:	Biochemistry, General Biology		
Category:	Molecular, Cellular, and Chemical Biology		

Continued efforts in the field of prostate cancer research require the development of innovative treatment plans and techniques to foster positive patient outcomes. New methodology in the treatments of metastatic and hormone resistant cancer lines have begun to diverge from the canon of use of small molecules, and towards the use of biomarkers to illicit therapeutic responses. Prostate Specific Membrane Antigen (PSMA), is recognized as an ideal biomarker for prostate-targeted chemotherapeutics due to its restriction of expression largely in prostate cancer cells. These cell lines have been observed to dramatically increase their presentation of PSMA in late stage cancer.

The selective recruitment of a host's natural immune system to facilitate a less invasive form of tumor rejection has shown promise as a new treatment strategy. Human immune systems naturally express large amounts of anti-Gal IgG and IgM isotypes in serum which interact exclusively with α-Gal epitope(galactosyl-α(1–3)galactose), which is expressed in all mammals excluding humans and old world primates. The anti-Gal antibodies facilitate the activation of the complement immunological cascade which is responsible for the rejection of xenografts.

The development of a therapeutic agent that targets PSMA and bears an α-Gal epitope is a recent focus of the Berkman lab. Upon binding of PSMA-specific targeting agent displaying an α-Gal epitope on the extracellular surface of PSMA positive cells, it is expected that natural immune responses will take hold and facilitate complete rejection and obliteration of the diseased tissue lines.

Poster Number 133

ABSTRACT:

Abstract Title:	**Historic Walking Tour in Colfax, Washington: A Link to Eastern Washington's Past**		
Presenter:	Kendra Bone		
Mentor:	Kathleen Ryan	**Campus:**	Pullman
Co-Authors:			
Major:	Interior Design		
Category:	Arts and Design		

Engaging in rural community development has become a prominent and important part of the design field's curriculum. Hard work has contributed to matured roles within civic-engagement and the important responsibilities designers have in the development of rural communities. The idea of improving rural communities was the goal behind the creation of the Colfax Washington Historic Walking Tour.

Colfax was named after Schuyler Colfax, vice president to president Ulysses S. Grant, and incorporated on January 14, 1879, (Colfax 100 Plus). The town has a rich history, which was analyzed through local references. Books (Colfax 100 Plus), articles (Whitman County Library), and photographs (Whitman County Historical Society, Whitman County Rural Heritage), were among the materials used to gather the historical and architectural context of each site. Small group discussions (Kristie Kirkpatrick, Patti Cammack, Ed Garretson), both casual and professional emails (Kirkpatrick, Cammack, Garretson), and phone conversations (Kirkpatrick, Cammack) were among the forms of communication used throughout the project. Investigation within the community through consideration of artifacts and events of cultural and historical importance were transformed through this new and exciting form of rural community service and development. Long-term community members affiliated with Whitman County (Kirkpatrick, Cammack, Garretson) towns were sought out and utilized in discussing Colfax's history both culturally and architecturally.

The implementation of a Historic Walking Tour in the town of Colfax will encourage those who usually only pass through to engage themselves in the cultural and architectural history of the town. In fact, the Colfax Historic Walking Tour won the Alexander A. Smick scholarship in Rural Community Service and Development, which provided $1,500 dollars worth of funding towards the project. The Historic Walking Tour will not only ignite interest among visitors, but also provide the town with recognition for their efforts towards preservation. The town of Colfax also has the potential to benefit economically due to an increased number of tourists, as well as be emotionally impacted by the increased connection between the townspeople and the history of the town.

Poster Number 134

ABSTRACT:

Abstract Title:	**Predictive Models for Dysphagia after Spine Surgery**		
Presenter:	Anthony Olivos		
Mentor:	Bala Krishnamoorthy	**Campus:**	Pullman
Co-Authors:	Bala Krishnamoorthy, Jung Yoo		
Major:	Mathematics		
Category:	Computer Science, Mathematics, Statistics, and Information Sciences		

After spine surgery, many patients develop a condition called dysphagia, which is a condition where the patient has difficulty in swallowing. The goal of this research is to find factors that could mathematically predict if a patient will develop dysphagia. A set of 194 patients underwent surgery at the Oregon Health & Science University (OHSU), with a subset developing dysphagia. Over 30 different factors were measured and recorded for each patient, including age, sex, BMI, blood lost during procedure, time of procedure, etc. We develop robust nonlinear predictive models for dysphagia using support vector machines (SVM) under cross validation. Some of the most predictive factors were diagnosis code (ICD), upper level of fusion, age, and time. We also investigated combinations of these factors. The group of easy to measure factors BMI, Smoking (Y/N), and Alcohol (Y/N) turned out to be the most predictive

Poster Number 135

ABSTRACT:

Abstract Title:	**Organic-Aqueous Tunable Solvents for Nanoparticle Catalysis**		
Presenter:	Joshua Rood		
Mentor:	Steven Saunders	**Campus:**	Pullman
Co-Authors:			
Major:	Chemical Engineering		
Category:	Engineering and Physical Sciences		

Catalysis is vital to the effectiveness of many industrial chemical processes, however it can account for major costs to production companies. In order to reduce these costs, efforts are being made to utilize the high catalytic activity of metal nanoparticles to better optimize the efficiency of processes used today. The high surface area to volume ratio of nanoparticles make their use as a catalyst appealing. In order to make nanoparticles a viable option, methods for their recovery must be developed. In this research we focus on the use of Organic Aqueous Tunable Solvents (OATS) to effectively separate nanoparticles from reaction mixtures. Separation involves pressurizing the reaction mixture with CO_2 to induce a phase split between the aqueous and organic liquids. Using CO_2 to induce a phase split is favorable to traditional methods as it requires less organic solvent. This in turn reduces the energy input required for separation, along with reducing the amount of harmful emissions being released. Another benefit is that the CO_2 used can be recovered and reused, which allows for lower costs. It has been found that for a system of aqueous acetonitrile and gold nanoparticles, a phase split occurs at 11 bar of absolute pressure. It is confirmed that at this point all of the nanoparticles are present solely in the top aqueous phase. It has also been found that nanoparticle concentration increases at higher pressures after the phase split. This shows that OATS is a viable method for nanoparticle separation, however, methods need to continue to improve to maximize recoverability.

Poster Number 136

ABSTRACT:

Abstract Title:	**Tap**		
Presenter:	Jordana Dahmen		
Mentor:	Diane Cook	**Campus:**	Pullman
Co-Authors:	Jessamyn Dahmen		
Major:	Biology		
Category:	Arts and Design		

The world is aging. In the United States alone, by 2030 adults aged 65 and older will comprise roughly 20% of the population [1]. As people age they become especially susceptible to cognitive disorders such as Parkinson's disease and Alzheimer's. Caring for individuals with these diseases requires a large amount of resources in terms of time and money. Detecting cognitive disorders early is crucial for intervention effectiveness. However, traditional techniques used to monitor cognitive health, such as paper based cognitive tests, suffer from several limitations. These paper-based tests are costly to administer, are not designed for continuous repeated measurement, and are limited in terms of the data they collect. This creative interdisciplinary project involved designing tablet-based game-like automated cognitive tests that address these limitations. The goal was to design engaging and interactive game formats that were also capable of collecting sensor data. Working with my mentor I analyzed various existing standard cognitive tests and created a game design that was able to provide data that could monitor cognitive state without compromising established testing mechanics and criteria. This project also involved the creation of a basic game prototype using self-taught programming skills and a game engine called Unity. In the future, this game design will be used with actual older adult users to help researchers gain deeper insights into cognitive disease processes.

Poster Number 137

ABSTRACT:

Abstract Title:	**The Effect of Low-pH on the Cellular Attachment of Herpes Simplex Virus**		
Presenter:	Floricel Gonzalez		
Mentor:	Anthony Nicola	**Campus:**	Pullman
Co-Authors:	Darin Weed, Sue Pritchard, Anthony Nicola		
Major:	Microbiology, English		
Category:	Molecular, Cellular, and Chemical Biology		

Herpes simplex virus (HSV) is a significant infectious agent causing several disease manifestations that have affected the human population for millennia. HSV can enter cells via multiple pathways, one of which is a pH-dependent endocytic route. HSV entry is comprised of multiple sequential steps including attachment, receptor binding, and fusion. Our laboratory previously demonstrated that exposure of viral particles to a mildly acidic pH of ~ 5.0 to 6.0 results in partial inactivation of HSV entry. The target of pH-inactivation has yet to be identified, partly due to the multi-component entry mechanism. By elucidating the step in HSV entry that is targeted by low-pH inactivation, we will reveal important mechanistic details of HSV entry. Previous research has demonstrated that receptor binding is not the target of pH-inactivation. Furthermore, glycoprotein B and C have been identified as the two proteins responsible for attachment via interactions with cell surface glycosaminoglycans, mainly heparan sulfate. In this study, we examined whether reduced infectivity following exposure to low-pH is due to inhibition of HSV attachment. HSV virions were treated with pH 7.4, 6.0, or 5.0, neutralized back to 7.4, and then added to Vero cells at 4°C to allow attachment. Cells were then washed with cold PBS to remove weakly bound virions. The reaction was shifted to 37°C and infectivity was measured via plaque assay. Our results indicate that low pH treatment of virions did not have a significant effect on HSV attachment. Thus, low-pH inactivation may be attributed to a defect in a downstream process during HSV entry, such as at the level of membrane fusion.

Poster Number 138

ABSTRACT:

Abstract Title:	**Washington State University Stormwater Master Plan**		
Presenter:	Taylor Arndt		
Mentor:	Dave McCarroll	**Campus:**	Pullman
Co-Authors:	Vince Mcintyre, Lindsay Myron, Jared Blakeman, Christian Williams, Ian Smith, Tanner Reijm, Anna Martin, Nicole Aitken, Aril Bartrand		
Major:	Civil Engineering		
Category:	Engineering and Physical Sciences		

Washington State University is over a hundred years old with an equally aged and ever expanding stormwater system. As this system grows and changes the people that manage it and depend on its functionality come to know less and less about what is actually in the ground and where our stormwater is going. Capital Planning and Development at WSU is tackling this problem with a team of interns to map and model the hydrology of the campus on a watershed basis for planning and maintenance purposes. The approach of the interns and faculty at Capital Planning in regards to the issue of utility management has been to use GPS and GIS mapping to first locate stormwater utility infrastructure like manholes and catch basins then manually record pipe information out in the field. Finally the GPS data and field notes are compiled onto hydrology spread sheets and later displayed on maps. So far about 70% of the campuses stormwater utility has been mapped by the team of interns over the past 2 years. Also much of the work done is assisting with on-campus maintenance and construction, helping to locate existing pipes while also recording newly added ones. Overall this project has had a huge impact on the campus by addressing some of the infrastructure issues many other large entities are facing today in regards to an aged stormwater utility system. The methods being used by the team of interns at Capitol Planning are unlike any other and have largely been generated by the interns themselves with the insight and guidance of faculty. Washington State University is small in size compared to most towns and cities, however the stormwater issues being faced are very much the same, making the solutions that the interns have produced an important model for other larger entities.

Poster Number 139

ABSTRACT:

Abstract Title:	**Pathfinders Multimedia Book Draft**		
Presenter:	Madeleine Brookman		
Mentor:	Dene Grigar	**Campus:**	Vancouver
Co-Authors:	Dene Grigar, Stuart Moulthrop, Will Luers, Craig Dietrich, Erik Loyer		
Major:	Digital Technology and Culture		
Category:	Arts and Design		

In this display, I feature the research I am undertaking with the Pathfinders project, specifically, the work I am doing to develop the interactive, open source book that contains the media and commentary produced by PIs Dene Grigar and Stuart Moulthrop.

Funded by a grant from the National Endowment for the Humanities, Pathfinders takes place in the Electronic Literature Lab (ELL) located at Washington State University of Vancouver. This lab – fitted with 35 vintage Macintosh computers and a library of over 200 unique pieces of electronic literature (e-lit) – became the starting point in preserving four seminal works of pre-web (circa 1986-1995) e-lit. These original pieces of digital literature are native to specific computing environments, and as a result, they are threatened of becoming obsolete. This is why the Pathfinders project developed a video capture preservation method called "traversal," with plans of making these recordings available to the public for free via a multimedia book.

As an Auvil Fellow, it has been my duty to compile and edit over 100 video clips, ranging from 5-10 minutes in length, with the ultimate goal of organizing them into this digital book environment known as Scalar. Established by University of Southern California, Scalar brings about an exciting opportunity to experiment with new methods of publishing, allowing us to revisit and protect the past like never before. For example, Duke Library currently owns the Judy Malloy Collection. Scholars visiting the library to access Malloy's database narrative Uncle Roger, published on a set of three 5 ¼ floppies, would not be able to because the library does not make the computers needed to read the work available. By providing an open source multimedia book containing video clips of the authors and readers experiencing the work in a traversal, we are able to provide scholars with a better idea of these important cultural artifacts.

Poster Number 140

ABSTRACT:

Abstract Title:	**Relationship between Physical Activity and Well-Being**		
Presenter:	Katherine Ladwig		
Mentor:	David Lin	**Campus:**	Pullman
Co-Authors:	David Lin, Maureen Schmitter-Edgecombe		
Major:	Bioengineering		
Category:	Engineering and Physical Sciences		

The quality of life in the elderly population could be drastically improved by decreasing the amount of negative affect they experience. Specifically, if a technology that is simple, non-invasive and cost effective can be developed to track patterns of positive and negative affect, persons can increase their awareness about their mental and physical health, and clinicians can have more accurate and quantitative data to create the best possible treatment plan for their patients. Therefore, a goal of this study was to search for patterns between a person's mood and movements with the potential outcome of developing computational algorithms to identify a person's well-being throughout the day.

In developing such technology, we hypothesized that better mood, more social contact, and better cognitive abilities would correspond to higher physical activity levels. A previously recorded data set in over 100 elderly participants for one week each had measurements of physical activity level (collected every minute by a wristwatch-like accelerometer worn on the dominant hand) and ecological moment assessments (collected by an automated phone system that asked questions and allowed participants to enter responses on a Likert scale four times a day). Specifically, we calculated correlations between a person's activity level and their responses to questions about their mood, social contact, physical activity, and mental engagement. We found statistically significant correlations for some of the variables. However, because there were a wide variety of participants, some were cognitively healthy while others had varying degrees of cognitive deficits, we found a wide variability among the participants. We then split the participants into two groups: cognitively healthy and unhealthy, and hypothesized that the healthy group would have stronger correlations between their well-being and activity data. Thus far we have not found a significant difference between the two groups, but we intend to try different analyses to distinguish between the cognitively healthy group and those with cognitive deficits.

Poster Number 141

ABSTRACT:

Abstract Title:	**The Effects of Trout Hatchery Effluent on a Small Stream**		
Presenter:	Joseph McGill		
Mentor:	Gretchen Rollwagen- Bollens	**Campus:**	Vancouver
Co-Authors:	Gretchen Rollwagen- Bollens		
Major:	Environmental Science, Biology		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Anthropogenic eutrophication of watersheds has been shown to cause excess phytoplankton growth that can sometimes lead to blooms of toxic algae within freshwater systems. Flow-through trout hatcheries in the northwest typically raise two or more species of trout from fry until they are of a size where they can be planted in area lakes for recreational fishing. Throughout their life cycle, fish excrement is exuded into the water and carried into the system via the effluent discharge thus increasing concentrations of biologically available nutrients downstream of the hatchery. In an initial literature search, minimal literature was located quantifying the impacts flow-through trout hatchery operations have on nutrient levels downstream of the hatchery; nor how additional nutrient availability impacts the growth rates of algae within the system. To address the literature gap, this study looks to answer the following: 1.) How is the presence of a flow-through hatchery affecting nutrient concentrations downstream? 2.) How does hatchery-influenced variability of nutrient concentrations affect downstream algal growth?

The Vancouver Trout Hatchery is located in the Columbia Slope Watershed along the Columbia River approximately at river mile 114. The site is fed by numerous artesian springs that come together to form a small creek that runs through the site to the Columbia River to the south. Bi-weekly water sampling commenced at three locations in October 2014: the holding pond above the hatchery; the effluent discharge point below the hatchery; and the stream's confluence with the Columbia River. Water sampling will conclude in September 2015. Samples collected will be assessed for concentrations of NO_3, NO_2, NH_4, PO_4, and chlorophyll. Five dilution experiments will be conducted to analyze nutrient effects on phytoplankton growth rates. Data is also being collected on flow rates, biomass, daylight, cloud cover, precipitation, and temperature.

Preliminary chlorophyll sampling initially shows distinctly higher chlorophyll concentrations below the hatchery compared above. At this time, preliminary conclusions on possible causations or correlations cannot be afforded. Nutrient concentrations have not yet been quantified for any of the sample dates, nor have the two completed lab dilution experiments been thoroughly analyzed for conclusions.

Poster Number 142

ABSTRACT:

Abstract Title:	**Growth Rate Comparison of Bottle-Raised Black-Tailed, White-Tailed, and Mule Deer Fawns**		
Presenter:	Emily Koch		
Mentor:	Lisa Shipley	**Campus:**	Pullman
Co-Authors:	Lisa Shipley, Stephanie Berry		
Major:	Wildlife Ecology		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

White-tailed deer (*Odocoileus virginianus*), black-tailed deer (*Odocoileus hemionus columbianus*), and mule deer (*Odocoileus hemionus*) fawns were all successfully hand-raised on a powdered milk formula specially developed for black-tailed deer. Feeding schedules and milk volumes were based on age and weight of each individual animal. Growth rates of these fawns to 50 days of age between the species did not vary drastically, although the black-tailed deer fawns did have a slightly higher growth rate. Preliminary research shows that the growth rates of all species of bottle-raised fawns did not differ from those of maternally fed fawns.

Poster Number 143

ABSTRACT:

Abstract Title:	**The New Wave of Propaganda: The Effects of Video Games on a State's Historical Memory and the Psyche of its Citizenry**		
Presenter:	Lauren Rachel Young		
Mentor:	Dr. Lydia Gerber	**Campus:**	Pullman
Co-Authors:			
Major:	History, Pre-Law		
Category:	Social Sciences		

In the 21st century, technology has changed the way people communicate and has changed the way governments use propaganda. Governments such as the People's Republic of China and the United States have created propaganda video games that allow the consumer to play through scenarios that embody the respective government's particular version of history. This study offers a qualitative primary source analysis of various games that have been funded by the P.R.C., of their portrayal of China's interaction with other powers in history, and of the history lessons these games offer to their players. By engaging with current scholarship on history and memory, and on video gaming in the fields of psychology, sociology, and education, this project explores the potential impact of "interactive propaganda" on video gamers and its potential meaning for a nation's approach toward its own history.

Poster Number 144

ABSTRACT:

Abstract Title:	**Pain-Relieving Effects of JWH-015, a Synthetic Cannabinoid Drug**		
Presenter:	Nicholas Greene		
Mentor:	Dr. Rebecca Craft	**Campus:**	Pullman
Co-Authors:	Rebecca M. Craft		
Major:	Neuroscience, Psychology		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

The primary psychoactive ingredient in marijuana, THC, is a cannabinoid that produces pain relief by acting at CB_1 and CB_2 receptors in the nervous system. However, THC's actions at CB_1 receptors also result in unwanted side-effects such as sedation, anxiety, and feeling "high." Synthetic cannabinoids have been developed that have CB_2 receptor selectivity, and these may be useful in the treatment of chronic pain while producing fewer unwanted side-effects than THC. While previous research has suggested that there are sex differences in THC's mechanism of action at CB_1 and CB_2 receptors, there is little data regarding potential sex differences in the mechanism of action of synthetic, CB_2-preferring cannabinoids. Using the Complete Freund's Adjuvant (CFA) model of chronic inflammatory pain, the antinociceptive (pain-relieving) effects of the synthetic, CB_2-preferring cannabinoid JWH015 were examined in rats of both sexes. Hindpaw mechanical sensitivity, thermal sensitivity, biased weight-bearing, and edema (swelling) were assessed. Rats then received an injection of 0.1 ml CFA into their right hind paw, creating a model of chronic inflammatory pain (edema, mechanical and thermal hypersensitivity, decreased weight-bearing on the inflamed hindpaw). Three days after CFA injection, rats received either vehicle or the CB_2-preferring cannabinoid JWH015 (5 or 10 mg/kg), and pain tests were conducted at 15-240 minutes post-injection. In both sexes, JWH015 significantly decreased CFA-induced mechanical and thermal hypersensitivity, with no significant reduction in biased weight-bearing or in edema. In a subsequent experiment, cannabinoid antagonists were used to determine whether JWH015's pain-relieving effects are mediated by the CB_1 and/or CB_2 receptor, and whether there are sex differences in this mechanism of action. Three days after receiving CFA, vehicle, the CB_1 receptor-selective antagonist rimonabant (1 mg/kg), or the CB_2 receptor-selective antagonist SR144528 (1 mg/kg) was administered; 30 minutes later, vehicle or JWH015 (10 mg/kg) was administered. Rimonabant and SR144528 each significantly reversed JWH015's effects in both sexes. This result suggests that JWH015's pain-relieving effects are mediated by both CB_1 and CB_2 receptors in both males and females. Therefore, despite its CB_2-preferring binding profile, JWH015 may not provide any significant clinical advantage over THC in the treatment of chronic pain.

Poster Number 145

ABSTRACT:

Abstract Title:	**Learning Through Play | Loose Parts Playscape**		
Presenter:	Uris Giron		
Mentor:	Kathleen Ryan	**Campus:**	Pullman
Co-Authors:			
Major:	Interior Design		
Category:	Arts and Design		

Every town, city, and metropolis has their own rich history, that, when visible, provides a method to understand local culture and community. How can we engage young children in the history of their community in a manner that meets their understanding? One method is through the experience of play through loose parts(Fehr & Russ, 2012).

In a rural town in the Pacific Northwest a group of early learning educators, historical society members and design students collaborated to develop a loose parts playscape that was historically relevant to the regional area.

The team collaborated using a co-design process (Sanders & Stappers, 2008). The challenge became: how to intertwine the disparate needs of early learning development, local history and play. The team composed of educators and designers used observations of children at play, knowledge of the earth science and cultural history, knowledge of developmental needs (Content and Skill Guidelines for Preschool, 2013), application of loose parts play (Sutton, 2011), and the physical site to develop play components.

The major events in the regional history (formation of the local landscape, settlement of early inhabitants, regional mining, railroad, and farming) were incorporated into the playscape in age-appropriate components. The playscape developed included eight major spaces to represent the earth and human history of the community. Components included: **Tricycle Path** to incorporate transportation through rail; **Natural Play Area** with native grasses reflect the distant past; **Uneven Landscape** that emulates the shape of the geographic region created through glacial processes; **Spiral Garden** for planting, growing and understand farming; **Water Table** to allow children to engage with elements found in logging.

This playscape design successfully incorporated experiences of the regional natural environment and local history. Each playscape component was integrally tied to the criteria of the early learning educators (Content and Skill Guidelines for Preschool, 2013). Learning earth and human history through play (Fehr & Russ, 2012) has the potential to increase cultural and environmental awareness of young children, thus creating a future of children who are experienced with the process of historical discovery through play.

Poster Number 146

ABSTRACT:

Abstract Title:	**American Reactions of the Rise of Communist China and the Impact of Cultural Awareness**		
Presenter:	Brianna Webb		
Mentor:	Lydia Gerber	**Campus:**	Pullman
Co-Authors:			
Major:	History		
Category:	Humanities		

In 1949 the People's Republic of China, led by Mao Zedong, defeated Chiang Kai-shek and his Republic of China in the Chinese revolution resulting in China becoming a Communist state. This greatly concerned the United States who were battling the spread of Communism during this time. It is well known that the U.S. Government responded very negatively and that members of the State Department were scrutinized for possible Communist sympathies during the McCarthy era. This project aims to take a broader look at U.S. Responses to China's 1949 regime change. Based on a qualitative analysis of a variety of sources, including newspapers and magazines, it argues that those who had spent significant time in China during the 1930s and 1940s were generally much more accepting of the Communist regime than those who had no personal experience with the country or those, like Henry Luce, whose experience in China dated from earlier decades. While the sample examined for this project is limited, it suggests an intriguing relationship between cross-cultural contact and the ability to respond with some openness and flexibility in situations of conflict or crisis. Yet it also acknowledges that such more flexible responses may not be implemented in times of confrontational politics. This study contributes to our understanding of the history of Sino-U.S. Relations.

Poster Number 147

ABSTRACT:

Abstract Title:	**The Role of Knowledge Acquisition in Cognitive Flexibility**		
Presenter:	Amy Nusbaum		
Mentor:	Paul Whitney and John Hinson	**Campus:**	Pullman
Co-Authors:	Arig Aboulenein		
Major:	Psychology		
Category:	Social Sciences		

People often have to use feedback to adjust to changing circumstances in their environment. Examples of this type of learning include changing a study strategy after failing an exam or adjusting social behavior depending on the reaction from a peer group. The ability to show this kind of cognitive flexibility is often studied in the laboratory using reversal learning tasks. In reversal learning experiments one choice option is rewarded more than another, but subsequently contingencies are reversed so the initially better choice option becomes worse and vice versa. Standard models of reversal learning posit that violation of expectancies about choice outcomes allow people to detect changes in contingencies. Typically, these models assume people maintain a running average of obtained outcomes in memory, but there is relatively little data on what information about previous outcomes is maintained in memory. This study examined the relationship between reversal learning ability and the knowledge gained before reversal. A sample of healthy young adults (N=120) made choices between two decks of cards, with each card revealing hypothetical monetary gains or losses. Both decks produced gains and losses but one deck was “good” (averaging a $50 gain), while the other was “bad” (averaging a $50 loss). After 60 trials, the deck outcomes reversed and there were 40 more choices post-reversal. Halfway through the task, knowledge of each deck was assessed by presenting potential gains and losses and asking participants from which deck each value was likely to have come. The data indicated that those participants who performed best and worse post-reversal (upper and lower quartile) had equivalent knowledge pre-reversal. Thus, the ability to show cognitive flexibility in reversal learning was separate from the ability to use feedback to learn contingencies in the first place. These data have implications for understanding the reversal learning deficits that have been demonstrated in a range of clinical populations, including people with Parkinson’s disease, frontal lobe damage, and substance abuse disorders.

Poster Number 148

ABSTRACT:

Abstract Title:	**Innovate Arts**		
Presenter:	Alyssa Korinke and Kate Palermini		
Mentor:	Will Luers	**Campus:**	Vancouver
Co-Authors:	Stephen Palermini		
Major:	Digital Technology and Culture / Digital Technology and Culture		
Category:	Arts and Design		

Innovate Arts will be a series of physical books about art for young people that provide an overview of basic art styles, historical contexts and methods of art interpretation. Using augmented reality, *Innovate Arts* will incorporate photography, video, animation, and audio recordings to increase engagement and retention.

The purpose of this project is to increase the availability of arts education to elementary aged children in grades three through five by incorporating the ways in which they learn in an engaging and focused way using three major learning styles: visual, auditory and kinesthetic. Arts education has been steadily declining in the public school system. A 2010 study by the National Center for Education Statistics found that only 14% of arts classes being taught are dedicated visual arts classes. Along with this, the classroom is becoming a more technologically based landscape. This project explores the relationship between learning styles and technology, while strengthening visual arts education.

The first book in the series will focus on the four areas of prehistoric art: petroglyphs, pictographs, prehistoric sculptures, and megalithic art. Focusing on prehistoric art will give us a way to begin a conversation about the earliest presence of art in human civilization and the basic underlying principles of all artistic endeavor. Each area will be presented in a way which engages all three learning modalities through video and animation, discussion provoking questions, auditory responses, and hands-on art experiments. Innovate Arts acts in conjunction with current visual arts curriculum, giving kids the conceptual framework to understand artistic principles and positively impacting their ability to think creatively.

Poster Number 149

ABSTRACT:

Abstract Title:	**Life Renewed**		
Presenter:	Adam Denny and Frankie Dunn		
Mentor:	Dene Grigar	**Campus:**	Vancouver
Co-Authors:	(22 other authors have since graduated)		
Major:	Digital Technology & Culture / Digital Technology & Culture		
Category:	Arts and Design		

Research Question
How can an interactive installation and mobile app environment create a unique learning experience that expresses the magnitude and impact of Mount St. Helens, including the 1980 eruption and subsequent renewal of life?

Description
The Mount St. Helens Science & Learning Center's "Life Renewed" project is a transmedia educational environment that tells the story of the rebirth of life on Mount St. Helens following the 1980 eruption. The project's goals are to: 1) produce a portable, educational exhibit that offers a quality educational experience, to develop a sustainable partnership between the Mount St. Helens Science and Learning Center and the CMDC program, 2) promote projects that benefit the community and visitors of all ages to Mount St. Helens, and 3) provide an opportunity for CMDC students to learn as well as to participate in civic engagement for the betterment of the region. "Life Renewed" incorporates an accelerometer-based flight simulator game as well as educational information via a PC-based touch screen installation and Android mobile app.

Research Methodology
In order to demonstrate the scale of the Mount St. Helens blast zone as well as the resurgence of the ecosystem, our team used a video game engine to create a transmedia educational environment that includes: a 3D simulated flyover of the volcano and surrounding terrain built on GIS data gained from the National Park Service, two augmented reality banners that reveal 2D hand-made illustrations and 3D animated models, and a touchscreen interface that gives contextual information about various species as well as controls the game.

Preliminary Findings
The interactive installation provides a game environment whereby visitors take the persona of a raven and soar over the mountain. Its flight is captured for the larger audience in the room via a large high resolution monitor. On the touch screen found on the cabinet display visitors can access detailed information about the plants and animals that the raven sees as well as direct the raven towards items of interest as well as get contextual information via two augmented reality enabled banners flanking the exhibit.

Poster Number 150

ABSTRACT:

Abstract Title:	**Pop Up Gallery**		
Presenter:	Angela Morrelli, Stephen Palermini, Brittany Wouden		
Mentor:	John Barber	**Campus:**	Vancouver
Co-Authors:	Josh Kim		
Major:	All are Digital Technology and Culture majors		
Category:	Arts and Design		

The Pop Up Gallery: Neuroscience Collaboration is a mobile application that uses augmented reality to teach the functions and processes of the brain in relation to every day stimuli. The theme of the project was generated from a need for interdisciplinary collaboration on the WSU Vancouver campus between science oriented curriculum and design programs. The core student research team sought out and partnered with authorities in the neuroscience department to create a kinesthetic and engaging educational app that satisfied common core curriculum for brain education in an engaging and technologically forward way. The research asks the question, is augmented reality an effective means of brain education for students, particularly in a middle school common core environment? The Pop Up Gallery team developed a mobile augmented reality based app in order to understand and answer this question.

Initial research was conducted in conjunction with Dr. Bill Greiser of the neuroscience department at WSU Vancouver to understand the key brain processes that the app should focus on. Research showed a need to demonstrate the brain transmissions related to the human senses, brain development, and emotional states and how function is hindered by controlled substances. Using the game development platform Unity 3D and the Metaio AR SDK the Pop Up Gallery team created an app that uses facial recognition software to overlay a 3D brain on a persons face. The application interface then allows the user to select particular stimuli to be demonstrated and the 3D brain responds to the user request. In partnership with the neuroscience department the app will be demonstrated and tested for many schools in the science outreach program and will continue to undergo development as the technology and research improves.

Our findings show that augmented reality proves to be an effective method of education for middle school curriculum. This project is an extension of the 2014 Pop Up Gallery research with a more refined topic. The need for this refinement will allow further research into other practical applications of augmented reality where other traditional media falls short.

Poster Number 151

ABSTRACT:

Abstract Title:	**Use of and Behavior at Ocelot Latrines by Neotropical Mammalia**		
Presenter:	Travis King		
Mentor:	Dr. Daniel Thornton	**Campus:**	Pullman
Co-Authors:	Dr. Daniel Thornton, Roberto Salom-Perez, Dr. Lisa Shipley, Dr. Paul Verrell		
Major:	Zoology		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

As one of the largest and least studied cats in the Americas, the ocelot (*Leopardus pardalis*) acts as an important predator and environmental barometer in Neotropical ecosystems. However, very limited study had been conducted on the ocelot populations of Costa Rica. My investigation in cooperation with Panthera (an international NGO) focused on examining ocelot latrine behavior in the Barbilla-Destierro Biological Sub-Corridor region of Costa Rica. Latrine behavior (in which multiple ocelots use a set location to mark and defecate) may play an important social role for ocelots and other mammalian species. To determine this, it is essential to understand the composition of species using these ocelot latrines, the temporal patterns of this usage by focal species, and the behaviors that are occurring at these sites. To accomplish this, remote video camera traps were placed at four known ocelot latrines throughout the region. Six months of video data was collected and used to monitor both the usage of the latrines and document key behaviors into an ethogram. The analysis of this data revealed that ocelot latrines act as information centers for multiple mammalian species including highly cryptic and poorly known species like the tayra (*Eira barbara*) to more common species such as white-nosed coati (*Nasua narica*). At these sites ocelot usage seemed to peak at regular intervals (approximately every 60-67 days) which may suggest the latrines play a role in mating as multiple males and females mark and examine these sites during peaks in activity. Furthermore, the host of mammalian species using the latrines display a range of behaviors such as scent marking, site examination, and scent acceptance (when a species rubs ocelot scent into its fur). This indicates the latrines are complex communication centers for multiple species (not only ocelots) and that latrines may have greater functionality beyond their role as places to leave or explore conspecific scent marks. However, further studies are required to determine the ultimate causes these behaviors. The diversity in species usage as well as in behaviors observed by these species; points to these latrines being important hubs for the local mammalian community.

Poster Number 152

ABSTRACT:

Abstract Title:	**Selective Exposure and Media Bias**		
Presenter:	Haley Beatty		
Mentor:	Dr. Dana Lee Baker	**Campus:**	Vancouver
Co-Authors:			
Major:	Political Science		
Category:	Social Sciences		

In this paper, I investigated if ownership of the media contributed to media bias and if that leads to viewers using selective exposure when considering news sources. I started this study from when Fox News and MSNBC began in 1996 rather than when CNN started in 1980 due to the lack of evidence concerning media bias in the latter date. In order to narrow the range of viewers' opinions, I stayed with those between the ages of 35-60, which are the ages people view CNN, MSNBC, and Fox News more. Analyzing different news sources and plenty of scholarly articles and journals, I assessed if media bias existed, how it affects viewers, and whether media ownership contributed to the bias. My findings came to the fact that media bias effectively contributes to viewers' use of selective exposure and that the monopolizing ownership of the media raises serious concerns about the high bias output.

Poster Number 153

ABSTRACT:

Abstract Title:	**Allostery through Protein-induced DNA Bubbles**		
Presenter:	Daniel Herrera and Joseph Traverso		
Mentor:	Nikolaos Voulgarakis	**Campus:**	Tri-Cities
Co-Authors:	Joseph Traverso, Nikolaos Voulgarakis		
Major:	Electrical Engineering / Mechanical Engineering		
Category:	Computer Science, Mathematics, Statistics, and Information Sciences		

Local melting of DNA is a crucial factor of DNA functions and, in many cases, proteins that are involved in the separation of the double strand form aggregates. In DNA transcription, for instance, the aggregation of transcription factors assists the RNA polymerase in opening the transcription bubble and exposing the genetic code. In mitochondrial DNA the clustering of transcription factors A, which are able to locally unwind the DNA, is strongly associated with efficient DNA packaging. In most cases proteins clustering and the local unzipping of the DNA are treated as two independent processes. In this work we present a mathematical model that unravels the role of the local melting of the DNA in mediating indirect protein-protein cooperativity (allostery).
We first present the mathematical formulation of our model that describes the ability of some proteins to locally melt DNA. We argue that coalescence of the protein-induced bubbles underlies protein oligomerization. Extensive numerical simulations verify our hypothesis. Potential of mean force (PMF) calculations provide the quantitative properties of the allosteric interaction, while statistical analysis of the molecular trajectories explain the nature and the origin of this type of DNA allostery.

Poster Number 154

ABSTRACT:

Abstract Title:	**DNA Allostery through Distortion of the Major Grooves**		
Presenter:	Joseph Traverso		
Mentor:	Nikolaos Voulgarakis	**Campus:**	Tri-Cities
Co-Authors:	Nikolaos Voulgarakis		
Major:	Mechanical Engineering		
Category:	Molecular, Cellular, and Chemical Biology		

Allostery through DNA and proteins is an important modulator of fundamental life processes, such as cell signaling and transcription. At the protein level allostery has been extensively studied, but allosteric signaling through DNA is less addressed and still remains far less understood. In the case of DNA, allostery is a conformational and/or dynamical change of the double strand induced by a binding protein, which affects the affinity of another nearby DNA binding protein. It is believed that precise theoretical interpretation of DNA allostery will provide a quantitative understanding of the cause of human diseases and ultimately advance drug discovery. In this project, we study how sequence specificity and protein binding on DNA can indirectly distort the major groove and produces allosteric signals that can be either attractive or repulsive.

We use the well-established Peyrard-Bishop-Dauxois model to describe the dynamics of the local melting of DNA. In this work, we introduce an additional degree of freedom that describes the base pair orientation. The coupling between local melting of DNA and base pair orientation is described through a simple harmonic interaction. We show that factors responsible for DNA unzipping, such as thermal fluctuations and DNA binding proteins modify significantly the orientation of the base pairs planes. This distortion affects the width of the major grooves, which in return modifies the affinity of DNA binding proteins. Our mathematical modeling and simulations are in excellent agreement with recent experimental observations.

Poster Number 155

ABSTRACT:

Abstract Title:	**The Yakima Arboretum: Linking People, Place, and Plants**		
Presenter:	Ashley Hope		
Mentor:	Jolie Kaytes	**Campus:**	Pullman
Co-Authors:			
Major:	Landscape Architecture		
Category:	Arts and Design		

People and plants are entwined by threads that reach back to our very beginnings as a species and is often subtle and unexpected. Connection with nature is a biological need all humans crave and spaces need to express this notion of natural linkage between humanity itself and the surrounding landscapes. Delivering deeper meanings of a space has to be subtle enough to become a personal discovery to really show connection. Spreading the knowledge and emotion of the natural world are key components in keeping the connection flowing.

Working with a traditional arboretum is a challenge when trying to make a unique experience. The Yakima Area Arboretum and Botanical Garden, located in Yakima, was in need of help to better serve the community. This extraordinary place lacks something that the employees and volunteers can't quite put their fingers on. They presented me with the opportunity to help spruce up the arboretum with inspiration and ideas from the staff and interested parties. After the first initial visit with the arboretum's staff, I left with several *"quick fixes"* and *wants* they would like to have done, but for my senior project, I decided to go deeper into what they *need*.

Incorporating the history of Yakima and the arboretum with linkages to the plantscape was a vital concept that was used in the design process. Expanding on to what was already in the collections of the arboretum was essential to continuing the flow of the buried masterpiece that is already there. Spreading the knowledge and emotion of the natural world are key components in keeping the connection of the community of Yakima, as well as visitors, with the natural environment and leave them with a lasting impression.

Poster Number 156

ABSTRACT:

Abstract Title:	**The Effects of Road Salts on Wood Frog (Lithobates sylvaticus) Physiology and Behavior**		
Presenter:	Molly Diamond		
Mentor:	Dr. Erica Crespi	**Campus:**	Pullman
Co-Authors:	Emily M. Hall, Dr. Erica Crespi		
Major:	Zoology		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Each year approximately 14 million tons of road salt is used in North America for de-icing roads, but run-off from these roads is increasing salinity in freshwater ponds used for breeding by many amphibian species. Recent studies have shown that tadpoles in roadside ponds have reduced survival, growth and development rate and increased susceptibility to disease. We hypothesize that in elevated salinity levels experienced by larval amphibians in roadside ponds cause reduced growth and alterations in locomotion because of the increase in energy needed to osmoregulate. To test this hypothesis, we exposed wood frog tadpoles (*Lithobates sylvaticus*) to elevated salt levels as observed in roadside ponds in the Yale-Myers Experimental Forest in Northeastern Connecticut, where the use of road salt is among the highest in the country. Egg clutches were placed in either a high (1200 µS/cm) or low salinity 5 gal aquaria until the second half of the larval period (Gosner stages 34-43). Resting, eating and swimming were recorded for two minutes for each tadpole (n=10/treatment), and observations repeated six times throughout a two-week period. Our results show tadpoles rested more in salt water developed more slowly and spent less time eating and more time resting than tadpoles in freshwater treatments. In a separate experiment in outdoor 114 L tanks of the same two salt concentrations, we recorded significantly more air gulps by tadpoles in the high salinity tanks. These findings suggest that tadpoles in salt water alter behavior and development rate to reserve energy for osmoregulation. While reduced feeding also may contribute to slower development rates, our findings also suggest that tadpoles in elevated salinity have more difficulty obtaining oxygen. To assess this hypothesis more directly, we are currently conducting histological analysis of preserved gill tissues from experimental animals to determine whether gills exposed to high salt experienced a reduction in oxygen absorbing cells and an increase in cell turnover to tolerate the elevated salinity levels. Taken together, our data support the idea that elevations in salinity in roadside ponds caused by increased de-icer run-off could cause the reductions in fitness of tadpoles in these ponds.

Poster Number 157

ABSTRACT:

Abstract Title:	**Mutations in Histone Demethylase Kdm6a Cause Motor Coordination Deficits in a Mouse Model for Kabuki Syndrome**		
Presenter:	Anna Aversa		
Mentor:	Terri Driessen	**Campus:**	Pullman
Co-Authors:	Terri Driessen, Matt Landowski, Caroline Baer, Jun Xu		
Major:	Animal Science		
Category:	Molecular, Cellular, and Chemical Biology		

Kdm6a is located on the X chromosome and regulates the expression of hundreds of genes. Mutations of this gene are associated with Kabuki syndrome, which is characterized by developmental delay, muscular weakness, and intellectual disabilities. We have generated male mice with $Kdm6a^{KO}$, making that gene nonfunctional in the brain. Motor coordination deficits have been previously identified in $Kdm6a^{KO}$ males, and the purpose of our current research is to investigate the molecular changes associated with this decrease in motor performance. Rotarod testing was run on 1 month old juveniles, 2 month old adults, and 8-9 month old adults. The results showed significant differences in the performance of both groups of the adult mice, with the $Kdm6a^{KO}$ males possessing a significant deficiency in motor coordination. There was no difference between the $Kdm6a^{KO}$ and wild type juveniles, indicating that deficits emerge between adolescence and adulthood. Fos, a marker for neuronal activation, was analyzed in the brain after rotarod testing. The results showed that the $Kdm6a^{KO}$ mice had higher Fos expression in the motor cortex and lobe IX of the cerebellum, suggesting that $Kdm6a^{KO}$ in these brain regions is contributing to the motor deficit phenotype. Based on the Fos data, real time quantitative PCR (RTqPCR) was used in the cerebellum to look at changes in the expression of GABA and glutamate receptors between $Kdm6a^{KO}$ mice and wild types. These neurotransmitters have been previously linked to motor coordination, and expression of the gene Grin3b was found to be down-regulated in $Kdm6a^{KO}$ mice. Finally, we are using a site specific AAV-Cre virus injection to determine if the loss of Kdm6a functionality in lobe IX of the cerebellum can induce motor deficits. We hypothesize that the injections will cause motor deficiency phenotypes similar to those present in the mice with whole brain $Kdm6a^{KO}$. In conclusion, our current research indicates that mutations in Kdm6a contribute to motor deficits and alters of the expression of the genes that it regulates. This research is important for understanding the function of Kdm6a and provides insight into genetic mutations such as Kabuki syndrome.

Poster Number 158

ABSTRACT:

Abstract Title:	**Hydrogen Liquefaction in the Pacific-Northwest**		
Presenter:	Parot Charoonsophonsak		
Mentor:	Jacob Leachman	**Campus:**	Pullman
Co-Authors:			
Major:	Mechanical Engineering		
Category:	Engineering and Physical Sciences		

Much of the liquid hydrogen delivered across the country is done by liquid hydrogen tanker trucks. This is due to the fact that the cryogenic liquid hydrogen density is superior to other forms of hydrogen. Only eight liquid hydrogen plants exist in North America, and none are located in the Pacific-Northwest. This raises the issue of an insufficient hydrogen infrastructure within the Pacific-Northwest in order to start a hydrogen economy that is seen across the nation specifically in California and on the east coast. As a component for the start of a hydrogen infrastructure, higher efficiency hydrogen liquefier technology must be developed in order to support a hydrogen economy in the Pacific-Northwest.

To develop this, a specific material property of hydrogen can he used to increase the effective cooling capacity of liquid hydrogen vapors below 100k. Hydrogen has two separable nuclear-spin isomers, denoted by ortho and para, with potentially significant differences in thermophysical properties. The entropy change with ortho-para conversion is the largest of any material phase change known to occur at cryogenic temperatures. A prior experimental study demonstrated that the endothermic reaction of para-ortho conversion can be utilized to increase the effective cooling capacity of liquid parahydrogen boil-off vapors below 100 K. This work expands the concept of endothermic para-ortho conversion to primary refrigeration below 77 K via kinetic manipulation in a vortex tube. Vortex tubes are non-moving devices that utilize a kinetic energy differential to partition a fluid into hot and cold streams. The vortex tube could use a hydrogen stream pre-cooled in a liquid nitrogen bath and catalyzed to the 50-50 equilibrium composition at 77 K. By catalyzing the hot fluid on the outer wall of the vortex, endothermic para-ortho conversion will cause bulk cooling after which the orthohydrogen is separated and recycled to the liquid nitrogen bath. The statistical partition function is utilized to establish performance limits of the concept. Initial experimental results in bare and catalyzed vortex tubes are presented. Based on the theoretical analysis and initial experiments, the potential for para-ortho conversion as a new approach to hydrogen refrigeration is assessed.

Poster Number 159

ABSTRACT:

Abstract Title:	**The Importance of Retinoic Acid Receptor Alpha (Rara) in Spermatogonia, defined through the Characterization of Early Postnatal Germ Cell Populations in the Testis**		
Presenter:	Sophie Ascaso		
Mentor:	Dr. Kwan Hee Kim	**Campus:**	Pullman
Co-Authors:	Natalie Peer, Kwan Hee Kim		
Major:	Zoology, Veterinary Medicine		
Category:	Molecular, Cellular, and Chemical Biology		

The active form of vitamin A, retinoic acid, is critical for spermatogenesis (sperm production). The removal of dietary vitamin A leads to testicular degeneration and infertility in male mice. Retinoic acid (RA) is a ligand to six retinoid receptors that are active in the testis in various cell types and during specific developmental times. Studies on one of these receptors show that retinoic acid receptor alpha (*Rara*) is essential for spermatogenesis. Mutations in *Rara* genes both in somatic and germ cells cause infertility in mice. Roles for RARA have been described for Sertoli cells; however, the functions of RARA in germ cells are not clearly understood. To test the hypothesis that RARA has distinct functions in germ cells, we generated *Rara* conditional knockout (cKO) mice with a segment of the *Rara* gene deleted specifically in germ cells. This renders the RARA mutant protein non-functional in germ cells. The testis from adult cKO animals shows germ cell disorganization, meiotic defects, and reduced sperm counts compared to wild type (WT) animals.

To investigate what effect RARA has on the pool of early germ cells called spermatogonia, antibodies against specific marker proteins were used to identify spermatogonial subpopulations. The antibody against MVH, a pan-germ cell marker, on testis cross-sections from cKO mice at postnatal day 1 (P1) and P2 displayed a higher number of spermatogonia than WT mice. This may be partially due to increased mitosis of spermatogonia, as detected by the immunoreaction with pHH3, a marker that indicates mitosis. These results together suggest that RARA may regulate the number of early spermatogonia at P1 and P2.

From P3 onward, there are two primary pools of spermatogonia, undifferentiated and differentiated spermatogonia. Antibodies against undifferentiated or differentiated spermatogonial markers on testis cross sections from P4-P8 mice revealed a decrease in both undifferentiated and differentiated spermatogonia in cKO compared to WT animals. These results suggest that RARA continues to play a role in the development of spermatogonia at P4 to P8. Our future studies would include experiments to understand how RARA acts to affect spermatogonial cell numbers at P1-P2 and affect spermatogonial development at P4-P8.

Poster Number 160

ABSTRACT:

Abstract Title:	**2014 Eggert Organic Family Farm Buckwheat Trial**		
Presenter:	Kristofor Ludvigson		
Mentor:	Dr. Kevin Murphy	**Campus:**	Pullman
Co-Authors:			
Major:	Organic Agricultural Systems Alternative Crop Breeding		
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

During the summer and early fall of 2014, a small-scale buckwheat trial was undertaking at the WSU Eggert Organic Family Farm. This trial was part of a larger trial working in conjunction with research being undertaken by the University of North Dakota in an attempt to continue working to find better-suited varieties of buckwheat for organic production in environments similar to Eastern Washington.

Seven different buckwheat varieties were utilized, six of which were indeterminant (e.g. plants grow/flower/produce seed until killed by the environment or farmer) and one determinant (e.g. plants possess a finite approximate three month lifespan). Results of flowering onset and finish, seed set rates, height and maturity rates were recorded for each variety throughout the growing season in order to best gauge which possessed the greatest ability to grow/thrive in an Eastern Washington Climate. The trial is currently ongoing, and results are pending.

Poster Number 161

ABSTRACT:

Abstract Title:	**Inhibition of Membrane-Type I Matrix Metalloproteinases**		
Presenter:	Sophia Beyer		
Mentor:	Dr. Cliff Berkman	**Campus:**	Pullman
Co-Authors:	Dr. Cliff Berkman, Desiree Mendes		
Major:	Chemistry		
Category:	Engineering and Physical Sciences		

Matrix metalloproteinases (MMPs) are proteins expressed in healthy tissue. However, it has been found that these enzymes are vastly upregulated in metastatic cancer cells (including, but not limited to, breast cancer cells).[1, 2, 3] Membrane-type I matrix metalloproteinases (MMP-14) are transmembrane proteins that are internalized by and processed within the cell, only to eventually be translocated to the plasma membrane via exocytosis[4]. The internalization of these proteins, along with the fact that they are upregulated in proliferating cancer cells, causes matrix-metalloproteinases to be seen as effective membrane biomarkers. Allosteric inhibition of MMP-14 is currently believed to be the most effective method of inhibition[5]. The hemopexin domain, which is critical to MMP-14 collagenolysis and therefore the function of the enzyme, can be inhibited by small molecules[5] as well as peptide ligands[6]. However, it is hypothesized that in order to create specific MMP-14 inhibition, the catalytic domain must be inhibited, in addition to the hemopexin domain, due to the fact that the hemopexin domain is not specific to MMPs. Therefore, the goal of this project is to selectively inhibit MMP-14 by synthesizing a chimeric heterobivalent platform and optimize the linker length between the catalytic site inhibitor and the hemopexin domain ligand. So far, the fragments used in this study have been synthesized and a library of targeting molecules has been built. Specifically, the S,R-phosphoramidate derivative from L-valinol and D-leucine amide hydrochloride was constructed. Nuclear magnetic resonance revealed that the procedure and purification methods were successful in synthesizing and purifying the phosphoramidate. It is hopeful that one day this insight into MMPs can be applied to imaging, diagnostic, and therapeutic techniques, starting with early, noninvasive detection of cancer.

Poster Number 162

ABSTRACT:

Abstract Title:	**Falls Mill Master Plan**		
Presenter:	Kyle Braun		
Mentor:	Steve Austin	**Campus:**	Pullman
Co-Authors:			
Major:	Landscape Architecture		
Category:	Arts and Design		

The Falls Mill Master Plan incorporates many recreational, educational, ecological, cultural, and historical opportunities to a large heavily used former lumber mill site. The plan includes vast array of constructed wetlands and riparian zones, interpretive center, mountain bike course, lake access, and much more all of which restores, connects and educates people on the core values used to instill a sense environmental responsibility for the actions preformed as a society and as individuals on an everyday basis.
In the short time humans have been on this planet we have managed to harvest and exploit the forests and natural landscapes that once existed abundantly and untouched. Weather the reasons are for economic gain or the betterment of society as a whole the environmental scar can been seen in all aspects of the modern day landscape. The former Snoqualmie Falls Lumber mill site is an example of one of these scars. Through years of harvesting surrounding watershed for timber to construct our present day cities there have been many negative and positive impacts on not only the landscape itself but the community surrounding the area. Having my family be involved with the logging industry for as long as I can trace back I feel it is mine, along with others, environmental responsibility to fix some of the negative impacts industries such as logging have had on the landscape. In order to instill this environmental responsibility on others there is a need to connect, educate and restore the surrounding community and region to a core set of recreational, educational, historical, cultural, and ecological values this site former lumber mill site has to offer.

Poster Number 163

ABSTRACT:

Abstract Title:	**Asphalt Field to Productive Environment: a Master Plan for the Future**		
Presenter:	Ciara Dahm		
Mentor:	Michael Sanchez	**Campus:**	Pullman
Co-Authors:			
Major:	Landscape Architecture		
Category:	Arts and Design		

The parking lot for a big box store sits empty several years after the store was closed. The expanse of asphalt continues to have a negative effect on the local environment, as well as the pedestrian access between key community districts. This scenario is prevalent throughout the United States; however, I am choosing to study and redesign a parking lot in Olympia, Washington. Reclaiming this site as a public park and education center will reduce stormwater runoff, encourage and facilitate alternative forms of transportation (esp. walking and biking), and provide unique education experiences to local schools.

In the context of the world's oil production, peak oil refers to the characteristic of oil harvesting where existing oil wells begin to run dry and new sources are becoming harder to find and harvest. This leads to a smaller supply of crude oil, higher production costs for the oil companies, and in turn a higher cost for consumers. Eventually gasoline will become too high for the average person to use on a daily basis, resulting in less vehicles on the road and more infrastructure left unused. Thus, it is time to address the effects large parking lots have on their surrounding environments, including stormwater runoff, urban heat island, and the lack of pedestrian conditions. Consequently, biofuel production will serve as the driving force for my design.

Conceptually, I want to explore and redefine the idea of parking lots. By using a traditional parking layout for the framework of the design, I can create a master plan that looks familiar, while at the same time incorporating components that are unexpected. Instead of vehicles, parking stalls will be home to vegetated beds. Part biofuel crops, part community gardens, these beds will provide local access to produce, provide raw materials for biofuel production, and collect all stormwater on site. The existing building will house a biofuel processing plant, classrooms, a cafe, and public amenities. Paths throughout will allow the site to act as both gardens and walking park. This approach can be implemented across the country to reclaim space devoted to transportation infrastructure as we transition into a future without crude oil.

Poster Number 164

ABSTRACT:

Abstract Title:	**Synthesis of a Potential Prostate Cancer Drug Conjugate**		
Presenter:	Matthew Galliher		
Mentor:	Clifford Berkman	**Campus:**	Pullman
Co-Authors:			
Major:	Biochemistry, Chemistry		
Category:	Engineering and Physical Sciences		

The protein Prostate-Specific Membrane Antigen (PSMA) has been described as an 'ideal biomarker' for prostate cancer because its presence on cell surfaces is restricted mainly to prostate tumor cells. PSMA expression increases on late-stage, androgen-independent, and metastatic prostate cancer cells. PSMA also decorates cells lining new blood vessels of a variety of other types of tumors such as breast, colon, lung, and ovarian, which has raised the prospect of its use as a biomarker for highly-vascularized tumors. The Berkman lab at WSU is the first and only lab to develop a unique class of molecules that selectively bind to PSMA and penetrate prostate cancer cells. Now these inhibitors are being pursued as targeting agents for the selective delivery of therapeutics agents into prostate tumors cells. To this end, we have designed a hybrid molecule that combines both a PSMA targeting agent with a cytotoxic drug for the selective treatment of prostate tumor cells. The cytotoxic drugs selected for these 1st-generation PSMA-targeted drug conjugates are the chemotherapeutic agents doxorubicin and paclitaxel which have been shown to be effective in the treatment of prostate, breast, and ovarian cancers. It is expected that such PSMA-targeted drug conjugates will exhibit high selectivity for prostate tumor cells and spare normal cells from the common side effects of chemotherapy. The proposed drug conjugate will be composed of a phosphoramidate inhibitor coupled to a cytotoxic drug by an acid labile linker. Previous efforts have involved a direct conjugation of the inhibitor to the linker. Currently, the use of an amino-hexanoic acid component is being explored as a bridging component between the inhibitor and linker. This presentation will highlight our progress in the development of our 1st-generation PSMA-targeted therapeutic platform. The effectiveness of these agents will be assessed for PSMA binding, extent of drug release, and cytotoxicity toward target cells.

Poster Number 165

ABSTRACT:

Abstract Title:	**Interpreting Culture through Visual Translation**		
Presenter:	Wanjiru Ndambiri		
Mentor:	Kathleen Ryan	**Campus:**	Pullman
Co-Authors:			
Major:	Interior Design		
Category:	Arts and Design		

Problem

Graphic Communication has the ability to transverse cultural boundaries.[1] This design challenge called for the graphic communication of historical information for a series of exhibits displayed in an academic anthropology museum. This project entailed dealing with sensitive cross-cultural boundaries as well as re-interpreting complex cultural information. Graphic communication was used as a comprehensible medium to convey Western and Native American culture through design. This research is relevant to Interior Design because it will enable designers and other disciplines alike to better comprehend the intricacies of exhibition design and the social-interactive significance that museums and other exhibition spaces hold in our society.

Background/Methods

This exhibit-design research was approached through developing the graphic context of the exhibit. The delivery of the text, which had already gone through a selective, cultural re-interpretive process was of utmost importance to the public's perception and comprehension of the exhibit through a Native American understanding. "The task at hand was to transform the text, and promotional information – i.e. posters, flyers, etc. – into easily understood graphic compositions of text – i.e., typography selection, size, shape, color, etc. "Perceptual psychology is the "theoretical groundwork" that helps us apprehend how we [the perceiver] recognize and understand graphic forms distinct from their respective backgrounds.[2] Case studies on how graphic communication can be applied to exhibition graphics were developed, in order to identify models and prototypes for how to best approach this design problem.[3] The Case studies aided in the justification of applying perceptual psychological principles into the museum exhibitions.

Results

As designers for informal learning environments, it is important to be aware of the intended audience and their perception of a space without the benefit of spoken human interaction. The use of culturally appropriate selected colors; fluently legible fonts, vividly cognitive images and a clear, systematic graphic layout are important so as not to convolute information that may already be misconstrued. Successful installation of these exhibits focused on the intersection of Western and Native American culture(s) in the Pacific Northwest and demonstrated that a robust visual rendition is paramount to the successful interpretation of culture.

Poster Number 166

ABSTRACT:

Abstract Title:	**Hydrogen Bond Dynamics at the Interface**		
Presenter:	Alexander McCue		
Mentor:	Aurora Clark	**Campus:**	Pullman
Co-Authors:	Tiecheng Zhou, Yasaman Ghadarghadr, Aurora Clark		
Major:	Chemistry		
Category:	Engineering and Physical Sciences		

My undergraduate research is focused upon understanding why the lifetime of a hydrogen bond in water decreases when water is at the vapor interface, or the interface with a hydrophobic solvent, like hexane. Molecular dynamics simulations have been performed that describe the water:vapor and water:hexane interface. In each simulation the lifetime of the hydrogen bond in the interfacial region was found to be decreased relative to the lifetime in pure water. To investigate this further, different classical force fields were studied for water to examine if this was an artifact of the way in which the intermolecular interactions of water were described. The observation of the decreased H-bond lifetime was found to be independent of the force field. We then hypothesized that the decreased lifetime could be attributed to: the decreased average number of H-bonds per molecule causing the H-bonds to break and reform faster than in pure water; or that due to the decreased density of water in the interface that the water molecules were simply unable to form new Hydrogen Bonds.

To test these hypotheses, he average number of Hydrogen Bonds per layer was found as well as the weighted average of the lifetime of those bonds per layer (after removing transient breaks/reformations). The weighted average of the amount of time that the hydrogen atoms remain free of a Hydrogen Bond while in each layer was also found (Non-Hydrogen Bond lifetime). These measurements allowed for the speed of the breaking and reformation events to be compared between interfacial water and pure water, and the Non-Hydrogen Bond lifetime tested how dispersed the water molecules were.

The average number of breaks/reformations per hydrogen bond was about 10% higher in the Interface than in the Bulk, so the first hypothesis does not account for the entire phenomenon. The lowered density in the Interface does inhibit hydrogen bonding as well, as the Non-Hydrogen Bond lifetime is increased in the Interface relative to the Bulk. It is therefore concluded that both of the hypothesis are part of the cause of the decrease in the average Hydrogen Bond lifetime in the interface.

Poster Number 167

ABSTRACT:

Abstract Title:	**Synergistic Regulation of Pro-Survival Responses by IGF-1R and EGFR Signaling**		
Presenter:	Emily Whitehead		
Mentor:	Haluk Resat	**Campus:**	Pullman
Co-Authors:	Zach Speth, Kasturi Banerjee, Haluk Resat		
Major:	Bioengineering		
Category:	Molecular, Cellular, and Chemical Biology		

Understanding signaling pathways of cancer cells is essential in developing effective treatment plans. Insulin-like Growth Factor Receptor (IGF-1R) and Epidermal Growth Factor Receptor (EGFR) activate almost the same set of sentinel proteins for proliferation and survival in cells. We hypothesized that activation of the key downstream signaling proteins have differences when stimulated through EGFR or IGF-1R pathways. Activating the receptors simultaneously or individually also allowed us to investigate whether there are cooperative pro-survival responses due to IGF-1R and EGFR signaling in MDA-MB-231 breast cancer cells.

The cells were activated with IGF-1 and/or EGF, respective ligands for IGF-1R and EGFR. Then, the activation of STAT3, p38, and Akt, which are the sentinel proteins for IGF-1R and EGFR signaling pathways, as well as activations of IGF-1R and EGFR were measured. We have also investigated how the selective inhibition of proteins using chemical inhibitors affected the activation levels of the other sentinels. Our results show similarities and differences in the activations of specific target proteins, Akt, STAT3, and p38. We found that STAT3 represses p38 and activates Akt when it is stimulated through either IGF-1R or EGFR pathways. However, STAT3 activation pattern itself was dependent on its stimulation through IGF-1R or EGFR. Analyzing the receptor signaling networks are therefore important in determining the context dependent relationships and how each protein/gene plays a role in the oncogenic signaling individually and as a set. Our results also established that IGF-1R and EGFR work cooperatively when activating the downstream proteins in our study. This is significant because cancer cell lines can quickly adapt and utilize a similar pathway when one major pathway is inhibited, i.e. adaptation to acquire pathway compensation. Because the two pathways activate similar downstream targets, cells can acquire resistance to EGFR-targeted therapies by utilizing the IGF-1R pathway. This holds true for the reverse process as well; IGF-1R inhibition can be overcome by utilizing the EGFR pathway. Understanding the ways in which these pathways work cooperatively will allow for better treatment targets/methods.

Poster Number 168

ABSTRACT:

Abstract Title:	**Perceptions of Vernacular | Differences in Readings of Grain Storage Structures**		
Presenter:	Jonathan Younce		
Mentor:	Kathleen Ryan	**Campus:**	Pullman
Co-Authors:			
Major:	Architecture		
Category:	Social Sciences		

This study explores the different perceptions between design and agricultural disciplines concerning the importance and meaning of the grain elevator. In the design disciplines, specifically Architecture, elevators are often viewed as the vernacular, or local architecture because of their immense visual impact on the surrounding landscape due to their size. Currently, many are being torn down for safety reasons. A loss of important cultural icons such as these could be considered disastrous. It is unclear, however, to what degree those who live around and work in the industries associated with the elevators consider the structures in the same light.

To explore the potential difference in perceptions between the disciplines, this study uses the ideas of place theory and consensual assessment technique to gauge initial bias throughout the developmental training phases of each discipline. In the survey developed for the study, participants from two or more of the design and agricultural disciplines are asked their major field of study, how many years of training they have received in that field, as well as to choose descriptive words for a pair of pictures of grain elevators from a word bank. There are 20 descriptive words ranging from more romanticised to more utilitarian terms. The pictures are taken in neutral light so as to prevent creating bias via photo composition. To prevent skewing of the results, participants are not told the purpose of the study.

This study expects to find that design disciplines put far more cultural emphasis on elevators than their agricultural counterparts, who will take a more utilitarian view, making the elevators' impact on a region's architectural and cultural consciousness much less than those in design disciplines might assume.

Poster Number 169

ABSTRACT:

Abstract Title:	**Efficacy of Soil Steaming to Control *Phytophthora Ramorum* in Washington Soils.**		
Presenter:	Zackery Zobrist		
Mentor:	Gary Cahstagner	**Campus:**	Pullman
Co-Authors:	Marianne Elliot, Gary Chastagner		
Major:	Landscape, Nursery and Greenhouse Managament		
Category:	Applied Sciences		

Phytophthora ramorum, otherwise known as sudden oak death, can lead to the rapid decline of oaks and tanoaks. The pathogen while devastating to forests, can also harm, and be harbored by a wide variety of important nursery crops. P. *ramorum* has contributed to the demise oak forests in California ever since its discovery in 1995, and is often spread across state lines through nursery stock. California, Oregon and Washington have seen Federal regulatory actions taken to prevent the movement of the pathogen within nursery stock. Current regulations mandate that infested soils must be fumigated, or paved over with a non-porous surface. *P. ramorum* can be controlled by the application of heat in excess of fifty degrees Celsius. Testing was done to see if the use of steam in a soil profile could reach the requisite temperatures to eliminate the pathogen. The following hypothesis was formulated, steaming could be used as an effective alternative to other pathogen control mechanisms, by deactivating *Phytophthora ramorum* in the soil profile via raising the soil temperature to above 50 degrees Celsius. In this preliminary testing a 40mm thick specialized tarp was used in conjunction with sandbags, and a custom industrial steamer to heat a 6ft by 6ft plot of soil. The testing area had five separate holes dug for temperature probes each with three depths 5cm, 15cm and 30cm. The steamer was run for approximately 13 hours and the temperature of the soil profile measured for 24 hours. The results of the experiment showed that the temperature of the soil increased rapidly at the 5 and 15cm mark. At the 30cm mark the results showed that, while delayed, temperatures did eventually reach the fifty degree mark at the depth of 30cm, save for the most exterior sensor which only reached 48 degrees Celsius. With those results it's possible to conclude that steaming may be an effective alternative to other control methods, even in the relatively moist and cool soils of Washington. However more research will be needed to determine the efficacy of steaming in more compact and modified soils.