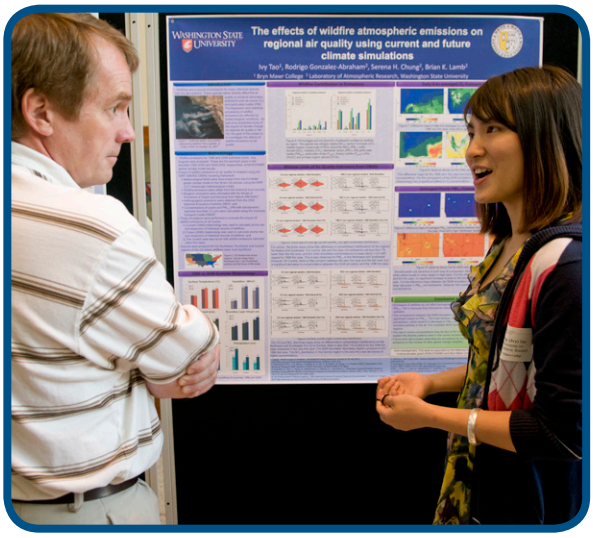
SURCA

SHOWCASE FOR UNDERGRADUATE RESEARCH AND CREATIVE ACTIVITIES



March 30, 2012

CUB Ballrooms

SURCA.wsu.edu

WASHINGTON STATE UNIVERSITY

UNIVERSITY COLLEGE

Showcase for Undergraduate Research and Creative Activities (SURCA)

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Showcase of Undergraduate Research
and Creative Activities (SURCA)

Friday, March 30, 2012

SCHEDULE OF EVENTS

12:00 – 1:30 pm	Oral Presentation Session I, Junior Ballroom – back Public welcome.
1:30 – 3:00 pm	Oral Presentation Sessions 2 and 3, Junior Ballroom Public welcome.
2:30 – 3:15 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 Judge's with refreshments available.
3:15 – 4:15 pm	FORMAL JUDGING, Senior Ballroom – Student presenters will be present to answer questions. All score and comment sheets must be submitted by 4:15 PM.
3:45 – 5:00 pm	Senior Ballroom open to the public for viewing of the posters. Refreshments will be served
5:00 pm	AWARDS PROGRAM, Junior Ballroom Presentation of Awards

2012

SHOWCASE OF UNDERGRADUATE RESEARCH

AND CREATIVE ACTIVITIES

AWARDS AVAILABLE:

Awards available in each category:

Crimson Award	$250
Gray Award	$150
Novice Award	$100
Early Career: FR/SO Award	$100

All monetary awards for SURCA were made possible by University College through the **Grady and Lillie Auvil Scholarship and Research Fund**. The Auvils have provided perpetual funding of scholarship and research at WSU and Grady once said, "I believe everyone has an obligation to try and improve the future of people, education and research are the only ways."

Additional Awards provided by:

LSAMP – Louis Stokes Alliance for Minority Participation

The following will be awarded at the WSU University College Awards Ceremony on April 17:

The Norma C. Fuentes and Gary M. Kirk Award for Excellence in Undergraduate Research

The Emeritus Society Awards for Undergraduate Achievement in Scholarship and Research

Our Sponsors

A huge Thank You to our supporters,
without whom this event could not happen!

University College at WSU
WSU College of Engineering and Architecture
WSU College of Veterinary Medicine
WSU College of Agricultural, Human, and Natural Resource Sciences
WSU College of Education
WSU College of Liberal Arts
Honors College at WSU
WSU Murrow College of Communications
WSU College of Business
WSU College of Sciences

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The SURCA Committee:

Shelley Pressley, Director of Undergraduate Research, University College
Mary Sanchez Lanier, Associate Dean, University College
Beverly Makhani, Communication Manager, University College
Jeremy Lessmann, Chemistry, College of Sciences
Samantha Gizerian, Neuroscience, College of Veterinary Medicine
Jeannie Holt, Vice Provost Office, University College
LeeAnn Tibbals, Pre-Health Advising, University College
Deb Dzuck, Director of Development, University College

Showcase for Undergraduate Research and Creative Activities (SURCA)
March 30, 2012
CUB M.G. Carey Senior Ballroom

INSTRUCTIONS FOR POSTER JUDGES

At the SURCA event, you will have up to 1.75 hours at the poster session. During the first 45 minutes no students will be present and you can view as many posters as you wish; this is followed by a one-hour period when all students making poster presentations will be present for visits by judges (see times below).

Your judge's packet will include a list of the posters you will be judging and scorecards. The scorecards will not be shared with students. You will also be given a comment sheet for each poster. You can record constructive comments that can be passed on to the student on these sheets. Please turn in the Comment Sheets with your score sheets; they will be given to the students at the end of the competition. The student researchers appreciate this feedback. You will be asked to judge 2 to 3 posters. Considerations should be given to the depth and the involvement of the research project. Please do remember that these are undergraduate students we are evaluating.

2:30 – 3:15 **Open judging for posters - informal** **CUB Ballroom**
Posters are available for previewing by judges during this time. The room is otherwise closed to the public. This time is available for your convenience. You are not expected to be there the entire time and the presenters will not be present during this time. The Judge's area in the Ballroom will be open with refreshments available.

3:15 – 4:15 **Formal Judging, Presenters will be available for questioning.**
This time allows you approximately 15-20 minutes per Presenter to evaluate their knowledge and presentation. Keep in mind that the public will be in the room during the last half hour. You may use the Judge's area in the Ballroom to tabulate your scores and complete the Comment Sheet. Refreshments will be available in the Judge's area.
Score sheets <u>must</u> be turned in by 4:15.

3:45 – 5:00 **Ballroom is open to the public**, refreshments available in open area.

4:15 – 5:00 **Scores will be tabulated** by the Tally Committee. Comment sheets will be gathered and distributed to the Presenters. Judges will have time to visit posters as your formal judging duties will be completed

5:00 **Awards presentation** – The winners and their mentors are introduced and presented with their awards. Please stay and enjoy the ceremony.

THANK YOU FOR PARTICIPATING IN THIS EVENT, THIS IS A GREAT PROFESSIONAL OPPORTUNITY FOR THE STUDENTS AND WE'RE GLAD YOU COULD ADD TO THE EXPERIENCE.

Showcase for Undergraduate Research and Creative Activities (SURCA)
March 30, 2012
CUB Junior Ballroom

INSTRUCTIONS FOR ORAL PRESENTATION JUDGES

At the SURCA event, you will be appointed to one 1.5 hour oral session. There are 5 to 6 presentations during each session, with each presentation lasting 10 minutes plus 5 minutes for questions. You will be asked to judge all presentations during the session. There is a private area in the CUB Senior Ballroom after 2:30 that will be available to judges for making comments and completing scorecards and enjoy some refreshments.

Your judge's packet will include the session number (1, 2, or 3), a list of the presentations you will be judging and scorecards. The scorecards will not be shared with students. You will also be given a comment sheet for each presenter. You can record constructive comments to turn in with the score sheets. The comment sheets will be returned to the students in a sealed envelope. The student researchers appreciate this feedback. Considerations should be given to the depth and the involvement of the research project. Please do remember that these are undergraduate students we are evaluating.

Noon – 1:30	**SESSION 1**	**CUB Junior Ballroom (back half)**
1:30 – 3:00	**SESSION 2**	**CUB Junior Ballroom (front half)**
1:30 – 3:00	**SESSION 3**	**CUB Junior Ballroom (back half)**

2:30 – 5:00 **Judge's Area is open to judges** **CUB Senior Ballroom**
You may use the Judge's are in the Ballroom to tabulate your scores and complete the Comment Sheet. Refreshments will be available in the Judge's area. **Score sheets <u>must</u> be turned in by 4:15**.

3:45 – 5:00 **Ballroom is open to the public**, refreshments available in open area.

4:15 – 5:00 **Scores will be tabulated** by the Tally Committee. Comment sheets will be gathered and distributed to the Presenters. Judges will have time to visit posters as your formal judging duties will be completed

5:00 **Awards presentation** – Enjoy as the winners and their mentors are introduced and presented with their awards. Please stay and enjoy the ceremony.

THANK YOU FOR PARTICIPATING IN THIS EVENT, THIS IS A GREAT PROFESSIONAL OPPORTUNITY FOR THE STUDENTS AND WE'RE GLAD YOU COULD ADD TO THE EXPERIENC

Judging Rubric for Presentation of Research

Score	Goal, Hypothesis or Description	Methods	Results	Conclusions and Future Work	Presentation
5	• Project had a goal or a logical hypothesis that was stated clearly and concisely or the creative endeavor was well described. • Background information was relevant and summarized well. Connections to previous literature or works and broader issues were clear. • Broad impact beyond project clearly stated.	• Excellent choice of empirical methods to address hypothesis or goal of project or demonstrates original thinking or approach to creative endeavor. • Excellent original thinking regarding innovation of technique or choice of how creative work will be presented. • Clear discussion of controls or comparative groups; all appropriate controls or comparative groups were included.	• Substantial amounts of high quality data were presented sufficient to address hypothesis or goal of project or original, creative work was presented. • Presentation of data was clear, thorough and logical or program notes were provided that provide insight into the creative process.	• Reasonable conclusions were given and strongly supported with evidence. • Conclusion was connected to project goals or hypothesis and their relevance in a wider context was discussed. • Potential problems and alternative approaches were presented and discussed.	• All expected components are present, clearly organized, and there is a logical flow to the presentation. • Text is concise, free of spelling or typographical errors; presentation is appropriate. • Figures and tables are appropriate and labeled correctly. • Photographs/tables/graphs improve understanding and enhance visual appeal.
4	• A logical goal or hypothesis was presented or the creative endeavor was adequately described. • Background information was relevant, but connections were not clear. • Mention of Broad Impacts beyond the project.	• Very good choice of empirical methods to address hypothesis or goal or project or demonstrates very good original thinking or approach to creative endeavor. • Very good original thinking. • Clear discussion of controls or comparative groups; most controls or comparative groups were included.	• Substantial amounts of good data were presented sufficient to address the hypothesis or goal of project or creative work was presented. • Presentation of data was clear and logical or program notes were provided that provide some insight into the creative process.	• Reasonable conclusions were given and supported with evidence. • Conclusion was connected to hypothesis or project goals but their relevance was not discussed. • Potential problems and alternative approaches were presented but not discussed.	• All components are present, but not organized well. • Text is relatively clear, mostly free of spelling and typographical errors; presentation is appropriate. • Most figures and tables are appropriate and labeled correctly. • Photographs/tables/graphs improve understanding.

3	• A questionable hypothesis or project goal was presented or a description of the creative endeavor was incomplete or confusing. • Background information was relevant, but connections were not made.	• Good choice of empirical methods to address hypothesis or goal or demonstrates good original thinking or approach to creative endeavor. • Good original thinking. • Adequate discussion of controls or comparative groups; some significant controls or comparative groups were lacking.	• Adequate amounts of reasonably good data were presented to address hypothesis or project goals or the creative work seemed incomplete. • Presentation of data was not entirely clear or program notes were not entirely clear and the creative process was unclear.	• Reasonable conclusions were given. • Conclusions were not compared to the hypothesis or project goal and their relevance was not discussed.	• Most expected components are present, but not organized well. • Text is relatively clear, but some spelling and typographical errors. • Figures and tables not always related to text, or are not appropriate, or poorly labeled. • Photographs/tables/graphs limited and do not improve understanding.
2	• A questionable hypothesis was presented and was not well supported or the goal of the project was not clear or the creative endeavor was not described sufficiently.	• Method not appropriate to address hypothesis or goal of project or demonstrates no original thinking or approach to creative endeavor. • No original thinking. • Controls or comparative groups not adequately described; some controls or comparative groups missing.	• Some data were lacking, not fully sufficient to address hypothesis or project goal or the creative work was inadequate. • Presentation of data or program notes was included, but unclear or difficult to comprehend	• Conclusions were given. • Little connection to hypothesis or goal was apparent. • Potential problems and alternative approaches were not presented.	• Some expected components are present, or organization is confusing and disorderly. • Text is hard to read due to font size or color, some spelling and typographical errors. • Figures and tables not related to text, or are not appropriate, or poorly labeled. • Photographs/tables/graphs limited and do not improve understanding.
1	• The hypothesis or goal was inappropriate or not stated or the description of the creative endeavor was missing. • Little or no background information was included.	• Methods section missing. • No original thinking. • Serious lack of controls or discussion of controls.	• Results are not yet available or reproducible or the creative work was incomplete. • Presentation of data or program notes was missing.	• Conclusions were missing. • There was no connection with the hypothesis or project goal.	• Some of the expected components are present, but poorly laid out and confusing. • Text hard to read, messy and contains multiple spelling and typographical errors. • Visual aids not used.

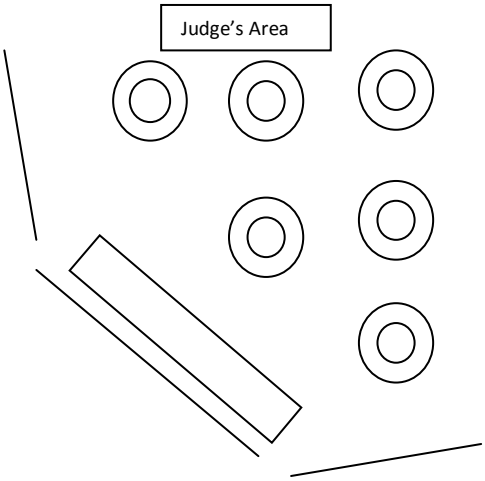
"adapted from the rubric developed by the American Society for Microbiology and the Committee for the Annual Biomedical Research Conference for Minority Students (ABRCMS)."

Judging Rubric for Presenter

Score	Knowledge of Project	Logical Presentation	Background Information	Presence
5	Answers difficult questions clearly and succinctly.	Presentation is consistently clear and logical. Comfortably uses visual aids to enhance presentation.	Demonstrates a very strong knowledge of the project and project background.	Speaks clearly, naturally and with enthusiasm; makes eye contact. Presenter was well prepared and professional.
4	Answers most questions.	Presentation is clear for the most part, but not consistently. Comfortably uses visual aids to enhance presentation.	Demonstrates a good knowledge of the project and project background.	Speaks clearly, naturally; makes eye contact. Presenter was prepared and professional.
3	Has some difficulty answering challenging questions.	Presentation is generally unclear and inconsistent. Uses some visual aids to enhance presentation.	Demonstrates some knowledge of the project and project background.	Reads from visual aid or script some of the time. Presenter was semi-prepared and professional.
2	Has difficulty answering challenging questions.	Presentation unclear and illogical. Does not use visual aid to enhance presentation effectively.	Demonstrates poor knowledge of the project.	Reads from visual aid or script most of the time. Presenter was not prepared or professional.
1	Does not understand questions.	Presentation very confusing. Does not use visual aids to enhance presentation effectively.	Does not demonstrate any knowledge of the project.	Reads from visual aid or script all of the time. Presenter was unprepared and unprofessional.

TENTATIVE ROOM SET UP

CUB Sr. Ballroom, March 30, 2012



Refreshments

104 103 82 81 60 59

105 102 83 80 61 58

106 101 84 79 62 57

107 100 85 78 63 56 41 40 25 24 9 8

127 108 99 86 77 64 55 42 39 26 23 10 7

109 98 87 76 65 54 43 38 27 22 11 6

126

110 97 88 75 66 53 44 37 28 21 12 5

125

111 96 89 74 67 52 45 36 29 20 13 4

124 112 95 90 73 68 51 46 35 30 19 14 3

113 94 91 72 69 50 47 34 31` 18 15 2

123

114 93 92 71 70 49 48 33 32 17 16 1

122 1

121

Refreshments 10

Entrance

2012 Showcase for Undergraduate Research and Creative Activities (SURCA)
JUDGES

We wish to thank our Judges who have donated their time this afternoon. The judging pool is comprised of many volunteers from the following areas:

Avista Utilities
The Boeing Company
Decagon Devices, Inc
Metriguard Incorporated
Palouse Discovery Science Center
Ray Combs Consulting
Strata Incorporated
University of Washington, School of Medicine
WSU Foundation Relations
WSU College of Engineering and Architecture
WSU College of Veterinary Medicine
WSU College of Agricultural, Human, and Natural Resource Sciences
WSU College of Sciences
WSU College of Education
WSU College of Liberal Arts
University College at WSU
Honors College at WSU
WSU Murrow College of Communications
WSU College of Business
WSU College of Pharmacy
WSU Emeritus Faculty

2012
SHOWCASE FOR UNDERGRADUATE RESEARCH AND CREATIVE ACTIVITIES
ENTRIES
ALPHABETICALLY BY PRESENTER

Poster No.	Presenter	Category	Title of Abstract
1	**Allan, Matthew**; mentor: Dr. Amit Dhingra	Applies Sciences	Micrografting Sweet Cherry Trees for Rapid Orchard Ready Tree Production
O-3	**Anaya, Gerardo**; mentor: Dr. Dogan Gursoy	Social Sciences	The Customer is Not Always Right: Categories of Customer Service Sabotage
8	**Ariza, Loren**; mentor: Dr. Asaph Cousins	Molecular, Cellular, and Chemical Biology	In vivo kinetics of Ribulose-1,5-bisphosphate Carboxylase Oxygenase in Arabidopsis thaliana
12	**Arnold, Briana**; mentor: Dr. Kris Johnson	Applied Sciences	Beef Cow Learning Behavior
2	**Baerlocher, Marsha**; mentor: Dr. Bailey Stokes	Arts and Design	Kyra
125	**Bahrami, Justin**; mentor: Dr. Cornelius Ivory	Engineering and Physical Sciences	Separations and Flow Regimes in Continuous Counterflow Centrifuges
123	**Balash, Hannah**; mentor: Dr. Jim Pru	Molecular, Cellular, and Chemical Biology	The Functional Role of NR3C1 in Ovarian Biology
O-4	**Baldwin, Steven:** mentor: Dr. R. Charles Well	Humanities	Personal Life History Project
6	**Bayomy, Omar**; mentor: Dr. James Krueger	Molecular, Cellular, and Chemical Biology	Interleukin-1 Receptor Accessory Protein B in Sleep Regulation

Poster No.	Presenter	Category	Title of Abstract
57	**Bizga, Jonathan**; mentor: Dr. Weihong Zhong	Engineering and Physical Sciences	Correlation between hybrid carbon nano-fill dispersion state and AC/DC conductivity ratio in polycarbonate
92	**Bliggenstorfer, Jonathan**; mentor: Dr. Douglas Call	Molecular, Cellular, and Chemical Biology	Efflux pump accumulation is the probable mechanism responsible for high level florfenicol resistance in Salmonella enterica
40	**Blum, Kyle**; mentor: Dr. Anita Vasavada	Engineering and Physical Sciences	Neck Muscle Strains in Females During Whiplash
20	**Bohan, Rachel and Daltas, James**; mentor: Dr. Reynolds	Arts and Design	Wine-Menu Design: An Investigation of Attributes and Causal Effects Using Brain-Computer Interface Technology
46	**Boyer, Melissa**; mentor: Dr. John McNamara	Organismal, Population, Ecological, and Evolutionary Biology	The environmental viability of Toggenburg goats and Holstein cattle in Northern Kenya
15	**Brewer, Sarah**; mentor: Dr. Norman G. Lewis	Molecular, Cellular, and Chemical Biology	Differential Expression Patterns of Arogenate Dehydratase genes 1-6 in Arabidopsis thaliana
70	**Brickman, Jared**; mentor: Rebecca Goodrich	Arts and Design	The World in a Suitcase: A Collection of Short Fiction
3	**Brown, Kevin**; mentor: Dr. Robert Dillon	Computer Science, Mathematics, Statistics, Information Sciences	Mathematical Model of Solid Tumor Growth
4	**Brown, Kevin**; mentor: Dr. Subra Muralidharan	Molecular, Cellular, and Chemical Biology	"Design of SNAP---Tag Fluorescent Probes to Study Dynamics Of $\alpha_V\beta_3$ Integrin Protein during Tumor Progression and Metastasis"

Poster No.	Presenter	Category	Title of Abstract
35	**Bunker, Teea**; mentor: Dr. Subra Muralidharan	Molecular, Cellular, and Chemical Biology	Design of SNAP-Tag Fluorescent Probes to Study Dynamics of E-Cadherin During Tumor Progression and Metastasis
25	**Buscher, John**; mentor: Farida Selim	Engineering and Physical Sciences	Characterization of Yttrium Aluminum Garnets Prepared by Sol-gel Method
26	**Callahan, Casey and Toscano, Miguel**; mentor: Dr. Krzysztof Czaja	Molecular, Cellular, and Chemical Biology	Systemic capsaicin reduces fat pad mass in adult male rats
29	**Chen, Frederick**; mentor: Farida Selim	Engineering and Physical Sciences	Optical Properties of Oxide Thin Films Synthesized for Photonic Applications by Spin Coating
106	**Christian, Ryan**; mentor: Amit Dhingra	Molecular, Cellular, and Chemical Biology	Characterization of Differentially Expressed Genes in Apple (Malus x domestica)
10	**Christianson, Charles**; mentor: Dr. Laura Lavine	Organismal, Population, Ecological, and Evolutionary Biology	Inhibition of P-glycoprotein efflux transporters increases the efficacy of insecticides against the western flower thrips, Frankliniella occidentalis
45	**Clark, Nicole**; mentor: Chengtao Her	Molecular, Cellular, and Chemical Biology	The human MutS homologue hMSH5 promotes genomic stability by suppressing error-prone DNA double-strand break repair
O-5	**Coan, Kristen**; mentor: Jesse Spohnholz	Humanities	Gender and Exile in the French Reformation: The Experiences of Refugee Women in Calvin?s Geneva, 1541-1544
124	**Colbert, Patrick**; mentor: Jim Durfey	Applied Sciences	Determining Soil Spatial Variability Using Electric Conductivity to Further Understand and Better Manage Orchards in the Pacific Northwest.

Poster No.	Presenter	Category	Title of Abstract
80	**Colburn, Zachary**; mentor: Dr. Dybdahl	Organismal, Population, Ecological, and Evolutionary Biology	The impact of competition when parasites affect host resource use
49	**Colby, Sean**; mentor: Dr. James Carson, PNNL	Computer Sciences, Mathematics, Statistics, Information Sciences	Three-Dimensional Reconstruction And Analysis Of High-Resolution Serial-Sectioned Mouse Brain Tissue Images
27	**Coleman, Heidi**; mentor: Dr. Bahr	Engineering and Physical Sciences	Longitudinal and Transverse Mechanical Properties of Wood Cells
11	**Comstock, Shealyn**; mentor: Dr. Teresa Cardon	Social Sciences	Use of Imitation to Aid in the Development of Children with Autism
14	**Conger-Best, Randall**; mentor: Michael C. Rowe	Engineering and Physical Sciences	A first look at mineral compositions of the 1886 Tarawera eruption, New Zealand
47	**Costello, Reilly**; mentor: Dr. Larry Bruya	Social Sciences	Physical Activity Goal Orientation in Adolescents
O-6	**Creekpaum, Vance**; mentor: Tracy Morgan	Social Sciences	Exporting a Service: How Governments Regulate Ambiguous Goods
110	**Creekpaum, Vance with Craig Murchison, Haydn Ritter, Lina Romero, Ramya Ramanathan, Curran Scott, Anil Shah, and Hue Xiong**; mentor: Tracy Morgan	Social Sciences	Comparative analysis of countries in need of 'potable water product solutions' using decision matrix and current country commercial guides
79	**Cutler, Eric**; mentor: Michael Rowe	Engineering and Physical Sciences	Petrology and Mineralogy of the Gold Hill Syenite-Pyroxenite Intrusion, Potlatch Quadrangle, Northern Idaho
20	**Daltas, James and Bohan, Rachel**; mentor: Dr. Reynolds	Arts and Design	Wine-Menu Design: An Investigation of Attributes and Causal Effects Using Brain-Computer Interface Technology

Poster No.	Presenter	Category	Title of Abstract
O-2	**Dart, Graham**; mentor: Dr. Shannon Scott	Arts and Design	New York Counterpoint: Exploring the Techniques of Taped Music
101	**Davis, Hana**; mentor: Dr. David Moffett	Molecular, Cellular, and Chemical Biology	Alkali secretion by the midgut of larval yellow fever mosquitoes Aedes aegypti and its control by serotonin.
81	**Dawson, Scott**; mentor: Dhrubojyoti D. Laskar	Molecular, Cellular, and Chemical Biology	Evaluation of depolymerized lignin suitable for aqueous phase conversion to jet fuel range hydrocarbons
13	**DeFord, Daryl**; mentor: Dr. Webb	Computer Science, Mathematics, Statistics, Information Sciences	Combinatorial rearrangements, restricted permutations, and matrix permanents
43	**Duran, Jhoana**; mentor: Martha Cottam	Social Sciences	The Mexican Military: Political Involvement and Corruption in the Drug War
63	**Elsarelli, Megan**; mentor: Sue Ritter	Molecular, Cellular, and Chemical Biology	The Role of Catecholamine and Orexin Neurons in Mediating the Feeding Response to Glucose Deficit
108	**Feeney, Amanda**	Molecular, Cellular, and Chemical Biology	The Role of Catecholamine and Orexin Neurons in Mediating the Feeding Response to Glucose Deficit
53	**Fulton, Melody**; mentor: Cliff E. Berkman	Molecular, Cellular, and Chemical Biology	Prostate-Specific Membrane Antigen and Folate Binding
33	**Galeana, Gerardo**; mentor: Dr. Julie Kmec	Social Sciences	Perceived Discrmination among Multicultural Students: An Examination of Latino and Asian-American Students at a Four-Year University in the Northwest

Poster No.	Presenter	Category	Title of Abstract
58	**Gavin, Patrick**; mentor: Sergey Lapin	Computer Science, Mathematics, Statistics, Information Sciences	Finite Element Analysis of Electromagnetic Wave Propagation
24	**Gibbons, Carlee**; mentor: Dr. Raymond Quock	Applied Sciences	Hyperbaric Oxygen Decreases Neuropathic Pain in Rats
122	**Glavin, Maria**; mentor: John Harrison	Engineering and Physical Sciences	Water level drawdown is a hot moment for methane ebullition in a small eutrophic reservoir, Lacamas Lake, Washington
73	**Graham, Elizabeth**; mentor: Gary Wayman	Molecular, Cellular, and Chemical Biology	Analysis of BDNF Induced Dendritic Outgrowth in Hippocampal Neurons
98	**Grandi, Fiorella**; mentor: Wenfeng An	Molecular, Cellular, and Chemical Biology	The birth and early life of mononucleotide microsatellite repeats: rapid and variable shortening of the poly(A) tract of LINE-1 insertions in a single generation in mice
36	**Graves, Laurel**; mentor: Brenton Sharratt	Engineering and Physical Sciences	Carbon and Nitrogen loss in windblown dust on the Columbia Plateau
71	**Hansen, Katrina**; mentor: Glenn Gaudette	Engineering and Physical Sciences	Stem Cell Mediated Cardiac Myocyte Proliferation: The Effect of hMSC Number on Colony Formation
84	**Harkleroad, Breoni**; mentor: John McNamara	Organismal, Population, Ecological, and Evolutionary Biology	Comparing the Environmental Efficiency of Cheese Production using Nubian Goats or Holstein Cattle
76	**Hartmann, Danielle**; mentor: Lydia Gerber	Social Sciences	The Invisible Force in the Family

Poster No.	Presenter	Category	Title of Abstract
105	**Hawley, Erik**; mentor: Matthias Hess	Molecular, Cellular, and Chemical Biology	Discovery of Biomass Degrading Genes from Uncultured Rumen Microbes
O-7	**Hewitt, David and Martinson, Briana**; mentor: Kathleen Ryan	Arts and Design	Palouse-Clearwater Environmental Institute Playscape
77	**Holloway, Connor**; mentor: Dr. Darryl Kaurin	Engineering and Physical Sciences	A Comparative Study of Helical Tomotherapy and Volumetric Modulated Arc Therapy (VMAT)
88	**Ingermann, Briana**; mentor: Matthew Duez	Engineering and Physical Sciences	Moving-Mesh Partial Differential Equations for Modeling Neutron Star Binaries
O-8	**Janney, Elizabeth**; mentor: Nancy Bell	Humanities	Teases on the silver screen: A comparison between teases in movies and in real life
61	**Johns, Colleen**; mentor: Dr. Michael Skinner	Organismal, Population, Ecological, and Evolutionary Biology	Pesticides methoxychlor and DDT promote adult onset ovarian disease through transgenerational epigenetic inheritance
41	**Johnson, Michael**; mentor: Nehal I. AbuLail	Engineering and Physical Sciences	A nanoscale investigation of the adherence and mechanical properties of pathogenic and nonpathogenic species of Listeria
17	**Jones, Romon**; mentor: Dr. Lisa Gloss	Molecular, Cellular, and Chemical Biology	Mutational Analysis of the Stability of the Mouse H2A.Z Histone Monomer
55	**Kandasamy, Ram**; mentor: Dr. Rebecca Craft	Organismal, Population, Ecological, and Evolutionary Biology	Sex Differences in THC-Induced Systemic and Peripheral Antinociception Against Chronic Inflammatory Pain

Poster No.	Presenter	Category	Title of Abstract
109	**Lacey, Marcus**; mentor: Dr. James Peters	Molecular, Cellular, and Chemical Biology	Acute Desensitization of Afferent Vagus Nerve Activation by Cholecystokinin (CCK) at the CCK-1 Receptor
59	**Lagervall-Adams, Kierra and Verrelli, Lauren;** Mentor: Bailey Stokes	Arts and Design	Refusion
37	**Lakey, Kelsi**; mentor: Pat Carter	Organismal, Population, Ecological, and Evolutionary Biology	Body Size and Shape Differences among Clonal Lines of Rainbow Trout
102	**Larson, Emily**; mentor: Dr. Julie Stanton	Molecular, Cellular, and Chemical Biology	Isolation, Purification and Characterization of 21 Novel Mycobacteriophages
56	**Laws, Elizabeth**; mentor: Nancy Magnuson	Molecular, Cellular, and Chemical Biology	The effect of A204E and G312V amino acid changes in HIV-1 subtype D gp120 on the ability to use macaque CD4
48	**Lindeberg, Abbie**; mentor: Michael Rowe	Engineering and Physical Sciences	Classifying crystallinity and mineralogy in devitrified rhyolites through the use of X-ray diffraction
121	**Lo, Eugenia and Walker, Erik**; mentor: Ruth Newberry	Applied Sciences	The use of color to announce enrichment to pigs
O-9	**Lungren, Stefan**; mentor: Kalvin Joshi	Social Sciences	Wheat Exporting Company Business Plan
50	**Lyon, Patrice**; mentor: Dr. Paul Benny	Engineering and Physical Sciences	Exploring the Reactivity of Thiols and Alkenes for the Coupling Technetium-99m Complexes with Biomolecules for Diagnostic Imaging Applications
28	**Malcom, Courtney**; mentor: Courtney Meehan	Social Sciences	Maternal Energy Expediture among the Aka Foragers in Central Africa

Poster No.	Presenter	Category	Title of Abstract
69	**Martin, Emily**; mentor: Dr. Jeb Owen	Organismal, Population, Ecological, and Evolutionary Biology	The effects of agriculture on West Nile Virus incidence in Washington State
19	**Marx, Gretchen**; mentor: Daniela Bermudez	Applied Sciences	Evaluation of the shelf-life of apple juice after High Hydrostatic Pressure treatments
90	**Maxfield, Benjamin**; mentor: Gary Thorgaard	Organismal, Population, Ecological, and Evolutionary Biology	Exploration of mitochondrial DNA markers for identification of Inland andCoastal forms of Rainbow Trout(Oncorhynchus mykiss)
83	**McBride, Alicia**; mentor: Dr. Rebecca Craft	Organismal, Population, Ecological, and Evolutionary Biology	Ovarian Hormone Modulation of Supraspinal THC-Induced Analgesia
O-10	**McInnes, Arianna**; mentor: John Osiri	Social Sciences	RE.M. Accesories
39	**McKahan, Gena**; mentor: Dr. Carolyn Ross	Applied Sciences	Development of Functional Food Products Made with Grape Pomace Flour
19	**Moody, Abigail**; mentor: Daniela Bermudez	Applied Sciences	Evaluation of the shelf-life of apple juice after High Hydrostatic Pressure treatments
110	**Murchison, Craig**; mentor: Tracy Morgan	Social Sciences	Comparative Analysis of Countries in Need of 'Potable Water Product Solutions' Using a Decision Matrix
O-11	**Myers, Kathryn**; mentor: Dr. Lydia Gerber	Humanities	Mothers in Tang China Compared to Exemplary Han Dynasty Mothers

Poster No.	Presenter	Category	Title of Abstract
67	**Negretti, Nicholas and Lawhead, Joseph**; mentor: Dr. Julie Stanton	Molecular, Cellular, and Chemical Biology	Bioinformatic Analysis of the Novel Mycobateriophage Jobu08
68	**Neira, Louis**; mentor: Dr. Brendan Walker	Molecular, Cellular, and Chemical Biology	Reversing withdrawal effects of two-week ethanol exposure using nor-BNI
9	**Nelson, Kylie**; mentor Dr. Kwan Hee Kim	Molecular, Cellular, and Chemical Biology	Transcriptome Profiling of Rara Conditional Knockout Mice
85	**Netter, Alicia**; mentor: Dr. Paul Verrell	Organismal, Population, Ecological, and Evolutionary Biology	Enrichment and its Behavioral Effects: A Case Study on the Guppy (Poecilia reticulata)
34	**Neuhauser, Eftishia**; mentor: Donald Knowles	Applied Sciences	Theileria Equi and Equine Piroplasmosis; Testing, Life Cycle, and Options for Equine Owners
65	**Nix, Camden**; mentor: Ben Ellis	Engineering and Physical Sciences	Analysis of Super-eruptions of Yellowstone through Titanium in Quartz
94	**Nixon, Chad**; mentor: Dr. Jacob Leachman	Engineering and Physical Sciences	Construction of a Solid Hydrogen Target Cryostat for Positron Moderation Studies
44	**Nolder, Nick**; mentor: Tracy Morgan	Social Sciences	Breaking the Ties to Traditional Burial
89	**Ong, Stella Mae**; mentor: Dr. Ella Inglebret	Applied Sciences	Disabilities as Viewed by Two Generations of Filipino-Americans
75	**Orellana, Josue**; mentor: Nitish Thakor	Applied Sciences	Long Term Wireless Monitoring and Behavior Correlation of EEG, Acceleration and Video in Post-Cardiac Arrest Animal Models

Poster No.	Presenter	Category	Title of Abstract
74	**Orellana, Josue**; mentor: Nehal Abu-Lail	Computer Science, Mathematics, Statistics, Information Sciences	Software Development for Data Analysis of Bacterial Adhesion and Surface Interaction
78	**Overacker, Ross**; mentor: Dr. Philip Garner	Applied Sciences	Synthesis of Hydroxy Proline-Based Nucleopeptides for Antisense Applications Synthesis of Hydroxy Proline-Based Nucleopeptides for Antisense Applications
66	**Parker, Morgan**; mentor: Dr. Susan Finley	Social Sciences	Children Talk to Dickens About Their Own 'Hard Times'
112	**Payton, Spencer**; mentor: Richard Gomulkiewicz	Organismal, Population, Ecological, and Evolutionary Biology	Population Projections Using Age- and Stage-Based Vital Rates
5	**Perez, Veronica**; mentor: Dr. David Bahr	Engineering and Physical Sciences	The Effect of Vacancy Concentration and Crystal Orientation on Dislocation Nucleation
82	**Peterson, Katrina**; mentor: Bin Yang	Engineering and Physical Sciences	Towards validating effective removal and competent recovery of lignin from plant biomass by hydrothermal flowthrough process
7	**Quezada, Evelyn**; mentor: Dr. Olusola Adesope	Humanities	Factors Influencing Language Choice Among Latino/a Spanish English Bilinguals
O-12	**Ramanathan, Ramya**; mentor: Tracy Morgan	Social Sciences	'Embracing Cultural Empathy: a Paradygm Beyond Skills' a Workshop for Exporters

Poster No.	Presenter	Category	Title of Abstract
62	**Reis, Daniel**; mentor: Dr. Brendan Walker	Molecular, Cellular, and Chemical Biology	Effects of Ethanol Withdrawal on Alcohol Self-Administration and Affect Characterized by Ultrasonic Vocalizations and Changes in Dynorphin
52	**Reyna, Cristal**; mentor: Dr. Hector Aguilar-Carreno	Molecular, Cellular, and Chemical Biology	Nipah Virus Fusion Protein HR3 Region Plays an Important Role in Viral Entry
86	**Richards, Jennifer**; mentor: Dr. Richard N. Mack	Organismal, Population, Ecological, and Evolutionary Biology	Effects of Competition on Native and Non-native Plant Germination in Eastern Washington Ponderosa Pine Forest and Palouse meadow Steppe
103	**Richardson, Nathan**; mentor: Kathleen McAteer	Molecular, Cellular, and Chemical Biology	1H NMR Metabolite Analysis of Light Inducible Genes in Neurospora crassa
O-9	**Riedinger, Eric**; mentor: Kalvin Joshi	Social Sciences	Wheat Exporting Company Business Plan
18	**Ringwood, Lauryn**; mentor: Dr. Robert Rosenman	Social Sciences	Economics, Culture, and Obesity
104	**Robinson, Hannah**; mentor: Jeff Sanders	Humanities	A Northwestern Desert Cure
111	**Rosser, Ethan**; mentor: Ming Xian	Engineering and Physical Sciences	C-Nitroso Reagents as New Activators for Thioacid Amidation
42	**Salilek, Tomas**; mentor: Dr. Weihong Zhong	Engineering and Physical Sciences	Soy based Solid Polymer Electrolyte for Li-Ion Battery Applications
O-13	**Scott, Amanda**; mentor: Lydia Gerber	Social Sciences	Wu Zhao: The Scheming Confucian Wife
60	**Scott, Jonathan**; mentor: Dr. David Mogul	Engineering and Physical Sciences	Epileptic Seizures in a Computational Model of the Hippocampus and Anterior Thalamus.

Poster No.	Presenter	Category	Title of Abstract
23	**Scott, Kaitlyn**; mentor: Colin Grier	Social Sciences	Radiocarbon Dating Ancient Plankhouse Villages on the Northwest Coast of North America
97	**Scott, Ryan**; mentor: Dr. Jeff Sanders	Humanities	Environments of Deadly Dust: Workers, doctors, policy makers, and the fight against asbestos disease in the shipyards of the Puget Sound region
31	**Scott, Spenser**; mentor: Michael C. Rowe	Engineering and Physical Sciences	Variations in Mantle Composition Inferred from Olivine Phenocryst and Xenocryst Geochemistry from the Southern Rio Grande Rift, New Mexico
O-1	**Sebring, Erin**; mentor: Dr. Phyllis Erdman	Social Sciences	Using Animal Assisted Therapy in Speech Language Pathology: A Review
22	**Silvas, Michael**; mentor: Dr. Robert Ritter	Molecular, Cellular, and Chemical Biology	CCK-induced pERK1/2 in the NTS leads to synapsin-1 phosphorylation in vagal afferent terminals
16	**Smith, Kassiopeia**; mentor: David Bahr	Engineering and Physical Sciences	Structure of carbon nanotube turfs processed by non-plasma enhanced chemical vapor deposition.
87	**Stack, Gordon**; mentor: Asaph Cousins	Engineering and Physical Sciences	Understanding the Balance of Energy Supply and Demand During Photosynthesis Using Biophysical Approaches
96	**Stavitsky, Suzan**; mentor: McKenna Kyriss	Molecular, Cellular, and Chemical Biology	Effect of mutating YMR018W on UV resistance in Saccharomyces cerevisiae
O-14	**Sudy, Samantha**; mentor: Phil Gruen	Arts and Design	The Architectural Language of Park51: Understanding Cultural and Historical Connections

Poster No.	Presenter	Category	Title of Abstract
64	**Sutcliffe, Chelsea**; mentor: Rebecca Goodrich	Humanities	Dragons: the Monster and the Myth
30	**Teare, Brody**; mentor; Colin Campbell	Applied Sciences	An Evaluation of the Practicality of Using Glass Beads with the Decagon Soil Matric Potential Sensor for the Measurement of High Water Potential
21	**Thompson, Ian**; mentor: Dr. Grant Norton	Engineering and Physical Sciences	Sn and Sn-alloy nano-needles in Li-ion battery anodes
72	**Thomson, Jonathan**; mentor: Gary Thorgaard	Organismal, Population, Ecological, and Evolutionary Biology	Evaluating Larger Containers for Cryopreserving Semen in Rainbow Trout
93	**Tokuno, Deven**; mentor: Douglas R. Call	Molecular, Cellular, and Chemical Biology	Can Imported Foods Serve as Vehicles for Transporting Antibiotic Resistance Genes?
26	**Toscano, Miguel and Callahan, Casey**; mentor: Dr. Krzysztof Czaja	Molecular, Cellular, and Chemical Biology	Systemic capsaicin reduces fat pad mass in adult male rats
38	**Turi, Steven**; mentor: Glenn Crellin	Social Sciences	Forecast Modeling of Realtor Members and Total Licensees in the State of Washington as an Economic Indicator
91	**Venkateswaren, Deepak**; mentor: Dr. Shyam Sablani	Engineering and Physical Sciences	Field peas and poly(lactic acid) biocomposites: preparation and physical properties
59	**Verrelli, Lauren and Lagervall-Adams, Kierra**; mentor: Bailey Stokes	Arts and Design	Refusion

Poster No.	Presenter	Category	Title of Abstract
100	**Vickoren, Daniel**; mentor: Dr. Robert Bauman	Humanities	'Just a Luck Thing': African American Homesteaders in the Inland Northwest
121	**Walker, Erik and Lo, Euginia**; mentor: Dr. Ruth Newberry	Applied Sciences	The use of color to enhance enrichment for pigs
113	**Walsh, Claire**; mentor: Laura Lavine	Arts and Design	Insects of Washington
32	**Wanty, Rachel**; mentor: Krzysztof Czaja	Molecular, Cellular, and Chemical Biology	Aging of Vagal Afferent Glutamatergic Neurons in the Rat
95	**Warren, Chad**; mentor: George Mount	Engineering and Physical Sciences	Greenhouse Gases and Climate: Past, Present, and Future
51	**Wedam, Kristen**; mentor: Jeb Owen	Organismal, Population, Ecological, and Evolutionary Biology	Fitness Effects of the Host\s Aquired Resistance to Southern House Mosquito
O-15	**Wheeler, Katie**; mentor: Dr. Kristin Arola	Humanities	The Facebook Me: Online Audience Evaluation and Identity Presentation
107	**White, Kaitlyn**; mentor: Michael Rowe	Engineering and Physical Sciences	Olivine: Unearthing Magma Evolution at Springerville Volcanic Field, Arizona
54	**Wilson, Megan**; mentor: Jay Wright	Social Sciences	Development of an Animal Model of Parkinson’s Disease
99	**Wong, Wing**; mentor: David W. Koh	Molecular, Cellular, and Chemical Biology	Selective chemotherapeutic toxicity of a Pseudomonas aeruginosa exotoxin A fragment due to increased NAD levels

2012
SHOWCASE FOR UNDERGRADUATE RESEARCH AND CREATIVE ACTIVITIES
ENTRIES
NUMERICALLY BY PRESENTATION

Poster No.	Presenter	Category	Title of Abstract
1	**Allan, Matthew**; mentor: Dr. Amit Dhingra	Applies Sciences	Micrografting Sweet Cherry Trees for Rapid Orchard Ready Tree Production
2	**Baerlocher, Marsha**; mentor: Dr. Bailey Stokes	Arts and Design	Kyra
3	**Brown, Kevin**; mentor: Dr. Robert Dillon	Computer Science, Mathematics, Statistics, Information Sciences	Mathematical Model of Solid Tumor Growth
4	**Brown, Kevin**; mentor: Dr. Subra Muralidharan	Molecular, Cellular, and Chemical Biology	"Design of SNAP---Tag Fluorescent Probes to Study Dynamics Of $\alpha_V\beta_3$ Integrin Protein during Tumor Progression and Metastasis"
5	**Perez, Veronica**; mentor: Dr. David Bahr	Engineering and Physical Sciences	The Effect of Vacancy Concentration and Crystal Orientation on Dislocation Nucleation
6	**Bayomy, Omar**; mentor: Dr. James Krueger	Molecular, Cellular, and Chemical Biology	nterleukin-1 Receptor Accessory Protein B in Sleep Regulation
7	**Quezada, Evelyn**; mentor: Dr. Olusola Adesope	Humanities	Factors Influencing Language Choice Among Latino/a Spanish English Bilinguals
8	**Ariza, Loren**; mentor: Dr. Asaph Cousins	Molecular, Cellular, and Chemical Biology	In vivo kinetics of Ribulose-1,5-bisphosphate Carboxylase Oxygenase in Arabidopsis thaliana
9	**Nelson, Kylie**; mentor Dr. Kwan Hee Kim	Molecular, Cellular, and Chemical Biology	Transcriptome Profiling of Rara Conditional Knockout Mice

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10	**Christianson, Charles**; mentor: Dr. Laura Lavine	Organismal, Population, Ecological, and Evolutionary Biology	Inhibition of P-glycoprotein efflux transporters increases the efficacy of insecticides against the western flower thrips, Frankliniella occidentalis
11	**Comstock, Shealyn**; mentor: Dr. Teresa Cardon	Social Sciences	Use of Imitation to Aid in the Development of Children with Autism
12	**Arnold, Briana**; mentor: Dr. Kris Johnson	Applied Sciences	Beef Cow Learning Behavior
13	**DeFord, Daryl**; mentor: Dr. Webb	Computer Science, Mathematics, Statistics, Information Sciences	Combinatorial rearrangements, restricted permutations, and matrix permanents
14	**Conger-Best, Randall**; mentor: Michael C. Rowe	Engineering and Physical Sciences	A first look at mineral compositions of the 1886 Tarawera eruption, New Zealand
15	**Brewer, Sarah**; mentor: Dr. Norman G. Lewis	Molecular, Cellular, and Chemical Biology	Differential Expression Patterns of Arogenate Dehydratase genes 1-6 in Arabidopsis thaliana
16	**Smith, Kassiopeia**; mentor: David Bahr	Engineering and Physical Sciences	Structure of carbon nanotube turfs processed by non-plasma enhanced chemical vapor deposition.
17	**Jones, Romon**; mentor: Dr. Lisa Gloss	Molecular, Cellular, and Chemical Biology	Mutational Analysis of the Stability of the Mouse H2A.Z Histone Monomer
18	**Ringwood, Lauryn**; mentor: Dr. Robert Rosenman	Social Sciences	Economics, Culture, and Obesity
19	**Marx, Gretchen and Moody, Abigail**; mentor: Daniela Bermudez	Applied Sciences	Evaluation of the shelf-life of apple juice after High Hydrostatic Pressure treatments
20	**Bohan, Rachel and Daltas, James**; mentor: Dr. Reynolds	Arts and Design	Wine-Menu Design: An Investigation of Attributes and Causal Effects Using Brain-Computer Interface Technology

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21	**Thompson, Ian**; mentor: Dr. Grant Norton	Engineering and Physical Sciences	Sn and Sn-alloy nano-needles in Li-ion battery anodes
22	**Silvas, Michael**; mentor: Dr. Robert Ritter	Molecular, Cellular, and Chemical Biology	CCK-induced pERK1/2 in the NTS leads to synapsin-1 phosphorylation in vagal afferent terminals
23	**Scott, Kaitlyn**; mentor: Colin Grier	Social Sciences	Radiocarbon Dating Ancient Plankhouse Villages on the Northwest Coast of North America
24	**Gibbons, Carlee**; mentor: Dr. Raymond Quock	Applied Sciences	Hyperbaric Oxygen Decreases Neuropathic Pain in Rats
25	**Buscher, John**; mentor: Farida Selim	Engineering and Physical Sciences	Characterization of Yttrium Aluminum Garnets Prepared by Sol-gel Method
26	**Callahan, Casey and Toscano, Miguel**; mentor: Dr. Krzysztof Czaja	Molecular, Cellular, and Chemical Biology	Systemic capsaicin reduces fat pad mass in adult male rats
27	**Coleman, Heidi**; mentor: Dr. Bahr	Engineering and Physical Sciences	Longitudinal and Transverse Mechanical Properties of Wood Cells
28	**Malcom, Courtney**; mentor: Courtney Meehan	Social Sciences	Maternal Energy Expediture among the Aka Foragers in Central Africa
29	**Chen, Frederick**; mentor: Farida Selim	Engineering and Physical Sciences	Optical Properties of Oxide Thin Films Synthesized for Photonic Applications by Spin Coating
30	**Teare, Brody**; mentor; Colin Campbell	Applied Sciences	An Evaluation of the Practicality of Using Glass Beads with the Decagon Soil Matric Potential Sensor for the Measurement of High Water Potential
31	**Scott, Spenser**; mentor: Michael C. Rowe	Engineering and Physical Sciences	Variations in Mantle Composition Inferred from Olivine Phenocryst and Xenocryst Geochemistry from the Southern Rio Grande Rift, New Mexico
32	**Wanty, Rachel**; mentor: Krzysztof Czaja	Molecular, Cellular, and Chemical Biology	Aging of Vagal Afferent Glutamatergic Neurons in the Rat

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33	**Galeana, Gerardo**; mentor: Dr. Julie Kmec	Social Sciences	Perceived Discrmination among Multicultural Students: An Examination of Latino and Asian-American Students at a Four-Year University in the Northwest
34	**Neuhauser, Eftishia**; mentor: Donald Knowles	Applied Sciences	Theileria Equi and Equine Piroplasmosis; Testing, Life Cycle, and Options for Equine Owners
35	**Bunker, Teea**; mentor: Dr. Subra Muralidharan	Molecular, Cellular, and Chemical Biology	Design of SNAP-Tag Fluorescent Probes to Study Dynamics of E-Cadherin During Tumor Progression and Metastasis
36	**Graves, Laurel**; mentor: Brenton Sharratt	Engineering and Physical Sciences	Carbon and Nitrogen loss in windblown dust on the Columbia Plateau
37	**Lakey, Kelsi**; mentor: Pat Carter	Organismal, Population, Ecological, and Evolutionary Biology	Body Size and Shape Differences among Clonal Lines of Rainbow Trout
38	**Turi, Steven**; mentor: Glenn Crellin	Social Sciences	Forecast Modeling of Realtor Members and Total Licensees in the State of Washington as an Economic Indicator
39	**McKahan, Gena**; mentor: Dr. Carolyn Ross	Applied Sciences	Development of Functional Food Products Made with Grape Pomace Flour
40	**Blum, Kyle**; mentor: Dr. Anita Vasavada	Engineering and Physical Sciences	Neck Muscle Strains in Females During Whiplash
41	**Johnson, Michael**; mentor: Nehal I. AbuLail	Engineering and Physical Sciences	A nanoscale investigation of the adherence and mechanical properties of pathogenic and nonpathogenic species of Listeria
42	**Salilek, Tomas**; mentor: Dr. Weihong Zhong	Engineering and Physical Sciences	Soy based Solid Polymer Electrolyte for Li-Ion Battery Applications

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43	**Duran, Jhoana**; mentor: Martha Cottam	Social Sciences	The Mexican Military: Political Involvement and Corruption in the Drug War
44	**Nolder, Nick**; mentor: Tracy Morgan	Social Sciences	Breaking the Ties to Traditional Burial
45	**Clark, Nicole**; mentor: Chengtao Her	Molecular, Cellular, and Chemical Biology	The human MutS homologue hMSH5 promotes genomic stability by suppressing error-prone DNA double-strand break repair
46	**Boyer, Melissa**; mentor: Dr. John McNamara	Organismal, Population, Ecological, and Evolutionary Biology	The environmental viability of Toggenburg goats and Holstein cattle in Northern Kenya
47	**Costello, Reilly**; mentor: Dr. Larry Bruya	Social Sciences	Physical Activity Goal Orientation in Adolescents
48	**Lindeberg, Abbie**; mentor: Michael Rowe	Engineering and Physical Sciences	Classifying crystallinity and mineralogy in devitrified rhyolites through the use of X-ray diffraction
49	**Colby, Sean**; mentor: Dr. James Carson, PNNL	Computer Sciences, Mathematics, Statistics, Information Sciences	Three-Dimensional Reconstruction And Analysis Of High-Resolution Serial-Sectioned Mouse Brain Tissue Images
50	**Lyon, Patrice**; mentor: Dr. Paul Benny	Engineering and Physical Sciences	Exploring the Reactivity of Thiols and Alkenes for the Coupling Technetium-99m Complexes with Biomolecules for Diagnostic Imaging Applications
51	**Wedam, Kristen**; mentor: Jeb Owen	Organismal, Population, Ecological, and Evolutionary Biology	Fitness Effects of the Host\s Aquired Resistance to Southern House Mosquito
52	**Reyna, Cristal**; mentor: Dr. Hector Aguilar-Carreno	Molecular, Cellular, and Chemical Biology	Nipah Virus Fusion Protein HR3 Region Plays an Important Role in Viral Entry

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53	**Fulton, Melody**; mentor: Cliff E. Berkman	Molecular, Cellular, and Chemical Biology	Prostate-Specific Membrane Antigen and Folate Binding
54	**Wilson, Megan**; mentor: Jay Wright	Social Sciences	Development of an Animal Model of Parkinson's Disease
55	**Kandasamy, Ram**; mentor: Dr. Rebecca Craft	Organismal, Population, Ecological, and Evolutionary Biology	Sex Differences in THC-Induced Systemic and Peripheral Antinociception Against Chronic Inflammatory Pain
56	**Laws, Elizabeth**; mentor: Nancy Magnuson	Molecular, Cellular, and Chemical Biology	The effect of A204E and G312V amino acid changes in HIV-1 subtype D gp120 on the ability to use macaque CD4
57	**Bizga, Jonathan**; mentor: Dr. Weihong Zhong	Engineering and Physical Sciences	Correlation between hybrid carbon nano-fill dispersion state and AC/DC conductivity ratio in polycarbonate
58	**Gavin, Patrick**; mentor: Sergey Lapin	Computer Science, Mathematics, Statistics, Information Sciences	Finite Element Analysis of Electromagnetic Wave Propagation
59	**Lagervall-Adams, Kierra and Verrelli, Lauren;**Mentor: Bailey Stokes	Arts and Design	Refusion
60	**Scott, Jonathan**; mentor: Dr. David Mogul	Engineering and Physical Sciences	Epileptic Seizures in a Computational Model of the Hippocampus and Anterior Thalamus.
61	**Johns, Colleen**; mentor: Dr. Michael Skinner	Organismal, Population, Ecological, and Evolutionary Biology	Pesticides methoxychlor and DDT promote adult onset ovarian disease through transgenerational epigenetic inheritance
62	**Reis, Daniel**; mentor: Dr. Brendan Walker	Molecular, Cellular, and Chemical Biology	Effects of Ethanol Withdrawal on Alcohol Self-Administration and Affect Characterized by Ultrasonic Vocalizations and Changes in Dynorphin

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63	**Elsarelli, Megan**; mentor: Sue Ritter	Molecular, Cellular, and Chemical Biology	The Role of Catecholamine and Orexin Neurons in Mediating the Feeding Response to Glucose Deficit
64	**Sutcliffe, Chelsea**; mentor: Rebecca Goodrich	Humanities	Dragons: the Monster and the Myth
65	**Nix, Camden**; mentor: Ben Ellis	Engineering and Physical Sciences	Analysis of Super-eruptions of Yellowstone through Titanium in Quartz
66	**Parker, Morgan**; mentor: Dr. Susan Finley	Social Sciences	Children Talk to Dickens About Their Own 'Hard Times'
67	**Negretti, Nicholas and Lawhead, Joseph**; mentor: Dr. Julie Stanton	Molecular, Cellular, and Chemical Biology	Bioinformatic Analysis of the Novel Mycobateriophage Jobu08
68	**Neira, Louis**; mentor: Dr. Brendan Walker	Molecular, Cellular, and Chemical Biology	Reversing withdrawal effects of two-week ethanol exposure using nor-BNI
69	**Martin, Emily**; mentor: Dr. Jeb Owen	Organismal, Population, Ecological, and Evolutionary Biology	The effects of agriculture on West Nile Virus incidence in Washington State
70	**Brickman, Jared**; mentor: Rebecca Goodrich	Arts and Design	The World in a Suitcase: A Collection of Short Fiction
71	**Hansen, Katrina**; mentor: Glenn Gaudette	Engineering and Physical Sciences	Stem Cell Mediated Cardiac Myocyte Proliferation: The Effect of hMSC Number on Colony Formation
72	**Thomson, Jonathan**; mentor: Gary Thorgaard	Organismal, Population, Ecological, and Evolutionary Biology	Evaluating Larger Containers for Cryopreserving Semen in Rainbow Trout
73	**Graham, Elizabeth**; mentor: Gary Wayman	Molecular, Cellular, and Chemical Biology	Analysis of BDNF Induced Dendritic Outgrowth in Hippocampal Neurons

Poster No.	Presenter	Category	Title of Abstract
74	**Orellana, Josue**; mentor: Nehal Abu-Lail	Computer Science, Mathematics, Statistics, Information Sciences	Software Development for Data Analysis of Bacterial Adhesion and Surface Interaction
75	**Orellana, Josue**; mentor: Nitish Thakor	Applied Sciences	Long Term Wireless Monitoring and Behavior Correlation of EEG, Acceleration and Video in Post-Cardiac Arrest Animal Models
76	**Hartmann, Danielle**; mentor: Lydia Gerber	Social Sciences	The Invisible Force in the Family
77	**Holloway, Connor**; mentor: Dr. Darryl Kaurin	Engineering and Physical Sciences	A Comparative Study of Helical Tomotherapy and Volumetric Modulated Arc Therapy (VMAT)
78	**Overacker, Ross**; mentor: Dr. Philip Garner	Applied Sciences	Synthesis of Hydroxy Proline-Based Nucleopeptides for Antisense Applications Synthesis of Hydroxy Proline-Based Nucleopeptides for Antisense Applications
79	**Cutler, Eric**; mentor: Michael Rowe	Engineering and Physical Sciences	Petrology and Mineralogy of the Gold Hill Syenite-Pyroxenite Intrusion, Potlatch Quadrangle, Northern Idaho
80	**Colburn, Zachary**; mentor: Dr. Dybdahl	Organismal, Population, Ecological, and Evolutionary Biology	The impact of competition when parasites affect host resource use
81	**Dawson, Scott**; mentor: Dhrubojyoti D. Laskar	Molecular, Cellular, and Chemical Biology	Evaluation of depolymerized lignin suitable for aqueous phase conversion to jet fuel range hydrocarbons
82	**Peterson, Katrina**; mentor: Bin Yang	Engineering and Physical Sciences	Towards validating effective removal and competent recovery of lignin from plant biomass by hydrothermal flowthrough process

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83	**McBride, Alicia**; mentor: Dr. Rebecca Craft	Organismal, Population, Ecological, and Evolutionary Biology	Ovarian Hormone Modulation of Supraspinal THC-Induced Analgesia
84	**Harkleroad, Breoni**; mentor: John McNamara	Organismal, Population, Ecological, and Evolutionary Biology	Comparing the Environmental Efficiency of Cheese Production using Nubian Goats or Holstein Cattle
85	**Netter, Alicia**; mentor: Dr. Paul Verrell	Organismal, Population, Ecological, and Evolutionary Biology	Enrichment and its Behavioral Effects: A Case Study on the Guppy (Poecilia reticulata)
86	**Richards, Jennifer**; mentor: Dr. Richard N. Mack	Organismal, Population, Ecological, and Evolutionary Biology	Effects of Competition on Native and Non-native Plant Germination in Eastern Washington Ponderosa Pine Forest and Palouse meadow Steppe
87	**Stack, Gordon**; mentor: Asaph Cousins	Engineering and Physical Sciences	Understanding the Balance of Energy Supply and Demand During Photosynthesis Using Biophysical Approaches
88	**Ingermann, Briana**; mentor: Matthew Duez	Engineering and Physical Sciences	Moving-Mesh Partial Differential Equations for Modeling Neutron Star Binaries
89	**Ong, Stella Mae**; mentor: Dr. Ella Inglebret	Applied Sciences	Disabilities as Viewed by Two Generations of Filipino-Americans
90	**Maxfield, Benjamin**; mentor: Gary Thorgaard	Organismal, Population, Ecological, and Evolutionary Biology	Exploration of mitochondrial DNA markers for identification of Inland andCoastal forms of Rainbow Trout(Oncorhynchus mykiss)
91	**Venkateswaren, Deepak**; mentor: Dr. Shyam Sablani	Engineering and Physical Sciences	Field peas and poly(lactic acid) biocomposites: preparation and physical properties

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92	**Bliggenstorfer, Jonathan**; mentor: Dr. Douglas Call	Molecular, Cellular, and Chemical Biology	Efflux pump accumulation is the probable mechanism responsible for high level florfenicol resistance in Salmonella enterica
93	**Tokuno, Deven**; mentor: Douglas R. Call	Molecular, Cellular, and Chemical Biology	Can Imported Foods Serve as Vehicles for Transporting Antibiotic Resistance Genes?
94	**Nixon, Chad**; mentor: Dr. Jacob Leachman	Engineering and Physical Sciences	Construction of a Solid Hydrogen Target Cryostat for Positron Moderation Studies
95	**Warren, Chad with Olga Martyusheva, Carly Winz, Brett Thompson**; mentor: George Mount	Engineering and Physical Sciences	Greenhouse Gases and Climate: Past, Present, and Future
96	**Stavitsky, Suzan**; mentor: McKenna Kyriss	Molecular, Cellular, and Chemical Biology	Effect of mutating YMR018W on UV resistance in Saccharomyces cerevisiae
	Scott, Ryan; mentor: Dr. Jeff Sanders	Humanities	Environments of Deadly Dust: Workers, doctors, policy makers, and the fight against asbestos disease in the shipyards of the Puget Sound region
98	**Grandi, Fiorella**; mentor: Wenfeng An	Molecular, Cellular, and Chemical Biology	The birth and early life of mononucleotide microsatellite repeats: rapid and variable shortening of the poly(A) tract of LINE-1 insertions in a single generation in mice
99	**Wong, Wing**; mentor: David W. Koh	Molecular, Cellular, and Chemical Biology	Selective chemotherapeutic toxicity of a Pseudomonas aeruginosa exotoxin A fragment due to increased NAD levels
100	**Vickoren, Daniel**; mentor: Dr. Robert Bauman	Humanities	'Just a Luck Thing': African American Homesteaders in the Inland Northwest
101	**Davis, Hana**; mentor: Dr. David Moffett	Molecular, Cellular, and Chemical Biology	Alkali secretion by the midgut of larval yellow fever mosquitoes Aedes aegypti and its control by serotonin.

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102	**Larson, Emily**; mentor: Dr. Julie Stanton	Molecular, Cellular, and Chemical Biology	Isolation, Purification and Characterization of 21 Novel Mycobacteriophages
103	**Richardson, Nathan**; mentor: Kathleen McAteer	Molecular, Cellular, and Chemical Biology	1H NMR Metabolite Analysis of Light Inducible Genes in Neurospora crassa
104	**Robinson, Hannah**; mentor: Jeff Sanders	Humanities	A Northwestern Desert Cure
105	**Hawley, Erik**; mentor: Matthias Hess	Molecular, Cellular, and Chemical Biology	Discovery of Biomass Degrading Genes from Uncultured Rumen Microbes
106	**Christian, Ryan**; mentor: Amit Dhingra	Molecular, Cellular, and Chemical Biology	Characterization of Differentially Expressed Genes in Apple (Malus x domestica)
107	**White, Kaitlyn**; mentor: Michael Rowe	Engineering and Physical Sciences	Olivine: Unearthing Magma Evolution at Springerville Volcanic Field, Arizona
108	**Feeney, Amanda**	Molecular, Cellular, and Chemical Biology	The Role of Catecholamine and Orexin Neurons in Mediating the Feeding Response to Glucose Deficit
109	**Lacey, Marcus**; mentor: Dr. James Peters	Molecular, Cellular, and Chemical Biology	Acute Desensitization of Afferent Vagus Nerve Activation by Cholecystokinin (CCK) at the CCK-1 Receptor
110	**Creekpaum, Vance with Craig Murchison, Haydn Ritter, Lina Romero, Ramya Ramanathan, Curran Scott, Anil Shah, and Hue Xiong**; mentor: Tracy Morgan	Social Sciences	Comparative analysis of countries in need of 'potable water product solutions' using decision matrix and current country commercial guides
111	**Rosser, Ethan**; mentor: Ming Xian	Engineering and Physical Sciences	C-Nitroso Reagents as New Activators for Thioacid Amidation
112	**Payton, Spencer**; mentor: Richard Gomulkiewicz	Organismal, Population, Ecological, and Evolutionary Biology	Population Projections Using Age- and Stage-Based Vital Rates

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113	**Walsh, Claire**; mentor: Laura Lavine	Arts and Design	Insects of Washington
121	**Lo, Eugenia and Walker, Erik**; mentor: Ruth Newberry	Applied Sciences	The use of color to announce enrichment to pigs
122	**Glavin, Maria**; mentor: John Harrison	Engineering and Physical Sciences	Water level drawdown is a hot moment for methane ebullition in a small eutrophic reservoir, Lacamas Lake, Washington
123	**Balash, Hannah**; mentor: Dr. Jim Pru	Molecular, Cellular, and Chemical Biology	The Functional Role of NR3C1 in Ovarian Biology
124	**Colbert, Patrick**; mentor: Jim Durfey	Applied Sciences	Determining Soil Spatial Variability Using Electric Conductivity to Further Understand and Better Manage Orchards in the Pacific Northwest.
125	**Bahrami, Justin**; mentor: Dr. Cornelius Ivory	Engineering and Physical Sciences	Separations and Flow Regimes in Continuous Counterflow Centrifuges
126	**McCord, Timothy with C. Calhoun, A. Burns, H. Maeda**; mentor: L.D. Bruya	Applied Sciences	Writing Revision in the Major
O-1	**Sebring, Erin**; mentor: Dr. Phyllis Erdman	Social Sciences	Using Animal Assisted Therapy in Speech Language Pathology: A Review
O-2	**Dart, Graham**; mentor: Dr. Shannon Scott	Arts and Design	New York Counterpoint: Exploring the Techniques of Taped Music
O-3	**Anaya, Gerardo**; mentor: Dr. Dogan Gursoy	Social Sciences	The Customer is Not Always Right: Categories of Customer Service Sabotage
O-4	**Baldwin, Steven:** mentor: Dr. R. Charles Well	Humanities	Personal Life History Project
O-5	**Coan, Kristen**; mentor: Jesse Spohnholz	Humanities	Gender and Exile in the French Reformation: The Experiences of Refugee Women in Calvin's Geneva, 1541-1544

Poster No.	Presenter	Category	Title of Abstract
O-6	**Creekpaum, Vance**; mentor: Tracy Morgan	Social Sciences	Exporting a Service: How Governments Regulate Ambiguous Goods
O-7	**Hewitt, David and Martinsen, Brianna**; mentor: Kathleen Ryan	Arts and Design	Palouse-Clearwater Environmental Institute Playscape
O-8	**Janney, Elizabeth**; mentor: Nancy Bell	Humanities	Teases on the silver screen: A comparison between teases in movies and in real life
O-9	**Lungren, Stefan and Riedinger, Eric**; mentor: Kalvin Joshi	Social Sciences	Wheat Exporting Company Business Plan
O-9	**Riedinger, Eric**; mentor: Kalvin Joshi	Social Sciences	Wheat Exporting Company Business Plan
O-10	**McInnes, Arianna**; mentor: John Osiri	Social Sciences	RE.M. Accesories
O-11	**Myers, Kathryn**; mentor: Dr. Lydia Gerber	Humanities	Mothers in Tang China Compared to Exemplary Han Dynasty Mothers
O-12	**Ramanathan, Ramya**; mentor: Tracy Morgan	Social Sciences	'Embracing Cultural Empathy: a Paradygm Beyond Skills' a Workshop for Exporters
O-13	**Scott, Amanda**; mentor: Lydia Gerber	Social Sciences	Wu Zhao: The Scheming Confucian Wife
O-14	**Sudy, Samantha**; mentor: Phil Gruen	Arts and Design	The Architectural Language of Park51: Understanding Cultural and Historical Connections
O-15	**Wheeler, Katie**; mentor: Dr. Kristin Arola	Humanities	The Facebook Me: Online Audience Evaluation and Identity Presentation
O-16	**Murchison, Craig and Fuentes, Juan**; mentor: Tracy Morgan	Social Sciences	The Necessity of Integrating the Social Mission with the Business Model for Domestic and Export Businesses

Presentation Number 1

ABSTRACT:

Abstract Title:	Micrografting Sweet Cherry Trees for Rapid Orchard Ready Tree Production		
Presenter:	Matthew Allen		
Mentor:	Dr. Amit Dhingra		
Additional Authors:	Tyson Kopeke, Amit Dhingra		
Presentation Type:	Poster	**Major and College:**	Food Science, Agricultural, Human, and Natural Resources
Category:	Applied Sciences		

A problem that tree farmers may face when planting an orchard is getting an order of trees with the fruit variety grafted onto the desired rootstalk in a timely manner. If the farmer is going to use a popular rootstalk like Gisela, they will have to place an order to the nursery up to 2 years in advance due to the limited amount of available rootstock. An extreme but possible situation is that the farmer may lose his order of trees unexpectedly due to pathogens or weather putting back orchard planting even further. My research has been in the development of a method for rapid propagation of grafted orchard ready sweet cherry trees. The goal was to use tissue culture technology to produce high numbers of individual plants of both the rootstalk and cherry variety. The challenge is to have the fragile rootstock plants root, grow, and receive the grafted cherry variety that was also multiplied in tissue culture. Since the plants are coming from sterile conditions with a surplus of nutrients and water, their defense systems are not very active and are very vulnerable to pathogen infection and dehydration. This new technology would provide the orchardist with trees 1-2 years sooner and labor could be performed year round to fill the orders. The trees will also have a head start in growth since they will be in ideal conditions and can continue growing during the winter. My work has made significant strides to overcome these challenges to achieve the overall goal and these results will be presented.

Presentation Number 2

ABSTRACT:

Abstract Title:	Kyra		
Presenter:	Marsha Baerlocher		
Mentor:	Bailey Stokes		
Presentation Type:	Poster	**Major and College:**	Apparel Merchandising Design and Textiles Agricultural, Human, and Natural Resources
Category:	Arts and Design		

The focus of this project was to create an aesthetically pleasing sustainable garment using recycled materials. Materials used to create this garment included wine corks, wine, wire, string, and cotton muslin fabric. A variety of techniques were used to manipulate these materials. First, the cotton muslin was draped and sewed into the foundation of the garment. Next, the corks were cut into thin disks using a knife. Some of the disks were dyed using wine in order to bring color to the piece. The disks were arranged on the bodice of the dress to create a pattern of curved vertical lines. All corks covering the surface of the muslin foundation were adhered using glue. Finally, wine corks cut into small triangles were strung and draped from the neckline to the hip to add movement to the piece. The completed garment successfully embodies sustainability and exploration into creatively developed and aesthetically pleasing surface texture development.

Presentation Number 3

ABSTRACT:

Abstract Title:	Mathematical Model of Solid Tumor Growth		
Presenter:	Kevin Brown		
Mentor:	Dr. Robert Dillon		
Authors:	Kevin Brown, Dr. Robert Dillon		
Presentation Type:	Poster	**Major and College:**	Biology/Sciences
Category:	Computer Science, Mathematics, Statistics, Information Sciences		

Cancer is a category of disease that is characterized by rapid cell growth. Several types of cancer start as solid tumors which are tumors that have not yet undergone angiogenesis. Therefore, the tumor relies on diffusion and electrochemical gradients for nutrients to enter the tumor and waste products to leave because the only blood vessels are external to the tumor. Eventually the solid tumor becomes too large causing nutrient deprivation which leads to the development of three distinct regions of cells within the tumor- a proliferating rim, a quiescent region, and a necrotic core. The purpose of this project is to create a mathematical model using partial differential equations with mixed boundary conditions to determine both the concentrations of oxygen, glucose, lactate ion, carbon dioxide, bicarbonate ion, chloride ion, and hydrogen ion inside a solid tumor as well as the growth of the tumor through time. The partial differential equations are expressed in spherical coordinates with the assumption of spherical symmetry. In the model, tumor growth rate at any time is described by the integration over the domain of a growth function of Michaelis-Menten type which is dependent on the concentration of the chemical species. Numerical solutions were obtained using Matlab by solving the coupled system of equations via discretization in both time and space. Parameters for cell growth rate, metabolic rate, and diffusion constants for the nutrients as well as other processes were obtained from the research literature. The mathematical analysis demonstrates that the nutrient and chemical concentrations inside the tumor vary as the tumor grows, eventually leading to the nutrient depletion and waste product build up in the center of the tumor. Specifically, the glucose and oxygen concentrations decrease while the concentration of the lactate ions, hydrogen ions, bicarbonate ions increase. The current model will be expanded to include additional components including cell differentiation into quiescent and necrotic cell types. This model will eventually be compared to more complex models as well available experimental data.

Presentation Number 4

ABSTRACT:

Abstract Title:	Design of SNAP--#8208;Tag Fluorescent Probes to Study Dynamics Of #945;V#946;3 Integrin Protein during Tumor Progression and Metastasis		
Presenter:	Kevin Brown		
Mentor:	Dr. Subra Muralidharan		
Authors:	Kevin Brown, Dr. Subra Murali		
Presentation Type:	Poster	**Major and College:**	Biology/Sciences
Category:	Molecular, Cellular, and Chemical Biology		

Cancer is a category of disease that is characterized by rapid cell growth. Tumor formation causes the extracellular matrix in the tumor microenvironment to stiffen due to interstitial fluid accumulation, hardening tissue, and angiogenesis which puts increased pressure on the tumor cells. The mechanical stress triggers the cells inside the tumor to undergo signaling pathways that could contribute to tumor progression and advance into a metastatic phenotype. Integrin, a cell-matrix adhesion membrane bound protein, is believed to play a role in the signaling pathway because it is upregulated when normal cells becomes cancerous and then progresses to a metastatic phenotype. This, however, is not well understood because there is currently no way to track the protein. The goal of our research is to understand response of Integrin in model prostate cancer cells to mechanical stress by fluorescently tagging this protein employing the SNAP-Tag technology. Fluorescence microscopy will be used to track fluorescent #945;V#946;3 Integrin as the levels of shear, tension, and osmotic force are increased for the benign, nonmetastatic, moderately metastatic, and highly metastatic prostate cancer cells. A mathematical model will then be developed based on of the results from the fluorescence studies on the dynamics of Integrin to relate to the material properties of cells and extracellular matrix. The overarching goal of this project is to introduce a new way of thinking about tumor progression and metastasis by understanding the effects of extracellular mechanical stress on the tumor cell membrane in cell signaling pathways.

We are currently designing and optimizing the expression of SNAP-integrin plasmids that will be transfected into prostate cancer cells for tracking Integrin in response to mechanical stress such as osmotic, shear, and tension forces. Time dependent studies of the fluorescently tagged integrin will provide insights into its response to mechanical stress experienced by the cell membrane and the biochemical signaling involving integrin triggered by this response.

Presentation Number 5

ABSTRACT:

Abstract Title:	The Effect of Vacancy Concentration and Crystal Orientation on Dislocation Nucleation		
Presenter:	Veronica Perez		
Mentor:	Dr.David Bahr		
Presentation Type:	Poster	**Major and College:**	Material Science and Engineering/Engineering Architecture
Category:	Engineering and Physical Sciences		

Nanoindentation is a technique that indents the surface of a sample and traditionally provides several direct measurements of the mechanical properties of materials, such as hardness and modulus. In this study load controlled nanoindentation, was performed to assess the mechanical response of single crystal nickel and copper; the load between a diamond tip and the sample is controlled while the depth of penetration is measured. The particular property of interest in this study is the start of permanent deformation, the yield point generated by the nucleation of dislocations in metals, and how that behavior changes under different conditions. The first experimental parameter investigated was the effect of vacancy concentration (missing atoms in the lattice) on the yield point. When a sample undergoes heat treatment the vacancy concentration can be changed depending on the severity of quench from elevated temperatures. This changes the stress needed to nucleate plasticity a parameter of interest. High and low vacancy concentrations were tested in (111) oriented nickel; a low concentration was obtained through heat treatment at 1023^{o}C for 4 hours and furnace-cooled; a high concentration was the 'as-received' sample. The second condition, deals with the effect of crystal orientation on dislocation nucleation; (111) and (100) orientations in copper were used. The distribution function of yield points with respect to maximum sheer stress was used to determine at what stresses dislocations nucleate. In nickel the lower vacancy concentration requires a higher maximum sheer stress: while the high concentration requires a lower stress. An average maximum shear stress value for low and high vacancy concentration was 6 GPa and 9.1 GPa respectively. This increase in maximum shear stress indicates that vacancy concentration has a significant effect on the stress needed to nucleate plasticity. From preliminary results, different orientations in copper have a much smaller effect on the maximum shear stress than previously shown in the literature. Average values for (111) copper was approximate 2.5 GPa, while the (100) orientation yielded at 2.8 GPa. Results from the final experiment, uniting alterations in vacancy concentrations with different orientations will also be presented.

Presentation Number 6

ABSTRACT:

Abstract Title:	Interleukin-1 Receptor Accessory Protein B in Sleep Regulation		
Presenter:	Omar Bayomy		
Mentor:	Dr. James Krueger		
Additional Authors:	P. Taishi, C. Davis, M.R. Zielinski, J.M. Krueger		
Presentation Type:	Poster	**Major and College:**	Neuroscience Veterinary Medicine
Category:	Molecular, Cellular, and Chemical Biology		

Introduction:

Interleukin-1beta (IL1) is involved in sleep regulation. The IL1-receptor-accessory-protein (IL1RAcP) is required for IL1-signaling. A brain-specific alternatively spliced form of IL1RAcP, IL1RAcPb, interferes with IL1RAcP-signaling. Lipopolysaccharide (LPS) is a

bacterial cell wall component that induces IL1 and sleep. We thus hypothesized that mice lacking IL1RAcPb (knockout; KO mice) would be more sensitive to LPS and sleep more after LPS challenge.

Methodology:

Male IL1RAcPbKO and C57BL/6 controls were implanted with EEG and EMG electrodes for sleep-analysis. Spontaneous sleep and sleep responses following intraperitoneal LPS (1 µg) injection were analyzed by established criteria.

Results:

LPS significantly enhanced non-rapid-eye-movement sleep (NREMS) and attenuated rapid-eyemovement sleep (REMS) over the 24 hour period in both strains [$F(1,11) = 331.204$, $p < 0.001$; $F(1,11) = 127.479$, $p < 0.001$, respectively]. However, AcPbKO mice had significantly more NREMS (approximately 2 extra hours) for 24 hours after LPS injection than did control mice [$F(1,11) = 14.726$, $p = 0.003$].

Conclusion:

IL1RAcPb is involved in LPS-induced sleep regulation; we therefore identified, for the first time, a function for IL1RAcPb. Additional studies from our lab indicate that IL1RAcPb messenger ribonucleic acid (mRNA) exhibits diurnal variations with greater mRNA expression during dark (waking) periods. Further, we found that sleep loss is associated with increases in IL1RAcPb mRNA in brain providing a link between the desire to sleep and IL1RAcPb. Current results are applicable to the treatment and understanding of many CNS pathologies associated with inflammation.

Support: The National Institutes of Health Grant No.#'s NS025378, NS031453, HD 36520; The Auvil Family: Auvil Fellowship.

Presentation Number 7

ABSTRACT:

Abstract Title:	Factors Influencing Language Choice Among Latino/a Spanish English Bilinguals		
Presenter:	Evelyn Quezada		
Mentor:	Dr. Olusola Adesope		
Presentation Type:	Poster	**Major and College:**	English Rhetoric and Professional Writin/Liberal Arts / Honors
Category:	Humanities		

Language is a dynamic form of communication that constantly changes and adapts to contemporary norms. Over the last few decades, research has been conducted on the hybridization of Spanish in the United States also referred to as Spanglish. Usually tagged as the verbal encounter between Anglo and Hispano civilizations, Spanglish serves as an umbrella term for various forms of the mix of English and Spanish. Spanglish is a much debated and controversial phenomenon. Some scholars argue that code switching/mixing is a choice that is dependent on varying factors; others argue that code switching/mixing is not a choice but marks a speaker as a low income or lowly educated individual. This study explores the specific factors that influence students' language choice at a large University in the Pacific Northwest, and to identify other elements that influence language choice and the use of Spanglish, beside social status. Twelve Spanish-English bilingual participants filled out two surveys and were then interviewed by a Spanish-English researcher. Results found that participants tended to follow the researcher's initial language choice and code-switched due to context. There was little correlation between income status and language choice and Spanglish use. In sum, Spanglish did not occur as frequently as anticipated. On the contrary it occurred unsystematically throughout the interview sessions with no apparent pattern or notable reasoning. Further, the participants who most commonly used Spanglish did not fall under the lower income level. Conversely, the participants in the highest income group were the ones who spoke more Spanglish.

Presentation Number 8

ABSTRACT:

Abstract Title:	In vivo kinetics of Ribulose-1,5-bisphosphate Carboxylase Oxygenase in Arabidopsis thaliana		
Presenter:	Loren Ariza		
Mentor:	Asaph Cousins		
Additional Authors:	Berkley Walker, Dr. Asaph Cousins		
Presentation Type:	Poster	**Major and College:**	Biology / Sciences
Category:	Molecular, Cellular, and Chemical Biology		

The current concern of rising atmospheric carbon dioxide levels has inspired the collaboration of a diverse body of research having the ultimate goal of ensuring that the quality of life on earth is not compromised. Because photosynthetic organisms represent a vital component of global carbon exchange with the atmosphere, understanding the impacts of climate change on plant processes has been a major area of research focus. Ribulose-1,5-bisphosphate Carboxylase Oxygenase (RubisCO) is among the most extensively studied plant enzymes because of its critical role during the first step of carbon reduction in photosynthesis. In addition to its interaction with carbon dioxide, RubisCO also interacts with oxygen to initiate photorespiration—a competing metabolic pathway that consumes energy and negatively impacts plant productivity. Contemporary models of leaf photosynthesis rely on the kinetic parameters of RubisCO obtained from *in vivo* gas-exchange measurements of tobacco (*Nicotiana tobacum*)—a plant that is adapted to warmer climates. Because such models assume that the kinetic parameters from tobacco apply to many different plant species, it is necessary to assess the accuracy of such models by obtaining measured parameters from different plants. The goal of this research was to obtain the *in vivo* kinetic parameters of RubisCO in *Arabidopsis thaliana*—a cold-adapted plant that is widely used as a model organism in the molecular plant sciences. *In vivo* kinetics of RubisCO were mathematically determined from gas-exchange measurements taken across a range of light intensities, carbon dioxide & oxygen gas concentrations, and ecologically significant temperatures. Results show that the *in vivo* kinetics of RubisCO in *A. thaliana* are consistent with those in tobacco at suboptimal and optimal temperatures (15-30˚C), but deviate significantly at supraoptimal temperatures (35-40˚C). Further studies focusing on the enzymatic behavior of RubisCO within a broad range of plant species from different environments will contribute to the veracity of the leaf photosynthesis models used to predict significant changes in the earth's climate.

Presentation Number 9

ABSTRACT:

Abstract Title:	Transcriptome Profiling of Rara Conditional Knockout Mice		
Presenter:	Kylie Nelson		
Mentor:	Kwan Hee Kim		
Additional Authors:	Sze Ming Law, Kwan Hee Kim		
Presentation Type:	Poster	**Major and College:**	Microbiology/Veterinary Medicine
Category:	Molecular, Cellular, and Chemical Biology		

Vitamin A is an important component for maintaining vision, immunity and reproductive efficacy. Vitamin A derivative retinoic acid (RA) governs key developmental events in chordate animals. Retinoic acid receptors and retinoid X receptors (both with alpha, beta and gamma isoforms) mediate the molecular action of RA on gene expression. Vitamin A deficient (VAD) mouse and rat models have been valuable to show that vitamin A is important for spermatogenesis. Testes from these animals were degenerated and lacked advanced germ cells. Interestingly, among transgenic mice with null mutations for retinoic acid receptors or retinoid X receptors, only retinoic acid receptor alpha (RARA)-null mice have testicular degeneration phenotypes that mimic the degeneration observed in VAD rodents. To determine the distinct function of RARA in germ cells, germ cell-specific RARA conditional knockout mice have been generated using the cre/loxP system. In the conditional knockout animals, one of the distinct features observed was the disruption of the organization of concentric germ cell layers. To investigate the genes that may give rise to this phenotype, the conditional knockout mice were sacrificed at postnatal day 10 (P10), and testes collected for RNA extraction. Microarray studies were conducted to analyze the global transcriptome changes. 261 genes were identified that were differentially expressed at ?2.5 fold or higher. Gene Ontology (GO) categories were determined, which included multicellular organismal development, cell adhesion and cytoskeleton organization categories relevant to the observed phenotype. To analyze the expression of genes related to these functions in germ cells, germ cells were separated from the somatic cells of P8 conditional knockout testes, and RNA was extracted. Semi-quantitative polymerase chain reaction (PCR) and real time PCR were used to assess the expression changes for selected transcripts. The selected transcripts included Nanos homolog 2 (Nanos), Kit oncogene (c-kit), Stra8, Synaptonemal complex protein 3 (Sycp3), and genes identified in the GO analysis, e.g., Lysine (K)-specific demethylase 5D (Kdm5D, also known as Smcy), Proteolipid protein 1 (Plp1), etc. Our results provide deeper insights into the role of retinoic acid on the development of testicular germ cells.

Presentation Number 10

ABSTRACT:

Abstract Title:	Inhibition of P-glycoprotein efflux transporters increases the efficacy of insecticides against the western flower thrips, Frankliniella occidentalis		
Presenter:	Charles Christianson		
Mentor:	Dr. Laura Lavine		
Presentation Type:	Poster	**Major and College:**	IPS- Field Crop Management / Agricultural, Human, and Natural Resource Sciences
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Western Flower Thrips (WFT) are economically important pests of many crops throughout the world. They are most notably pests in greenhouse and floricultural crops, vectoring harmful viruses such as tospoviruses. Because WFT have been pests for a number of years, insecticide resistance has developed too many different chemicals used against these insects. Resistance to insecticides manifests via a diverse array of mechanisms. Single gene mutations in key insecticide receptors that confer resistance to specific compounds are the most well known. However, multi-drug resistance is another lesser known mechanism by which insects can have innate resistance to insecticides in more than one chemical class. P-glycoprotein efflux transporters are a class of protein receptors that pump drugs toxic metabolites out of cells. They have been shown to be an important mechanism in multi-drug resistance in mammalian and bacterial cells and increasingly are being shown to play a key role in insecticide cross-resistance. Our hypothesis is that the WFT has evolved insecticide resistance specifically through the P-glycoprotein pathway. Therefore, if P-glycoproteins are involved in insecticide resistance in WFT, inhibiting the pathway should increase the efficacy of the insecticide thereby killing more WFT with the same or lower dosages of insecticide.

Presentation Number 11

ABSTRACT:

Abstract Title:	**Use of Imitation to Aid in the Development of Children with Autism**		
Presenter:	Shealyn Comstock		
Mentor:	Dr. Teresa Cardon		
Presentation Type:	Poster	**Major and College:**	Speech and Hearing Sciences: Liberal Arts
Category:	Use of Imitation to Aid in the Development of Children with Autism		

This research aimed to discover whether language deficits could be alleviated if imitation skills were taught to children with Autism Spectrum Disorder (ASD). This is an important discovery because language is a key component to being able to function socially (Langendoen Chomsky, 2001) and children with ASD often have language deficits paired with social deficits. To conduct this research, an archival data set, collected by Dr. Teresa Cardon to analyze Video Modeling Imitation Training (VMIT), was utilized. The purpose of this research was to discover what language gains, if any, were made by the children with ASD after exposure to VMIT. This project yielded results indicating a relationship between imitation gains made directly during VMIT and language gains made indirectly. It is possible that by addressing a child's imitation deficits, remediation of other related skills may occur. This is due to how one is able to learn through imitation. People learn by observing the behaviors of others and their outcomes (Ormrod, 1999). Imitation is also related to cognition. Learning through observations as opposed to learning strictly by cognition was theorized by Bandura in 1977 and is known as the Social Learning Theory (Bandura, 1977; Ormrod, 1999). This theory helps explain why children with autism who struggle to imitate also struggle to learn from their environments. It also helps explain how remediating a child's imitation deficits, may support development in other areas as well, such as language. Future research should focus specifically on language gains as they relate to imitation. VMIT has the potential to positively impact autism research and intervention, especially with regard to language intervention.

Presentation Number 12

ABSTRACT:

Abstract Title:	**Beef Cow Learning Behavior**		
Presenter:	Briana Arnold		
Mentor:	Kris Johnson		
Additional Authors:	Jennifer J. Michal, Robin R. White, Kristen A. Johnson		
Presentation Type:	Poster	**Major and College:**	Animal Sciences: Agricultural, Human, and Natural Resource Sciences
Category:	Applied Sciences		

The objectives of this study were to determine how quickly a cow learned to visit GreenFeed, if there was a daily visitation pattern, and if they remembered how to use the feeder. GreenFeed, a specially-equipped feed station is used to measure daily methane production from grazing beef cattle. A radio-frequency identification tag was affixed to the ear of each cow and used to track feeder visits and control feed drops (number and timing). Three different measurement periods were used to examine cow learning and visitation patterns. During Period 1 (24 d) cows were introduced to GreenFeed and were grazing moderate-quality pasture. Thereafter, cows had no access to GreenFeed for 45 d. GreenFeed and cows were then moved to a new pasture for Period 2 (22 d). In Period 3 (66 d), feeder and cows were returned to the initial pasture and cows were fed bluegrass straw once daily at 7:00. GreenFeed was programmed to drop feed at set intervals so a cow would not be fed for a prolonged period and encouraged visitation at different times in 24 h. If a cow visited before the set interval, she did not receive feed. During each period, frequency of feeder visits, including times fed and not fed, were recorded. Cows visited GreenFeed diurnally. In general, visitations peaked between 7:00 and 10:00 and again between 16:00 and 19:00 and were lowest between 20:00 and 4:00 when cows were grazing. Frequency of fed and not-fed visits (1.7 and 0.3 per day, respectively) were lowest ($P<0.05$) in Period 1 because cows were learning to use the feeder and there was adequate forage in the pasture. Cows were fed 3.8 times out of a total of 6.8 visits per day after reintroduction to GreenFeed during Period 2, indicating that cows remembered how to use the feeder. Visitation frequency in Period 3 when cows were fed was similar to Period 2, but visitations when cows were not fed decreased to 1.6 times per day, which suggests that visitation was less random. These results show that cows easily adapted to using GreenFeed.

Presentation Number 13

ABSTRACT:

Abstract Title:	Combinatorial rearrangements, restricted permutations, and matrix permanents		
Presenter:	Daryl DeFord		
Mentor:	Dr. Webb		
Presentation Type:	Poster	**Major and College:**	Mathematics/Sciences
Category:	Computer Science, Mathematics, Statistics, Information Sciences		

Enumerative Combinatorics is the study of counting problems. A common Combinatoric technique is to provide a bijection from an abstract problem to a more concrete model. Here, we present a model based on seating rearrangements and show how it can be applied to a variety of problems.

To begin, we show how many of the famous recurrent sequences, such as the Fibonacci numbers, can be motivated with our rearrangements. Then, using this model we generate closed form expressions and linear recurrences for counting cycle covers on digraphs, and even more generally, enumerating the permutations that satisfy a given set of restrictions.

Finally, combining these solutions with the theory of matrix permanents we can apply our method to a variety of problems in physics. These problems include flows in electrical networks, movements of particles in crystal lattices, dimer coverings, and the Ising model.

Presentation Number 14

ABSTRACT:

Abstract Title:	A first look at mineral compositions of the 1886 Tarawera eruption, New Zealand		
Presenter:	Randall Conger-Best		
Mentor:	Michael C. Rowe		
Additional Authors:	M.C. Rowe, B.S. Ellis		
Presentation Type:	Poster	**Major and College:**	Geology / Sciences
Category:	Engineering and Physical Sciences		

The 1886 eruption of Tarawera volcano, New Zealand which destroyed the Pink and White Terraces, considered one of the wonders of the world at the time, was highly explosive. The rare style of eruption is referred to as a basaltic plinian eruption, and is considerably more explosive than typical basaltic eruptions, such as those commonly observed at Kilauea volcano, Hawaii. This style of eruption, although rare, has the ability to transport significant quantities of gas into the stratosphere, and therefore has the potential to significantly impact global climate. Prior studies of the eruption have focused on the physical properties of the deposits to try to understand why this particular eruption was so explosive. However, little is actually known about the melt and gas composition of the magma prior to eruption, due in part to the scarce and relatively small crystals in the erupted basalt. In order to understand how the magma changed with time and what it\s gas contents were prior to eruption, we have focused on chemical identification of the rare mineral components within the erupted basalt. Mineral components have been subdivided into two categories, phenocrysts (derived from the original basaltic magma) and xenocrysts (derived from sources other than the basalt). Identified phenocrysts include plagioclase, olivine, and pyroxene, while xenocrysts include a second population of plagioclase, biotite, and quartz. Chemical compositions of the mineral components were determined by electron microprobe analysis in order to understand the crystallization history of the magma and to decipher how the magma was interacting with the crust prior to eruption. In addition, within the phenocrysts, we have identified melt inclusions (small pockets of magma trapped within the crystals) which have provided the first ever measurements of volatile contents for the Tarawera magma prior to eruption. Mineral chemistry, in conjunction with the analyses of melt inclusions, will finally allow us to unravel the evolution of the Tarawera magma and understand the driving forces of this devastating eruption.

Presentation Number 15

ABSTRACT:

Abstract Title:	**Differential Expression Patterns of Arogenate Dehydratase genes 1-6 in Arabidopsis thaliana**		
Presenter:	Sarah Brewer		
Mentor:	Dr. Norman G. Lewis		
Additional Authors:	Oliver R. A. Corea, Claudia L. Cardenas, Kye-won Kim, Laurence B. Davin and Norman G. Lewis		
Presentation Type:	Poster	**Major and College:**	Agricultural Biotechnology, Biochemistry / College of Agricultural, Human, and Natural Resource Sciences, College of Veterinary Medicine
Category:	Molecular, Cellular, and Chemical Biology		

Phenylalanine (Phe) is an amino acid that is made only in plants, bacteria and fungi. In all organisms, Phe acts as one of twenty amino acids that make up proteins. In plants, Phe also plays a critical role as a precursor for important compounds, such as lignin, a substance that strengthens plant cell walls. Arogenate dehydratases (ADTs) are enzymes that perform the final step in Phe biosynthesis, and are thought to be important for controlling Phe production for protein, versus making Phe for lignin and other compounds. We discovered the 6-membered *ADT* gene family in the model plant, *Arabidopsis thaliana*, and showed these six genes (*ADT*1-6) were able to convert arogenate into Phe. In order to understand where the *ADT* genes are expressed within plant tissue and how the expression of these genes changes as the *Arabidopsis* plant develops and grows, we generated *ADT* promoter::GUS (*β*-glucuronidase) fusion constructs for each of the *ADT*s and transformed them into *Arabidopsis*. After selection, plants at various growth stages (from three-day-old seedlings to mature plants) and various tissues (roots, leaves, stems, flowers, siliques and seeds) were analyzed. The results established the expression patterns of the six *ADT*s providing insight into the possible functions of each enzyme in *Arabidopsis*.

Presentation Number 16

ABSTRACT:

Abstract Title:	Structure of carbon nanotube turfs processed by non-plasma enhanced chemical vapor deposition.		
Presenter:	Kassiopeia Smith		
Mentor:	David Bahr		
Presentation Type:	Poster	**Major and College:**	Materials Science and Engineering/Engineering Architecture
Category:	Engineering and Physical Sciences		

Since their discovery nearly twenty years ago carbon nanotubes (CNT\s) have shown to possess many promising characteristics. It is currently believed that CNT\s may be one of the most thermally and electrically conductive materials known, and they may exhibit unique collective mechanical properties. When CNT\s are arranged in nominally vertically aligned bundles, referred to as CNT turfs they can be useful in applications such as contact switches and thermal transfer for small electronic devices. However, CNT\s are typically studied as single structures and for properties alone, but it is important to understand how the processing of the CNT turfs relate to the structure they form. In order to research the connection between processing and structure we are using a horizontal tube furnace in which non-plasma enhanced chemical vapor deposition will be utilized. By manipulating variables such as growth temperature, gas flow rates, and substrate catalysts we will attempt to clarify the conditions that allow desirable CNT turf growth for use in small electronic devices. To begin these experiments the substrate we use is a plain Si wafer patterned with sol-gel, a flow rate of 25 ccm of hydrogen and 325 ccm of acetylene, and a growth temperature of 750^{o}C. We will take the CNT\s that we grow and using SEM we will explore the structures we are able to create.

Presentation Number 17

ABSTRACT:

Abstract Title:	Mutational Analysis of the Stability of the Mouse H2A.Z Histone Monomer		
Presenter:	Ramon Jones		
Mentor:	Dr. Lisa Gloss		
Additional Authors:	Jasmine Villanueva		
Presentation Type:	Poster	**Major and College:**	Biology/Sciences
Category:	Molecular, Cellular, and Chemical Biology		

Histones are the protein core of the nucleosome which serves as the basic unit for DNA packing in eukaryotes. This packing ability allows large amounts of genetic material to be stored inside the nucleus, but also must allow proper access for DNA chemistries such as transcription and replication. The H2A.Z histone is an H2A variant that is important because it is involved in the regulation of heterochromatin and euchromatin. While H2A and H2A.Z are conserved across species, the two variants share only 60% identity. It was observed that the H2A.Z/H2B heterodimer is relatively unstable compared to the H2A/H2B heterodimer. The H2A.Z/H2B constructs that have been used in the literature and our lab employed the mouse H2A.Z and the Xenopus H2B. Our hypothesis is that the instability of H2A.Z/H2B is not the result of using highly conserved proteins from different species. To test this hypothesis we mutated residues in mouse H2A.Z to resemble the Xenopus H2A.Z. The mutants were by how they affected the stability of the heterodimer in response to salt induced folding. We examined their secondary structure using far-UV circular dichroism, and their tertiary structure using tyrosine fluorescence and anisotropy. The conclusion is WT mouse H2A.Z-Xenopus H2B heterodimer is more stable than the mutant variants mouse H2A.Z_T83S-H2B and H2A.Z_H36L S39N heterodimer. Thus, the WT mouse H2A.Z variant reconstitutes with Xenopus H2B better than the Xenopus like H2A.Z mutants. We also conclude that the instability of H2A.Z-H2B does not reflect the dimerization of histone between different species.

Presentation Number 18

ABSTRACT:

Abstract Title:	Economics, Culture, and Obesity		
Presenter:	Lauryn Ringwood		
Mentor:	Dr. Robert Rosenman		
Presentation Type:	Poster	**Major and College:**	Economics/Agricultural, Human, and Natural Resource Sciences / Honors
Category:	Social Sciences		

Obesity rates around the world have more than doubled since the 1980s, tripling in some nations. This widespread and rapid increase of obesity rates has made obesity a source of international concern. Researchers from a variety of fields are working to identify the causes of this increase and have found that analyzing the roles of economics and culture can help us to understand the nature and timing of these increases. Up to this point, the relationships of economics and culture to obesity have primarily been analyzed separately, so the purpose of this research is to analyze how the interaction of economics and culture can affect obesity rates.

There are three components to this analysis. The first is a case study comparison of food culture and consumption in the United States and France in which the characteristics of each are compared. The second is an application of culture to a traditional utility maximization model for food consumption through the inclusion of culture in the parameters of the model. The final component is an econometric analysis using data from a variety of countries to compare the relationship between two core cultural values, long-term orientation versus short-term orientation and indulgence versus restraint, and national obesity rates in the context of different economic environments. The hypotheses were that long-term orientation would be associated with lower obesity rates and indulgence would be associated with higher obesity rates.

The results of this analysis support that economics and culture matter independently but their ultimate effects on the prevalence of obesity are best understood when considered together. The case study comparison showed that culture can help to explain how economically similar countries can have significantly different obesity rates while the adapted utility maximization model showed that culture can impact consumption habits through different priorities and values related to health and social expectations. The results of the econometric analysis confirmed expectations regarding the relationship of long-term versus short-term orientation and indulgence versus restraint to obesity. These results suggest that further analysis of the interaction of economics and culture could be valuable in understanding the dynamics of the obesity epidemic.

Presentation Number 19

ABSTRACT:

Abstract Title:	Evaluation of the shelf-life of apple juice after High Hydrostatic Pressure treatments		
Presenter:	Gretchen Marx and Abigail Moody		
Mentor:	Daniela Bermudez		
Authors:	Abigail Moody, Gretchen Marx, Daniela Bermudez		
Presentation Type:	Poster	**Major and College:**	Zoology/Sciences / Honors
Category:	Applied Sciences		

Shelf-life of fruit juices is reduced mainly because the presence and growth of yeasts during storage. Most commercial juices are thermally pasteurized to inactivate pathogenic bacteria, reduce the loads of spoilage microorganisms, and extend the shelf-life. However, thermal treatments considerably reduce the quality attributes of juices such as flavor, color, and nutrient content. Thus, there is a current research need to find alternatives of thermal pasteurization: technologies able to inactivate microorganisms but also to keep the fresh-like characteristics of the product. High hydrostatic pressure has been shown to be a useful technology to inactivate bacteria in food products but shelf-life studies have not been extensively reported. The aim of this research was to study the shelf life of apple juice at two storage conditions after be treated with high hydrostatic pressure and be inoculated with *Saccharomyces cerevisiae* ATCC 4113 (10^7 cfu/ml). Pressure was applied at 300 and 600 MPa at room temperature and samples were stored at 4˚C and 21˚C. Every other day, color, pH, and microbial loads of samples were assessed. Initial yeast inactivation reached up to 6 log reduction after high hydrostatic pressure treatment. The control samples at room temperature began multiplying exponentially immediately and the control samples held at refrigeration temperature started multiplying exponentially after an average of 2 weeks. Significant color and pH changes of apple juice accompanied the growth of the yeast but the treated samples did not vary significantly during the period of shelf life. Furthermore, no important yeast growth was observed in the pressurized samples during the storage (40 days) even at room temperature. Results of this research show that high hydrostatic pressure is a viable technology to pasteurize fruit juices and considerably extend the shelf-life of the product.

Presentation Number 20

ABSTRACT:

Abstract Title:	**Wine-Menu Design: An Investigation of Attributes and Causal Effects Using Brain-Computer Interface Technology**		
Presenter:	Rachel Bohan and James Daltas		
Mentor:	Dr. Reynolds		
Presentation Type:	Poster	**Major and College:**	Wine Business Management : College of Business
Category:	Arts and Design		

The purpose of this study is to discern how potential restaurant guests are influenced by wine-menu design. Specifically, we test whether guests engaged in greater cognitive function when a wine list includes greater specificity regarding the description (e.g., flavor profile, varietal blend) or one with pairing descriptions as opposed to the more traditional wine list that includes producer and price alone. We assessed this using brain-computer interface technology, which allows us to test causal linkages between neuro-response stimulus and stimulus attribute resonance. We hypothesize pairing suggestions will elicit the strongest cognitive resonance. Moreover, we expect that brief pairing descriptions are superior to elaborate descriptions, which refutes earlier research. The linkage is expected to be strongest for those with little experience with wine but also evident for experienced wine consumers. This study should provide important information for practitioners and researchers. Restaurant owners may want revise their wine lists to include pairing recommendations. Future research should explore further how wine lists and even food menus might be altered to maximize consumer engagement.

Presentation Number 21

ABSTRACT:

Abstract Title:	Sn and Sn-alloy nano-needles in Li-ion battery anodes		
Presenter:	Ian Thompson		
Mentor:	Dr. Grant Norton		
Presentation Type:	Poster	**Major and College:**	Material Science and Engineering/Engineering Architecture
Category:	Engineering and Physical Sciences		

While Li-Ion batteries have been used for many years in the electronics industry, Li-Ion batteries are becoming ever more popular for use in aerospace, hybrid, and electric vehicles. With these new applications come new challenges. While Li-Ion batteries have many advantages: light weight, higher open circuit voltage, no memory effect, and low self discharge rates, there is much room for improvement. The ever-increasing expectations on batteries have pushed researchers to look for new materials to use for the anode in Li-Ion batteries. One material that has been researched extensively is a metallic anode, specifically tin and tin alloys. Tin anodes offer a higher lithium storage capacity than that of their carbon based counterparts. This is due to the formation of Li-M intermetallics. Due to a high theoretical capacity, 994 mAh/g versus 374 mAh/g, researchers are looking at one metal, tin, to potentially replace graphite as an anode material in lithium-ion batteries. However, tin anodes suffer from a low cycling life. During the lithiation process, Li-Sn intermetallics are forming and an electron transfer reaction is taking place. This electron transfer reaction of metal ions, MO + Xe- M-x, creates an abundance of negative host ions. These negative host ions have a substantially larger volume than their neutral counterparts, this leads to a volume expansion ~100-300% in lithiated metallic anodes. Constant expansion and contraction causes mechanical stresses within the anode. Because the Sn-Li intermetallics are very brittle, being ionic in nature, the anode will begin to crack and fracture, eventually separating the anode and the current collector, rendering the battery useless. However, decreasing the particle size, and forming a loose packing structure will allow room for the particles to expand without pressing against each other, relieving the internal stresses during the volume expansion. Refining the surface structure will also improve the cycling life. Using a nano-wire structure, or decreasing the aspect ratio, will have improved affects on the cyclability of the anode. Through facile strain relaxation, a nano-wire or needle structure will be able to increase in both length and diameter without fracture.

Presentation Number 22

ABSTRACT:

Abstract Title:	CCK-induced pERK1/2 in the NTS leads to synapsin-1 phosphorylation in vagal afferent terminals		
Presenter:	Michael Silvas		
Mentor:	Dr. Robert Ritter		
Additional Authors:	Campos, C.A., Shiina, H., Czaja, K., and Ritter, R.C.		
Presentation Type:	Poster	**Major and College:**	Basic Medical Sciences/Sciences
Category:	Molecular, Cellular, and Chemical Biology		

The control of body weight depends on the balance between food intake and energy expenditure. The current epidemic of obesity, which represents a major risk factor for the development of type 2 diabetes and cardiovascular diseases, is associated with increases in meal size. The size of individual meals is controlled by neural and humoral gastrointestinal (GI) signals that promote satiation and result in meal termination. Cholecystokinin (CCK) is a gut-derived peptide that has been shown to reduce meal size by activating GI vagal afferent fibers that synapse in the caudal hindbrain in the nucleus tractus solitarius (NTS). Previously published observations indicate that intraperitoneal (IP) injection of CCK induces ERK1/2 phosphorylation (pERK1/2) in NTS neurons and inhibition of hindbrain pERK1/2 attenuates reduction of food intake by CCK. Moreover, observations from our lab indicate that CCK also triggers pERK1/2 in vagal afferents, suggesting that pERK1/2 can facilitate the reduction of food intake by CCK through presynaptic mechanisms. In other systems, pERK1/2 in axonal varicosities modulates presynaptic plasticity through synapsin-1 phosphorylation. Therefore, we hypothesized that IP injection of CCK induces synapsin-1 phosphorylation in vagal afferents via a pERK1/2-dependent mechanism. We found that IP CCK triggers synapsin-1 phosphorylation in vagal afferents in the NTS. Furthermore, we demonstrate that chemical lesion of vagal afferents with capsaicin or IP injection of a CCK-A receptor antagonist (Devazepide) attenuates CCK induced synapsin-1 phosphorylation in the NTS. These observations indicate that CCK-induced phosphorylation of synapsin-1 in the NTS is dependent on the activation of vagal afferents that originate from the GI tract. Finally, we found that fourth ventricular injection of a pERK1/2 inhibitor (U0126) reduces CCK-induced synapsin-1 phosphorylation in the NTS. Collectively, these results support the hypothesis that CCK-induced pERK1/2 leads to synapsin-1 phosphorylation in vagal afferents.

Presentation Number 23

ABSTRACT:

Abstract Title:	Radiocarbon Dating Ancient Plankhouse Villages on the Northwest Coast of North America		
Presenter:	Kaitlyn Scott		
Mentor:	Colin Grier		
Presentation Type:	Poster	**Major and College:**	Anthropology/Liberal Arts
Category:	Social Sciences		

Over the past 60 years, radiocarbon dating has revolutionized the practice of archaeology. However, the technique has its limitations. Recent literature has discussed issues with the application of radiocarbon dating techniques to coastal locations where marine resources were used. Here, an attempt is made to correct and calibrate the many radiocarbon dates obtained for Dionisio Point, an ancient settlement found along the southwestern coast of British Columbia. Radiocarbon dating results must be examined and controlled in order to reduce errors that arise when interpreting dates from this and other Coast Salish plankhouse village settlements. This approach will allow for a better understanding of the development and chronology of this region.

Presentation Number 24

ABSTRACT:

Abstract Title:	Hyperbaric Oxygen Decreases Neuropathic Pain in Rats		
Presenter:	Carlee Gibbons		
Mentor:	Dr. Raymond Quock		
Additional Authors:	Raymond M. Quock, Yangmiao Zhang		
Presentation Type:	Poster	**Major and College:**	Neuroscience/Veterinary Medicine / Honors
Category:	Applied Sciences		

According to Apfelbaum et a. (Anesth. Analg. 97:534-540, 2003), 86% of patients have moderate-to-severe postoperative pain, and more patients experience this pain after discharge from the hospital than before. Undermanagement of such pain may lead to poor clinical outcomes and reduced well-being. Nitric oxide (NO) is a small free radical biological messenger that has been implicated in many physiological systems and cascades. It plays a huge and complex role in the study of pain?both in inducing pain and helping to alleviate it. Hyperbaric oxygen (HBO2) treatment has been shown to decrease acute and chronic pain potentially per modulating an NO cascade. Chung et al. (J. Pain 11:847-853, 2010) showed that HBO2 treatment could induce antinociception in a mouse model of acute pain; this unusually long antinociception was antagonized when nitric oxide synthase (NOS) was inhibited, suggesting antinociception was NO-dependent. Thompson et al. (Neurosci. Res. 66:279-283, 2010) demonstrated that HBO2 could cause antinociception in two rat models of neuropathic pain. The present study was conducted to determine whether HBO2 treatment causes an unusually long antinociceptive effect in a rat model of neuropathic pain and whether this effect could be NO-dependent. Allodynia was induced per sciatic nerve crush surgery or i.p. Paclitaxel injection. Rats were then treated with HBO2, intracerebroventricular (i.c.v.)pretreated with either L-NAME (L- NG-nitroarginine methyl ester, nonselective NOS inhibitor) or SMTC (S-methyl-L-thiocitrulline, selective neuronal NOS inhibitor) and then treated with HBO2, or left as a control. Allodynia was taken as a baseline and followed after treatment for at least 20 days and area under the curve (AUC) measurements were calculated for this data. Results indicate that both models did induce neuropathic pain, which was reversed by HBO2 ($p<0.001$ for nerve crush, $p<0.01$ for PAC using one-way ANOVA and Bonferroni multiple comparison test on AUC measurements), but not for reversal using LNAME or SMTC. From these results, it can be concluded that HBO2 reduces neuropathic pain in a rat model for a lengthy duration. However, further testing is needed to determine whether this effect is NO-dependent. This work was supported by WSU College of Pharmacy.

Presentation Number 25

ABSTRACT:

Abstract Title:	Characterization of Yttrium Aluminum Garnets Prepared by Sol-gel Method		
Presenter:	John Buscher		
Mentor:	Farida Selim		
Presentation Type:	Poster	**Major and College:**	Running Start
Category:	Engineering and Physical Sciences		

Yttrium aluminum garnets, $Y_3Al_5O_{12}$ (YAG), are complex oxides, widely used as host materials for solid state lasers. They are also promising materials for radiation detectors and solid state lightening. YAG powders and films were synthesized at relatively low temperatures using a chemical method known as solution-gelatin (sol-gel) method and investigated by X-ray diffraction (XRD), which is an established technique for measuring the crystal structures. XRD measurements showed the formation of fully crystallized single phase with well defined pronounced garnet crystal structure. The sample optical properties were monitored and compared with YAG single crystals. Efforts were made to improve the luminescence properties and the ability of materials to detect radiation.

Presentation Number 26

ABSTRACT:

Abstract Title:	Systemic capsaicin reduces fat pad mass in adult male rats		
Presenter:	Casey Callahan and Miguel Toscano		
Mentor:	Dr. Krzysztof Czaja,PhD,D.V.M		
Presentation Type:	Poster	**Major and College:**	Neuroscience/Veterinary Medicine
Category:	Molecular, Cellular, and Chemical Biology		

In the United States, obesity kills between 111,909 to 365,000 people a year. Worldwide, obesity kills 2.5 million people a year. Capsaicin, a pungent component of chili peppers has been shown to lower body weight when administered orally. It is also known that the vagal system, containing capsaicin sensitive TRPV1 receptor expressing neurons play the key role in regulation of satiety. However, the anti-obesity effect of capsaicin is not yet fully understood. In the present study we tested the hypothesis that damage to the peripheral vagal afferents will decrease the body weight and fat mass in adult rats. Twelve Sprague-Dawley male rats were injected intraperitoneally by either capsaicin or a vehicle solution. Body weight and food intake was measured daily. Nose-to-tail length was recorded weekly. Brown adipose and tail temperature were measured daily by using an infrared thermometer. Rats were sacrificed after 14 days post injection and perfused with paraformaldehyde. Mesenteric, inguinal, epididymal, retroperitoneal, brown fat, and dorsal fat depots were extracted and weighed. Results of the study revealed that intraperitoneal administration of capsaicin significantly decreased the body weight and total fat mass in adult rats. Capsaicin was not shown to have a significant effect on food intake, length and temperature of the studied animals. The results of the study show that TRPV1-expressing vagal afferents are important in maintaining the fat tissue metabolism. Collectively, these findings establish a crucial link among sensory nerves and obesity and identify TRPV1 manipulation as a novel therapeutic approach for obesity treatment.

Presentation Number 27

ABSTRACT:

Abstract Title:	Longitudinal and Transverse Mechanical Properties of Wood Cells		
Presenter:	Heidi Coleman		
Mentor:	Dr. Bahr		
Presentation Type:	Poster	**Major and College:**	Material Science and Engineering/Engineering Architecture
Category:	Engineering and Physical Sciences		

Mechanical properties of wood at a cellular level have grown more important as applications for wood have grown. Nanoindentation is a method of testing mechanical properties such as modulus and hardness on the cellular level. Sample preparation is an important part of nanoindenting wood cell walls. A common way of prepping wood samples is to embed them in an epoxy resin; this is done because it is necessary for the sample surface to be smooth and level to perform nanoindentation tests. In this study a cryo ultra microtome with a diamond knife was used to prep the sample surface. The procedure was successful without adding any foreign materials to the sample so tests were done without the influencing factors of other materials. Maple was the wood of choice because it was the most readily available hardwood. Earlywood cells were targeted for nanoindentation tests, the S2 and middle lamella layers were indented separately. Nanoindentation was done using single load and unload, load controlled, load functions with a cube corner tip. Hardness and modulus values were obtained in the longitudinal and transverse directions on both the S2 and middle lamella(ML) layers. There is no significant difference in modulus or hardness of the layers using the nanoindentation technique. The transverse S2 and ML averages were 6.03 and 5.68 GPa for modulus and 0.53 and 0.53 GPa for hardness. The longitudinal S2 and ML averages were 11.00 and 10.81 GPa for modulus and 0.33 and 0.46 Gpa for hardness. With the data obtained from nanoindentation a composite grid model was used to predict properties of maple on a larger scale. These localized results will then be compared to published composite models.

Presentation Number 28

ABSTRACT:

Abstract Title:	Maternal Energy Expediture among the Aka Foragers in Central Africa		
Presenter:	Courtney Malcom		
Mentor:	Courtney Meehan		
Presentation Type:	Poster	**Major and College:**	Anthropology/Liberal Arts
Category:	Social Sciences		

Life history theory argues that women face trade-offs between somatic and reproductive efforts. Previous research suggests that child care reduces maternal energy expenditure in resource collection in small-scale populations. If mothers reduce their time allocated to resource collection, this can have clear and negative health consequences for families. However, some scholars suggest this may not apply to foraging groups; mothers often carry their children with them during work activities. The Aka tropical forest foragers in the Central African Republic are highly cooperative mobile hunter-gatherers. Cooperative caregiving and resource exchange are ubiquitous among the Aka. While infants spend the majority of their day in the direct care of their mothers, they also spend a significant amount of time being cared for by others (allomothers). Using quantitative behavioral observations collected on 28 Aka mothers, we calculated energy expenditure in kilocalories derived from their Basal Metabolic Rates (BMR). Mothers were observed across all daylight hours (over 250 hours of observations). We hypothesized that increased maternal energy expenditure would reduce the frequency of maternal child care activities. In addition, higher maternal energy expenditure would be associated with non-maternal caregiving. When maternal child care responsibilities are reduced due to non-maternal investment, we predicted that mothers would redirect their effort toward labor activities. Results indicate that, contrary to our predictions, the presence of fathers does not reduce maternal energy expenditure. However, other categories of allomothers have a significant impact on maternal energy expenditure. Juvenile girls decrease maternal energy expenditure, while juvenile boys significantly increase maternal energy expenditure across daylight hours. While Aka fathers, juvenile boys, and juvenile girls have been previously shown as high investors in infant care, results indicate that they are differentially affecting maternal time allocation and energy expenditure.

Presentation Number 29

ABSTRACT:

Abstract Title:	Optical Properties of Oxide Thin Films Synthesized for Photonic Applications by Spin Coating		
Presenter:	Frederick Chen		
Mentor:	Farida Selim		
Presentation Type:	Poster	**Major and College:**	Running Start
Category:	Engineering and Physical Sciences		

Solid state lightening (SSL) devices based on light emitting diode (LED) outperform conventional illumination sources of incandescent and fluorescent light in all aspects such as energy consumption, lifetime, and efficiency. The efficiency of incandescent and fluorescent lights is limited by fundamental factors. However, the solid state sources have extraordinary high efficiency, and they provide energy saving and environmental benefits. Zinc oxide is a promising material for solid state lightening devices. In this work, thin films of zinc oxide were prepared by chemical routes based spin coating technique on different substrates. The effects of solvents and reaction conditions on the morphology, transparency, and luminescence properties were investigated using state-of-the art structural and optical characterization. This work should help to discover the key elements for synthesis of high quality inexpensive ZnO thin films for LED, which is of high national priority.

Presentation Number 30

ABSTRACT:

Abstract Title:	An Evaluation of the Practicality of Using Glass Beads with the Decagon Soil Matric Potential Sensor for the Measurement of High Water Potential		
Presenter:	Brody Teare		
Mentor:	Colin Campbell		
Additional Authors:	Colin Campbell, Doug Cobos, Gaylon Campbell		
Presentation Type:	Poster	**Major and College:**	Agriculture Biosystems - Organic Agriculture/Agricultural, Human, and Natural Resource Sciences / Honors
Category:	Applied Sciences		

Soil matric potential is a measurement of how tightly water is bound by soil particles. In practical terms, this is how much energy a plant must exert to remove water from the soil. This is measured in units of energy and is negative in the soil (under suction). Decagon Devices manufactures a sensor for this purpose, the MPS-II, which uses an engineered ceramic disk. The sensor works by measuring the charge storing ability (dielectric value) of the disk volume. Dielectric is an indication of how much water is present, which can be used to infer matric potential. The disk allows for sensitivity over a range of -5kPA to -500kPa. The goal of this research is to investigate the possibility of using a sintered glass disk to obtain good sensitivity in the 0 to -10kPa range. Current tools available to measure that range include tensiometers and heat dissipation sensors. Both of these have use and price restrictions which make them impractical to use as a leave-in-place sensor. To collect data at many points across a large area over time, it is much more practical to use a leave-in-place sensor which is cost effective. The MPS-II is such a sensor. The range of 0 to -10kPA is relevant to geotechnical engineers, primarily in the study of slope failure. By monitoring matric potential in this range, engineers may be able to predict land slides. Based on particle-water interactions, it is entirely possible to make a disk from glass beads which would allow accuracy in this range. A range of glass bead sizes were selected and obtained. These beads were mixed to create a desired particle size distribution. The mixtures were placed in an apparatus which creates known suctions. An MPS-II sensor was present in each sample and the output recorded to obtain the sensitivity range for each mixture. Data obtained show that each mixture produces sensitivity in an unique range. By manipulating the particle size distribution, any desired range of sensitivity may be obtained, but the equations for predicting the distribution are not available, therefore, the correct mixture must be obtained through experimentation.

Presentation Number 31

ABSTRACT:

Abstract Title:	Variations in Mantle Composition Inferred from Olivine Phenocryst and Xenocryst Geochemistry from the Southern Rio Grande Rift, New Mexico		
Presenter:	Spenser Scott		
Mentor:	Michael C. Rowe		
Additional Authors:	Rowe, M.C., Boroughs, S.		
Presentation Type:	Poster	**Major and College:**	Geology/Sciences
Category:	Engineering and Physical Sciences		

The composition of the mantle beneath an active rift zone may have a significant impact on the amount and rate of crustal extension and deformation while influencing volcanism in the region. Considering this, geochemical analysis of volcanic material from an active rift zone can be utilized to determine the composition of the upper mantle and infer the processes promoting extension therein.

The Rio Grande Rift in southern New Mexico is a unique locality where both extension and volcanism has played a key role in forming the land. Olivine grains from basalts and mantle xenoliths spanning the southern portion of the rift have been collectively analyzed with a variety of geochemical techniques. Olivine compositions were measured by electron microprobe analysis and laser ablation ICPMS, concurrent with the formation of a new methodology for standardizing in situ trace element analysis of olivine grains. The trace element data gathered from these methods allows us to characterize the upper mantle in terms of two possible components: peridotite or pyroxenite, giving an indication of the composition of the mantle source. Olivine trace element concentrations and ratios suggest that the upper mantle beneath the Rio Grande Rift consists of a mixture of these two components. Oxygen isotope data was also collected by laser fluorination. In previous studies, these signatures have been found to show evidence for contamination within basaltic samples as well as variations among mantle sources.

It has been hypothesized that during the subduction of the Farrallon Plate beneath western North America (80-40 Ma) fluids and melts from the subducting plate may have interacted with the overlying mantle, potentially resulting in a change in mineral compositions and modes. We hope to demonstrate that erupted basalts, and particularly olivine grains, can record evidence for this change in mantle chemistry and mineralogy beneath the Rio Grande Rift, forming a modified upper mantle that is much more susceptible to extension, deformation, and volcanism.

Presentation Number 32

ABSTRACT:

Abstract Title:	Aging of Vagal Afferent Glutamatergic Neurons in the Rat		
Presenter:	Rachel Wanty		
Mentor:	Krzysztof Czaja		
Additional Authors:	Ritter RC, Czaja K		
Presentation Type:	Poster	**Major and College:**	Neuroscience / Veterinary Medicine / Honors
Category:	Molecular, Cellular, and Chemical Biology		

We are currently looking at the physiological effects of aging in regards to feeding behavior in male rats. Autonomic functions (those that do not require conscious thought) regarding feeding are controlled by the vagus nerve, as this nerve leaves the spinal cord, it forms two centers of neuronal cell bodies on either side of the spinal cord. These neuronal centers are referred to as the nodose ganglia (NG). These ganglia are the take off point for the nerves that will later innervate the visceral organs of the gut such as the intestines and stomach. Moreover, it has been previously reported that neurons located in NG express the glutamate NMDA receptor, which participates in the control of food intake. However, with age the number of neurons in NG has been shown to decline. Furthermore, our results show that the NMDA receptors seem to change their phenotypes with age. These NMDA receptors are composed of several subunits known as NR1, NR2A and NR2B. To confirm this relationship between receptor type and feeding behavior we use satiety modulators (cholecystokinin, CCK) and NMDA receptor antagonists (MK801 and RO Compound). CCK decreases the appetites of rats and MK801 stimulates their appetite. These chemicals confirm the relationship between the feeding behavior and the receptor and they have been used in both young and old rats and yield similar effects just to varying degrees. Preliminary data suggests that the older rats eat less which is to be expected based on the decrease in receptor number. Thus it may be expected that these decreases in neuronal number might manifest themselves as changes in feeding behavior. Further research will focus on quantifying the changes in receptor number in the hindbrain. This will allow us to create a more complete picture of the systemic changes with age.

Presentation Number 33

ABSTRACT:

Abstract Title:	Perceived Discrmination among Multicultural Students: An Examination of Latino and Asian-American Students at a Four-Year University in the Northwest		
Presenter:	Gerardo Galeana		
Mentor:	Dr. Julie Kmec		
Presentation Type:	Poster	**Major and College:**	Political Science/Liberal Arts
Category:	Social Sciences		

This study looked at whether multicultural students, specifically Latinos and Asian-Americans, perceived discrimination at a four-year institution in the Northwest. Four hypotheses were developed and were tested by having participants fill out an online survey with questions regarding perceived discrimination in the classroom, at the workplace, and around campus in general. The four hypotheses were that 1) Latinos would perceive discrimination more than Asian-Americans, 2) males would perceive discrimination more than females, 3) multicultural Greeks would perceived discrimination more than non-Greeks, and 4) upper classmen would perceive discrimination more than lower classmen. The results of the project supported only one of the four hypotheses in that indeed multicultural Greeks perceived discrimination more than non-Greeks. Perceived discrimination is an area that should continue to have research conducted on.

Presentation Number 34

ABSTRACT:

Abstract Title:	Theileria Equi and Equine Piroplasmosis; Testing, Life Cycle, and Options for Equine Owners		
Presenter:	Eftishia Neuhauser		
Mentor:	Donald Knowles		
Presentation Type:	Poster	**Major and College:**	Animal Sciences/Agricultural, Human, and Natural Resource Sciences
Category:	Applied Sciences		

Babesia equi, also referred to as Theileria equi, is a tick transmitted protozoan parasite which affects all equids worldwide and is one cause of equine piroplasmosis. This disease can cause acute or chronic infections and may lead to many symptoms, including death in acute cases. Chronically affected animals become carriers and efficient transmitters, which are of the greatest concern to the United States in their efforts to maintain infection and disease free status. These carriers exhibit little to no symptoms but still act as a reservoir for the parasite, possibly infecting other equids which increases the chances of the United States becoming an endemic nation. An endemic status places major trade restrictions on international movement of horses to non-endemic areas. This would result in an immense economic loss for the equine industry. Previous testing practices, mainly the Complement Fixation Test for Babesia Equi, allowed carrier horses to enter the country due to false negatives. With the revised testing methods such as the cELISA (Competitive Enzyme Linked Immunosorbent Assay), additional positive horses are being detected leading to increasing concerns over the United State's endemnicity status. The ability of many ticks to transmit B. equi isn't known, complicating control. Treatment options for affected equids include long term quarantine, euthanasia, or the chemotherapeutic agent Imidocarb dipropionate. This drug was recently shown to eliminate B.equi from infected horses. Many of these horses showed prolonged positivity in the cELISA, likely due to high titers of anti-parasite antibodies. Infected horses were also shown to go nested PCR negative after treatment with Imidocarb dipropionate. Quarantine and euthanasia are not always viable options for owners who have monetary, genetic, and emotional investment in their animals. Imidocarb dipropionate gives new hope to animals infected with B. equi and new hope to controlling this persistent infection in horses.

Presentation Number 35

ABSTRACT:

Abstract Title:	Design of SNAP-Tag Fluorescent Probes to Study Dynamics of E-Cadherin During Tumor Progression and Metastasis		
Presenter:	Teea Bunker		
Mentor:	Dr. Subra Muralidharan		
Presentation Type:	Poster	**Major and College:**	Biochemistry/ Molecular Biology
Category:	Molecular, Cellular, and Chemical Biology		

The overarching theme of this research is to understand the role of extracellular mechanical stress in tumor progression and metastasis. As a tumor develops, the extracellular matrix of cells stiffens due to interstitial fluid accumulation, hardening tissue, and angiogenesis that exerts increased pressure on the tumor cells. This mechanical stress triggers the cells inside the tumor to undergo signaling pathways that could contribute to tumor progression and advance into a metastatic phenotype. This, however, is not well understood since there is currently no way to follow the dynamics of mechanosensitive signaling proteins. This research will address that need by designing fluorescent probes by the recently developed SNAP-Tag technology. This project specifically looks at the mechanosensitive protein E-Cadherin that undergoes changes in expression levels when normal cells turn cancerous and further change to metastatic phenotypes. E-Cadherin is a cell-cell adhesion membrane protein and is downregulated when normal cells become cancerous and progress to metastatic phenotype. The goal is to follow the dynamics of E-Cadherin by fluorescence microscopy in prostate cancer cells. The dynamics of E-Cadherin in model benign, nonmetastatic, moderately metastatic, and highly metastatic prostate cancer cells subjected to tension, shear, and osmotic stress will be monitored. We are currently designing and optimizing the expression of SNAP-cadherin plasmids that will be transfected into prostate cancer cells for tracking E-Cadherin in response to the mechanical stresses. Time dependent studies of the fluorescently tagged cadherin will provide insights into its response to mechanical stress experienced by the cell membrane and the biochemical signaling involving cadherin triggered by this response.

Presentation Number 36

ABSTRACT:

Abstract Title:	Carbon and Nitrogen loss in windblown dust on the Columbia Plateau		
Presenter:	Laurel Graves		
Mentor:	Brenton Sharratt		
Additional Authors:	Brenton Sharratt, Shelley Pressley		
Presentation Type:	Poster	**Major and College:**	Civil Engineering/Engineering Architecture/ Honors
Category:	Engineering and Physical Sciences		

Soil erosion from windstorms may lead to high nutrient loss in fields and cause environmental degradation as a result of suspension in the atmosphere or deposition in surface water systems. In particular, high wind weather events can emit particulates from tilled agricultural soils on the Columbia Plateau in the Pacific Northwest. These particulates contain nitrogen (N) and carbon (C), which are essential nutrients for crops and soil microorganisms. Loss of these nutrients is an economic concern to local farmers because depletion of nutrients from soils results in lower crop yield. Historic sediment samples collected from fields in the summer fallow phase of a winter wheat/summer fallow rotation were tested for N and C to assess nutrient loss. These events occurred between 1999 and 2006. Dust samplers designed to measure creep, saltation, and suspension at various heights were employed to capture transported particulates. While sediment size distribution for each event has been analyzed, total N and C at various heights has not been analyzed for these events. In order to quantify N and C in the sediment, each sample was weighed and analyzed for N and C content by combustion using a LECO analyzer. These data can be used to determine the enrichment of sediment in N and C compared to the source (soil) and the overall loss of nutrients from agricultural fields on the Columbia Plateau. In the future, our results could lead to testing the effects of lower N and C on soil productivity and measuring the impacts of windblown N and C on the surrounding environment.

Presentation Number 37

ABSTRACT:

Abstract Title:	Body Size and Shape Differences among Clonal Lines of Rainbow Trout		
Presenter:	Kelsi Lakey		
Mentor:	Pat Carter		
Presentation Type:	Poster	**Major and College:**	Software Engineering/Engineering Architecture / Honors
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

The overall objective purpose of my project is to test whether differences in body shape among clonal lines of rainbow trout explains the differences in burst swim speed that have been measured among these lines. I measured approximately 100 fish from four different clonal lines for 26 different body size and shape variables. As a initial step I am analyzing the size and shape data, independent of burst swim speed, using Principal Component Analysis in MATLAB and in SAS, to test for overall size and shape differences among the clonal lines. My results demonstrate significant differences in size and shape among these clonal lines, opening the possibility that the differences in speed may be able to be explained by differences in shape. In the near future I will incorporate the swimming speed data and will run similar principal component analysis to test the hypothesis that shape differences among clonal lines explains the variation in swim speed.

Presentation Number 38

ABSTRACT:

Abstract Title:	Forecast Modeling of Realtor Members and Total Licensees in the State of Washington as an Economic Indicator		
Presenter:	Steven Turi		
Mentor:	Glenn Crellin		
Presentation Type:	Poster	**Major and College:**	Economic Sciences/Agricultural, Human, and Natural Resource Sciences/ Honors
Category:	Social Sciences		

This research is designed to use models of total licensees and Realtors for the state of Washington as an indicator of the real estate market's health. Furthermore, it is hoped the results will allow more accurate forecasting of revenues for the state's department of licensing and for the Realtor Association.

To begin with, it is important to understand what is a Realtor and what is a licensee. A real estate licensee; such as a sales person, a broker or a managing broker; is defined in this research as someone granted a license by the state of Washington to perform a specific duty to help buyers and sellers - or landlords and tenants in the case of rental properties - through the complexities of real estate transactions. A Realtor is a subset of licensees who is a member of the Washington Association of Realtors and acts as an intermediary between buyers and sellers of real estate property.

It is presumed that when the economy is in a boom, licensees are likely to enter the market due to increased residential construction and reselling of homes; a substantial proportion of those new licensees will join the Association, but that affiliation also fluctuates. New members of Realtors and licensees enter to because the idea of earning a large income is attractive and supported by a healthy economy with many home transactions. However, when the economy declines, it is expected to see the number of Realtors and licensees decrease. As housing transactions dwindle, the market cannot support all the Realtors and licensees of a boom era. Individuals who have little experience or just recently joined because of the intriguing income possibilities may be the first to leave, leaving behind experienced salespeople who they themselves may leave the market due to poor conditions. Observing this behavior will be useful to see if the economy is on the verge of decline or improvement. An application of this research could be an early-warning analysis of economic conditions in the state of Washington, allowing politicians to act quicker with instating recession-diverting policies.

Presentation Number 39

ABSTRACT:

Abstract Title:	Development of Functional Food Products Made with Grape Pomace Flour		
Presenter:	Gena McKahan		
Mentor:	Dr. Carolyn Ross		
Presentation Type:	Poster	**Major and College:**	Food Science/Agricultural, Human, and Natural Resource Sciences
Category:	Applied Sciences		

The overall objective of this research is to use an agricultural waste product, grape pomace flour (GPF), to develop a sensorial acceptable food product that contain physiologically relevant concentrations. The central hypothesis for the proposed research is that consumption of food products containing GPF will produce health benefits, with food consumption compliance being dependent on the sensory properties of the food. We formulated this hypothesis based on published studies that suggest the consumption of grape fiber improves cardiovascular disease risk factors and research from our lab that indicate that food products can have a sensorial optimal acceptable concentration of GPF.

Presentation Number 40

ABSTRACT:

Abstract Title:	**Neck Muscle Strains in Females During Whiplash**		
Presenter:	Kyle Blum		
Mentor:	Anita Vasavada		
Additional Authors:	Gunter Siegmund, Anita Vasavada		
Presentation Type:	Poster	**Major and College:**	Bioengineering: Engineering Architecture
Category:	Engineering and Physical Sciences		

Whiplash injury is a worldwide problem due to both the financial and physical costs associated with it. In the United States, the whiplash injury rate has been estimated to 800,000 per year [1]. Of these injuries, 270,000 were caused by rear impacts with an annual cost of $2.7 billion [2]. Furthermore, statistical data have shown that females have a higher risk of sustaining whiplash injuries than males under similar crash conditions. This injury risk is up to 3 times higher for females compared to males [1]. Mechanisms of whiplash injury are not well understood. The stresses and strains on neck tissues cannot be measured directly in humans. For this reason, biomechanical models are useful to estimate tissue stresses and strains which cannot be measured in vivo. A previous study from our lab [3] used experimental data from human volunteers undergoing low-speed impacts (5mph) in conjunction with a biomechanical model to calculate strains in neck muscles during whiplash. A limitation of this study was that it only analyzed data from male subjects, because the existing model represented an average male. However, females have different dynamic responses during simulated whiplash impacts [1] and therefore may experience different neck muscle strains. Other studies in our lab have shown that male and female necks are not geometrically similar [4], and a model representing the female neck musculoskeletal system was developed [5]. The main purpose of this study is to quantify musculotendon and fascicle strains in anterior and posterior neck muscles due to whiplash kinematics in females using a biomechanical model. These data will then be compared to strain estimates from a similar male model to determine if there are statistically significant gender differences in musculotendon and fascicle strains.

References: [1] Carlsson et al., Traffic Inj Prev, 12:347-357, 2011. [2] National Highway Traffic Safety Administration, Fed Regist., 69:74848:74891, 2004. [3] Vasavada et al., Spine, 32(7):756-65, 2007. [4] Vasavada et al., J Biomech, 41(1):114-21, 2008. [5] Zheng, Am Soc Biomechanics, 2007

Presentation Number 41

ABSTRACT:

Abstract Title:	A Nanoscale Investigation of the Adherence and Mechanical Properties of Pathogenic and Nonpathogenic Species of Listeria		
Presenter:	Michael Johnson		
Mentor:	Nehal I. Abu-Lail		
Additional Authors:	Alaa I. Abu-Lail, Fabiola Quiroa, Bong-Jae Park and Nehal I. Abu-Lail		
Presentation Type:	Poster	**Major and College:**	Bioengineering/Engineering Architecture
Category:	Engineering and Physical Sciences		

The genus of Listeria is comprised of six species (monocytogenes, ivannovii, welshimeri, grayi, innocua and seeligeri). Among these six species, the former two are pathogenic and the remaining species are nonpathogenic. L. monocytogenes are known for their ability to survive in a wide range of environments and cause severe infections including listeriosis and meningitis. L. ivannovii are largely infectious in animals. Despite being closely related in genome, Listeria species span a range of pathogenicities. The goal of this study was to investigate if the physiochemical properties such as adherence and mechanics are conserved among various Listeria species. We hypothesize that pathogenic species differ from nonpathogenic species in their physiochemical properties. Atomic force microscopy (AFM) was used to: 1) probe the morphology of at least 15 bacterial cells that represent each species, 2) measure the nanoscale adhesion forces that bind bacterial cells to a model surface of silicon nitride and 3) indent in the bacterial surface to map the mechanical properties of these cells. Hertz model of contact mechanics was applied to the force-indentation data to quantify the Young's modulus of elasticity of cells that represent various species. A steric model of polymer brushes was also applied to the force-distance data to compare the thicknesses and the grafting densities of the bacterial surface biopolymer brushes of bacterial cells that belong to various species. Our preliminary results show that the pathogenic species are characterized by higher adhesion, softer cells, longer and denser biopolymer brushes in comparison to the nonpathogenic species. In conclusion, physiochemical properties can be used to profile pathogens.

Presentation Number 42

ABSTRACT:

Abstract Title:	Soy based Solid Polymer Electrolyte for Li-Ion Battery Applications		
Presenter:	Tomas Sadilek		
Mentor:	Dr. Weihong (Katie) Zhong		
Additional Authors:	Jianying (Tracy) Ji, Weihong (Katie) Zhong		
Presentation Type:	Poster	**Major and College:**	Materials Science Engineering/Engineering Architecture
Category:	Engineering and Physical Sciences		

The electrolyte material is a crucial element in the functionality of Lithium Ion Batteries. It facilitates the ion transfer between the cathode and anode while mechanically separating the two electrodes. As demand grows for battery applications in small scale and flexible solid state electronic devices, a low cost, high performance electrolyte material is necessary. The purpose of this research is to develop a solid polymer electrolyte with high ionic conductivity and elasticity, which would be biodegradable and inexpensive to manufacture. The proposed approach is to combine a denatured soy protein isolate (SPI) matrix with Polyethylene Oxide (PEO) polymer and carbon nano-tubes (CNTs). The resulting thin film has been prepared, and preliminary testing shows this method to be a promising solution for Lithium Ion Battery electrolytes of the future.

Presentation Number 43

ABSTRACT:

Abstract Title:	The Mexican Military: Political Involvement and Corruption in the Drug War		
Presenter:	Jhoana Duran		
Mentor:	Martha Cottam		
Presentation Type:	Poster	**Major and College:**	Global Politics/Liberal Arts
Category:	Social Sciences		

The Mexican military is known for their professionalism and, despite the example set by other Latin American coup-prone militaries, they stayed out of political affairs. However through their involvement in the war against drugs, human right violations and corruption has been witnessed. The question addressed is if Mexican military can become increasingly important in Mexican politics due to the drug cartels' growing wealth and power. It is inevitable that in the 2012 presidential elections, the military will be the center of Mexican politics because of their involvement in the war against drugs and the negative reputation they have attained by violating human rights.

Presentation Number 44

ABSTRACT:

Abstract Title:	Breaking the Ties to Traditional Burial		
Presenter:	Nick Nolder		
Mentor:	Tracy Morgan		
Presentation Type:	Poster	**Major and College:**	International Business/Business
Category:	Social Sciences		

As globalization continues to take root, many consumers are torn between traditional cultural practices and modern, often more practical methods. In some cases, the export presence of an American product can highlight this issue and even sway the decision. To better analyze this phenomenon, research was conducted on the exportation of basalt columbarium from Spokane Washington to potential East Asian markets. In this instance, the issue of traditional burial versus modern cremation was examined. In order to gain perspective on these markets, statistical data was examined as well as relevant cultural and governmental documents from several sample countries. The results show that, despite long held beliefs, the vast majority of consumers readily leave traditional practices, moving towards cremation. There are many factors responsible for this, including the presence of high quality US products now more readily available than ever before. From this, we can predict that, as world markets continue to mesh, localized cultural practices will often be abandoned for modern procedures even when in conflict with long-held, core belief systems.

Presentation Number 45

ABSTRACT:

Abstract Title:	**The human MutS homologue hMSH5 promotes genomic stability by suppressing error-prone DNA double-strand break repair**		
Presenter:	Nicole Clark		
Mentor:	Chengtao Her		
Additional Authors:	Xiling Wu, Aneesa Al-Soodani, Chengtao Her		
Presentation Type:	Poster	**Major and College:**	Biochemistry (Molecular Biology emphasis); Genetics and Cell Biology: Veterinary Medicine
Category:	Molecular, Cellular, and Chemical Biology		

Background: Accurate processing of DNA double-strand breaks (DSBs) that occur during DNA metabolism or damage is essential for cell survival, while defective repair can cause genomic instability and cancer development. There are two DSB repair pathways: homologous recombination (HR) and non-homologous end-joining (NHEJ). NHEJ offers a quicker, but more error-prone, fix of DSBs.

Objective: We are investigating the cellular selection of these DSB repair pathways. Preliminary data indicates that the mismatch repair family protein hMSH5 (human MutS homologue 5) inhibits NHEJ. We hypothesize that hMSH5 promotes genomic stability by suppressing NHEJ and promoting the more accurate HR repair.

Methods: We performed several assays to compare NHEJ in human cell lines that express varying levels of hMSH5. We used PCR to analyze NHEJ products in DNA from cells with enzyme-induced DSBs. We used cells containing a green fluorescent protein (GFP)-based NHEJ reporter - in which successful NHEJ of enzyme-induced DSBs led to GFP expression - to quantitatively compare NHEJ levels. We used pulsed field gel electrophoresis (PFGE) to assess NHEJ of radiation-induced DSBs. We are currently using chromatin immunoprecipitation (ChIP) to study the mechanism of hMSH5 interaction with proteins involved in NHEJ and HR repair.

Results: PCR analysis of DNA from cells with DSBs indicated that cells expressing more hMSH5 had fewer NHEJ repair products. The GFP assay showed higher NHEJ activity in cells with lower hMSH5 expression. PFGE showed more DNA breaks - indicating less NHEJ repair - in cells with higher hMSH5 expression. ChIP analysis is being used to elucidate the molecular events at the site of DSBs, and we anticipate showing that hMSH5 interferes with the loading of NHEJ proteins, thereby promoting HR repair.

Conclusion: The preliminary results of our experiments support our hypothesis that hMSH5 inhibits error-prone NHEJ and suggest that hMSH5 plays a regulatory role in promoting HR repair, therefore maintaining genomic stability. Understanding hMSH5's role in NHEJ will help us to decipher the effects of hMSH5 mutations in cancer. Manipulating DNA repair activity is a common strategy to increase the therapeutic efficacy of anti-cancer drugs. Thus, this study may lead to potential therapeutic applications involving hMSH5.

Presentation Number 46

ABSTRACT:

Abstract Title:	The environmental viability of Toggenburg goats and Holstein cattle in Northern Kenya		
Presenter:	Melissa Boyer		
Mentor:	Dr. John McNamara		
Presentation Type:	Poster	**Major and College:**	Animal Science/Agricultural, Human, and Natural Resource Sciences
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

To ensure an adequate food supply in the future, developing nations must improve their food yields and provide for their population in a sustainable manner. This study used a mathematical model to determine whether Toggenburg goats or Holstein cattle were more environmentally viable species to produce cheese in Northern Kenya. The environmental impact of the production of 500,000 tons of cheese (10.6kg per person annually for the Kenyan population) using milk produced by the two species was determined. Factors taken into account included land use, water use, and emissions given off by the individual animal based on grassland reared livestock with no additional supplementation. Animals were assumed to graze Kenyan grassland whose composition was calculated as a weighted average of the individual nutrient composition of trees, shrubs, dwarf shrubs, herbs, and grasses representative of the typical foliage. Suitable diets for the livestock based on yearly dry matter intake (YDMI) for all populations within a species were then calculated using these averages. Water intake based on YDMI or lactation and land use based on pasture consumption were calculated for each species. Methane emissions based on YDMI and nitrous oxide (N_2O) emissions based on the composition and amount of pasture fed. Each population's carbon footprint based on methane and N_2O emissions was also calculated. It was found that to make 500,000 tons of cheese, a total population of 23,553,490 goats and 4,089,135 cows (accounting for breeding females during gestation and lactation, breeding males, and replacement and feeder offspring) was needed. The goats used 34.1L of water, 0.013 acres of land, gave off 0.471kg of methane, 0.002kg of N_2O, and had a carbon footprint of 11.8kg per kilogram of cheese. Cattle, however, used 63.6L of water, 0.025 acres of land, gave off 0.691kg of methane, 0.004kg of N_2O, and had a carbon footprint of 17.7kg per kilogram of cheese. This indicates that in Northern Kenya, for the purpose of producing cheese, Toggenburg goats would be more environmentally sustainable than Holstein cattle as emissions and resource usage were lower for goats than for cattle in all areas.

Presentation Number 47

ABSTRACT:

Abstract Title:	Physical Activity Goal Orientation in Adolescents		
Presenter:	Reilly Costello		
Mentor:	Dr. Larry Bruya		
Presentation Type:	Poster	**Major and College:**	Kinesiology/Education
Category:	Social Sciences		

Introduction: Low levels of physical activity were correlated with high rates of obesity. A majority of adolescents failed to meet recommended levels of physical activity. A need existed to motivate youths to engage in more moderate to vigorous exercise. Intrinsic motivation was found to correlate with higher physical activity levels. Goal orientation was positively related to intrinsic motivation. Little research had been done investigating goal orientation as a function of health status. The purpose of this pilot study was to examine goal orientation in middle school aged youths. A null hypothesis was used which stated that there would be no difference in physical activity goal orientation between healthy and unhealthy adolescents. Methods: The population consisted of 27 male and female sixth grade students ranging from 11 to 12 years old. Two groups were created based on Body Mass Index. Group One consisted of students with healthy BMI scores while Group Two consisted of students with unhealthy BMI scores. Instrumentation was adapted from Elliot and McGregor's 2X2 Achievement Goal Questionnaire (2001). It was modified to be specific to physical activity and contained twelve items. Each question presented a statement regarding a specific goal orientation. Subjects rated how true the statements were of themselves on a four point Likert scale. Four two-tailed independent t-tests were computed to compare four types of goal orientations between the two groups. Results: Three of four t-tests resulted in insignificant findings. One t-test showed a significant mean difference of .31. Discussion: The null hypothesis for this pilot study stated there would be no difference in physical activity goal orientation between healthy and unhealthy adolescents. Based on the data, this hypothesis was rejected. The literature showed that motivation was influenced by many factors, and there were multiple types of motivation behind the drive to be active. Future research should further investigate goal orientation and other motivational influences. Reasons why individuals have a particular goal orientation should also be examined. Future work should explore ways to influence adolescents to adopt a mastery goal orientation, as this orientation correlated with being more active.

Presentation Number 48

ABSTRACT:

Abstract Title:	Classifying crystallinity and mineralogy in devitrified rhyolites through the use of X-ray diffraction		
Presenter:	Abbie Lindeberg		
Mentor:	Michael Rowe		
Additional Authors:	Michael Rowe, Ben Ellis		
Presentation Type:	Poster	**Major and College:**	Environmental Science/Sciences
Category:	Engineering and Physical Sciences		

Devitrification, the process by which glassy substances become crystalline, may have a significant impact on the rheology and emplacement of lavas. To understand the processes controlling devitrification and the timing of devitrification relative to cooling of lava flows, we must first investigate how to characterize devitrification. In this study we investigate changes in the various mineral compositions and crystallinity through a devitrified volcanic deposit.

The use of powder X-ray diffraction techniques to classify crystallinity of materials are commonly utilized by polymer/material sciences, however these techniques have not previously been utilized for geological applications. We calculate the crystallinity of each rock powder sample by analyzing the X-ray diffraction pattern, and separating the values into crystalline and amorphous (glassy in the case of volcanic rocks) components. By Taking the ratio of the X-ray counts associated with the two components, we can calculate a relative crystallinity. This technique may be applied to whole rocks to determine the bulk crystallinity of the sample, and may also be applied to groundmass (bulk rock removed of large crystals). To validate the technique we combined various proportions of entirely crystalline (granite) and entirely amorphous (a glass plate) materials in known weight proportions. By comparing the calculated percent crystallinity generated by analysis of the X-ray diffraction to the known percent crystallinity of the actual sample, we generated an equation that represents the relationship between the two variables. The agreement between the known and calculated crystallinity of the calibration curve is excellent, indicating validity in the technique.

Crystallinity results for the volcanic rock samples as determined via X-ray diffraction indicate varying crystallinity (~10-100%) for both groundmass and bulk rock. Additionally, the proportions of the silica minerals cristobalite and tridymite systematically vary through the samples suggesting a possible correlation to cooling rate. Powder X-ray diffraction techniques therefore appear to provide a robust method for determining the crystallinity and mineral proportions of devitrified volcanic materials- a vital step in being able to quantify physical properties of the cooling rates of lava flow.

Presentation Number 49

ABSTRACT:

Abstract Title:	**Three-Dimensional Reconstruction and Analysis of High-Resolution Serial-Sectioned Mouse Brain Tissue Images**		
Presenter:	Sean Colby		
Mentor:	Dr. James Carson, PNNL		
Additional Authors:	James Carson, Matthew Enlow, and Lance Kindle		
Presentation Type:	Poster	**Major and College:**	Bioengineering: Engineering and Architecture
Category:	Computer Science, Mathematics, Statistics, Information Sciences		

Through use of high-resolution optical microscopy, detailed images of histological tissue sections provide a means to visualize and, more importantly, analyze tissue information at the cellular level. Further, by implementation of nonradioactive high-throughput in situ hybridization (HT-ISH), specific gene expressions can be detected in parallel across a section of tissue, effectively identifying cells of varying levels of expression. Comparison of these image sets, however, requires reconstruction of two-dimensional (2D) cross sections into a three-dimensional (3D) volume representative of the tissue's original physical state. This process demands extensive use of computational resources wherein refining and transforming the images ensures spatial accuracy of the 3D model while maintaining high dataset resolution. Steps integral to the procedure are as follows: rigid alignment, defect mitigation, 2D image registration, and 3D dataset registration. Once the 3D volume is rendered, multiple sets of isotropic tissue can be registered and compared based on respective levels and clustering of gene expression. With respect to our research specifically, 3D reconstruction was applied to two serialized adult mouse brains; one wild type and one methyl CpG binding protein 2 (MECP2) mutant to model Rett Syndrome tagged via HT-ISH for the Corticotropin-releasing hormone (Crh) gene.

Presentation Number 50

ABSTRACT:

Abstract Title:	Exploring the Reactivity of Thiols and Alkenes for the Coupling Technetium-99m Complexes with Biomolecules for Diagnostic Imaging Applications		
Presenter:	Patrice Lyon		
Mentor:	Dr. Paul Benny		
Additional Authors:	Thomas Hayes, Elsa Silva-Lopez, Brendan Twamley, Dr. Paul Benny		
Presentation Type:	Poster	**Major and College:**	Chemistry/Sciences
Category:	Engineering and Physical Sciences		

Technetium-99m (^{99m}Tc) is one of the primary radionuclides utilized for diagnostic applications in nuclear medicine. The gamma radiation emitted from ^{99m}Tc nucleus is used by physicians to follow the patient's biological processes and detection of cancerous tumors through an external imaging technique called Single Photon Emission Computed Tomogaphy (SPECT). Bifunctional chelators used in radiopharmaceuticals are molecules that contain a ligand to bind radiometals and a molecular probe (i.e., peptide, small molecule) for targeting a biomarker expressed in specific cell type. The thioene 'click' reaction, the reaction of a thiol (R-SH) and an alkene through a heat- or photo-initiated radical reaction, represents a facile method to combine two molecules by creating a covalent linker. This specific reaction can be utilized to combine a ligand or technetium complex functionalized with an alkene to a thiol containing molecular probe. This approach promotes a versatile application for combining a number biomolecules that contain free thiol from a cysteine residue with a ligand or the corresponding technetium complex. Two versions of dipicolylamine (DPA) ligands were synthesized and characterized by standard chemical methods that contained an alkene functional group, either directly attached to the DPA or with an ether spacer for this study. The DPA ligand provides an ideal ligand for complexing the organometallic $M(OH_2)_3(CO)_3^+$ (M = Re, ^{99m}Tc) core. Two strategies of the thioene reaction were investigated that examined: 1) the reaction of the DPA ligands with a free thiol followed by coordinating metal and 2) coordination of the DPA ligands with the metal followed by the thioene reaction. Several variables, the effect of the alkene spacer on the electronics of the system, reaction time, concentration of stable (Re) vs. radioactive metal (^{99m}Tc), and thiol concentration, were examined and the results indicate the thioene 'click' reaction has potential for expansion towards the labeling of thiol containing molecular probes.

Presentation Number 51

ABSTRACT:

Abstract Title:	Fitness Effects of the Host's Aquired Resistance to Southern House Mosquito		
Presenter:	Kristen Wedam		
Mentor:	Jeb Owen		
Additional Authors:	Jacob Gable, Marisa King, Jeb Owen		
Presentation Type:	Poster	**Major and College:**	Animal Science/Agricultural, Human, and Natural Resource Sciences / Honors
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

The southern house mosquito (SHM), Culex pipiens quinquefasciatus, is a widespread blood-feeding insect that transmits a diversity of harmful parasites to people and animals. The parasites (and associated diseases) include West Nile Virus (human and equine encephalitis), Haemoproteus (avian malaria), and filarial worms (lymphatic filariasis). For all of these diverse infectious diseases, the transmission rate is influenced by the number of mosquitoes in the environment. However, the processes that shape the dynamics of mosquito populations remain unclear. We hypothesized that the host may acquire resistance to the mosquito that would impair mosquito survival and reproduction. Using house sparrows (Passer domesticus) as a mosquito host, we tested this hypothesis by blood feeding SHM (n = 50 mosquitoes/bird) on sparrows that had 1 prior mosquito exposure (n = 50 mosquitoes/bird), or sparrows with no prior mosquito exposure. We documented the number of eggs produced by the mosquitoes, reared the larvae to the adult stage and measured the wing lengths of the offspring as a proxy for adult size. We found that mosquitoes that fed upon previously-exposed sparrows laid fewer eggs, and had fewer and smaller offspring than those that fed upon naive birds. These data indicate that host birds can acquire resistance to mosquito blood feeding that reduces mosquito fecundity and the size of the offspring, which is known to correlate with survival. These effects may be strong enough to influence mosquito population dynamics, which would establish host condition (mosquito resistance) as an important force shaping the patterns of pathogen transmission by mosquitoes.

Presentation Number 52

ABSTRACT:

Abstract Title:	Nipah Virus Fusion Protein HR3 Region Plays an Important Role in Viral Entry		
Presenter:	Cristal Reyna		
Mentor:	Dr. Hector Aguilar-Carreno		
Presentation Type:	Poster	**Major and College:**	Biochemistry/Veterinary Medicine
Category:	Molecular, Cellular, and Chemical Biology		

The research I am currently involved in focuses on the highly pathogenic and lethal Nipah virus (NiV). My project focuses on the novel function of the helical region 3 (HR3) of the Nipah Fusion (NiV-F) protein, which has not been studied in the Paramyxoviridae family. The NiV-F protein is involved in the membrane fusion event necessary for viral entry into host cells that contain the mammalian receptor ephrin B2 and for the pathologic induction of cell-cell fusion. It is known that binding of the viral attachment protein to ephrinB2 triggers NiV-F to carry out viral entry into mammalian cells. This project focuses on the characterization of mutants of the NiV-F HR3 region, obtained by alanine scan mutagenesis. Specific mutants in the HR3 region have been found to display hyperfusogenic or hypofusogenic phenotypes, increasing or decreasing viral entry. These data strongly suggest that the HR3 region plays a critical role in modulating cell-cell fusion and viral entry. My role in this project is to determine which step of viral entry these mutations affect. This study will utilize new and unique assays to measure the kinetics of the early steps of fusion, which will give our team insights into what part(s) of the fusion cascade hyper- and hypo-fusogenic mutants affect. Currently, I am optimizing such assays. The identification of novel determinants of viral entry in NiV-F offers new potential targets for therapeutic intervention against NiV.

Presentation Number 53

ABSTRACT:

Abstract Title:	Prostate-Specific Membrane Antigen and Folate Binding		
Presenter:	Melody Fulton		
Mentor:	Cliff E. Berkman		
Presentation Type:	Poster	**Major and College:**	Biology/Sciences and Veterinary Medicine
Category:	Molecular, Cellular, and Chemical Biology		

Folic acid, or Vitamin B_9, is a common nutritional supplement found in grain-based foods such as cereals and breads. On the cellular level, it is particularly important for cell proliferation. Recent studies have shown that folic acid may interact with prostate specific membrane antigen (PSMA), a protein uniquely presented on the surface of prostate tumors. Through the process of cellular absorption, it has been shown that PSMA is transported into prostate tumor cells. Furthermore, prostate tumors cells that are decorated with PSMA take up greater amounts of folic acid than cells with no PSMA on their surface. Based on these observations, it is likely that PSMA has a role in the uptake of folic acid in prostate tumors. The goal of this project is to uncover aspects of PSMA's interactions with folic acid in order to develop a greater understanding and working model by which PSMA likely transports folic acid into prostate tumor cells. Folate and four folate analogs were assayed for binding to PSMA by determining their inhibitory potency of PSMA's enzymatic activity: pteroyl-L-glutamic acid (folic acid), pemetrexed, methotrexate, 5-methyltetrahydrofolate (5-MTHF), and folinic acid. In addition to inhibition studies, ligand docking studies were conducted to further analyze the nature of folate binding to PSMA. Of the folate analogs examined, folic acid exhibited the greatest affinity for PSMA. Knowledge of folate binding is expected to lead to a better understanding of dietary folate's role in prostate cancer progression, which may warrant dietary precautions for recommended folic acid intake.

Presentation Number 54

ABSTRACT:

Abstract Title:	Development of an Animal Model of Parkinson\s Disease		
Presenter:	Megan Wilson		
Mentor:	Jay Wright		
Additional Authors:	Daniel Sondheim, Jay Wright, Joe Harding		
Presentation Type:	Poster	**Major and College:**	Neuroscience/Veterinary Medicine / Honors
Category:	Social Sciences		

Parkinson's Disease (PD) is a motor symptom disease which is a result of the loss of dopamine-producing brain cells in the substantia nigra (SN). As many as one million Americans are currently living with PD and approximately 60,000 Americans are diagnosed each year. These numbers are staggering and currently there is no cure for the disease. We have worked to develop an animal model of PD using male rats and lesioning the SN pars compacta of the right hemisphere with 6-hydroxydopamine (6-OHDA) via direct injection. Following lesioning the animals are able to recover for one to two weeks and are then put through a series of motor related tests to determine the success of the lesioning. It is implied that if the dopamine neurons which have been targeted in the SN have been damaged the animals will exhibit clear motor dysfunction, resembling that of human PD patients. The tests for motor dysfunction include amphetamine and apomorphine injection, gait analysis, and rope and screen hang time tests. We have found that injection of 8 micro liters of 6-OHDA into two locations of the SN, injected at a rate of approximately 1 micro liter/30 seconds is effective in causing motor symptoms in the animal models. In addition, it has been determined that by preparing the 6-OHDA solution on ice in the dark helped to prevent oxidation of the solution. Because we have effectively developed an animal model, the next step in this project entails using a mini-osmotic pump to inject Dihexa, a small peptide based on the structure of angiotensin IV (Val-Tyr-Ile-His-Pro-Phe), in an effort to produce neural protection and synaptogenesis of dopamine neurons in order to recover motor functioning. By developing an effective animal model of PD we will be able to conduct further research which could potentially result in the development of an effective drug treatment for PD.

Presentation Number 55

ABSTRACT:

Abstract Title:	Sex Differences in THC-Induced Systemic and Peripheral Antinociception Against Chronic Inflammatory Pain		
Presenter:	Ram Kandasamy		
Mentor:	Dr. Rebecca Craft		
Presentation Type:	Poster	**Major and College:**	Neuroscience/Veterinary Medicine
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

The majority of all biomedical research has been done in male subjects with very little attention given to the therapeutic effects of drugs in females. Thus, this project examined sex differences in the antinociceptive and anti-inflammatory properties of the plant-derived cannabinoid, Δ9-tetrahydrocannabinol (THC), the primary psychoactive constituent of marijuana. The complete Freund's adjuvant (CFA) model of chronic inflammatory pain in the rat was used. Pain (mechanical allodynia and thermal hyperalgesia) was induced by injecting CFA into the plantar surface of the rat's right hindpaw. Male and female rats received systemic (intraperitoneal, i.p.) injections (0, 0.32, 1.0, 3.2 mg/kg) or peripheral (intraplantar, i.pl.) injections (0, 250, 500 μg) of THC on days 1, 3 and 7 post-CFA injection. In both sexes, THC dose-dependently decreased mechanical allodynia and thermal hyperalgesia when administered i.p. or i.pl. However, when administered i.pl., THC's antinociceptive properties were stronger in females, while the anti-inflammatory properties of THC were stronger in males. In addition, systemic THC dose-dependently attenuated locomotor activity in both sexes; however, this effect was not present when drug was administered peripherally. Taken together, these results suggest that cannabinoid treatment for chronic inflammatory pain may be more effective in females than in males.

Presentation Number 56

ABSTRACT:

Abstract Title:	The effect of A204E and G312V amino acid changes in HIV-1 subtype D gp120 on the ability to use macaque CD4		
Presenter:	Elizabeth Laws		
Mentor:	Nancy Magnuson		
Additional Authors:	Daryl Humes, Julie Overbaugh		
Presentation Type:	Poster	**Major and College:**	Microbiology/Veterinary Medicine
Category:	Molecular, Cellular, and Chemical Biology		

Macaques are commonly used animal models of HIV/AIDS. Because HIV-1 replication cannot be directly observed in macaques, Simian-Human Immunodeficiency Viruses (SHIVs) are created to model HIV-1 pathogenesis, while avoiding host restrictions. Of particular interest in constructing these SHIVs are the HIV-1 strains that predominately circulate sub-Saharan Africa subtypes C, A, and D. Although subtype C based SHIVs (SHIV-C) have been successful, little research has been done on SHIV-As and SHIV-Ds as they replicate poorly in macaque cells. The Overbaugh lab has previously shown that the introduction of two independent amino acid changes (A204E and G312V) to the gp120 subunit of the envelope (Env) conferred more efficient replication of SHIV-As in macaque cells by increasing the ability of the virus to use macaque CD4. Since the G312 and A204 residues are conserved in subtype D gp120, we hypothesized that the introduction of the G312V and A204E amino acid changes would also increase the ability of subtype D Envs to use macaque CD4. To address this, the G312V and A204E amino acid changes were introduced to three subtype D gp120s (QA013, QB857, and QD435) and the ability of viruses bearing these Envs to infect cells expressing macaque CD4 was determined. The QA013 A204E and QB857 G312V Env variants showed a >100-fold increase in their ability to use macaque CD4, however the amino acid changes had no effect, or were deleterious, in all other Envs tested. Ultimately, the QA013 A204E and QB857 G312V Envs could form the basis for a subtype D SHIV

Presentation Number 57

ABSTRACT:

Abstract Title:	Correlation between hybrid carbon nano-fill dispersion state and AC/DC conductivity ratio in polycarbonate		
Presenter:	Jonathan Bizga		
Mentor:	Weihong (Katie) Zhong		
Additional Authors:	Brooks Lively, Wei-Hong Zhong		
Presentation Type:	Poster	**Major and College:**	Materials Engineering, Engineering and Architecture
Category:	Engineering and Physical Sciences		

Current methods of investigating the dispersion and distribution of conductive polymers composites involving carbon fiber in a polymer matrix rely on destructive testing and often require extensive sample preparation. CNT/GNP agglomerates will respond differently in AC vs DC fields depending on the dispersion state within the polycarbonate matrix. This ratio of AC/DC conductivity correlates with data from a statistical image analysis. This was shown in the data with the AC/DC ratio varying from ~3*101; with the highly dispersed sample to ~1.6*104 ; with the low dispersion sample. When these ratios where correlated against data collected in the image analysis, a strong correlation was found. Such information may one day be used to develop a characterization tool that can produce quantitative results that are nondestructive to the test specimens.

Presentation Number 58

ABSTRACT:

Abstract Title:	Finite Element Analysis of Electromagnetic Wave Propagation		
Presenter:	Patrick Gavin		
Mentor:	Sergey Lapin		
Presentation Type:	Poster	**Major and College:**	Electrical Engineering/Engineering Architecture / Honors
Category:	Computer Science, Mathematics, Statistics, Information Sciences		

Wave propagation is a key phenomenon with many applications in engineering and applied mathematics. Therefore the ability to model the way in which waves are absorbed or reflected by obstacles of different shapes and materials is of great interest. The problem being considered involves numerical modeling the flow of waves around an object which interacts with them by either reflecting them, absorbing them or some combination of the two. We use explicit time discretization coupled with finite element method on non uniform meshes. To reduce the complexity of the mesh necessary to model the phenomena, the region of interest is decomposed into two subdomains with differing mesh densities and a Lagrange multiplier technique is used to match the values along this boundary. The combination of these techniques allows a very precise model of the complex interaction between the waves and a variety of geometries. The solver was developed and adapted to run on the High Powered Computing Cluster at WSU allowing more complex geometries to be analyzed.

Presentation Number 59

ABSTRACT:

Abstract Title:	Refusion		
Presenters:	Kierra Lagervall-Adams and Lauren Verrelli		
Mentor:	Bailey Stokes		
Presentation Type:	Poster	**Major and College:**	Apparel Merchandising, Design and Textiles/Agricultural, Human, and Natural Resource Sciences / Lauren - Honors
Category:	Arts and Design		

The purpose of our design was to creatively recycle and put to use 1,800 defective program covers from our department's annual fashion show. We wanted to stay true to the "Fusion" theme of the 2011 fashion show by bringing together the design and merchandising aspects of our department. This design was used as a promotional display for the fashion show and has continued to be used to promote our design and merchandising department.

The inspiration for the dress came from the fashion show program cover art and the desire to create a promotional and wearable art piece. A sheath dress was created for the base of the garment and placed on a dress form. The exterior of the dress was then constructed on top of the sheath dress. The cardstock paper was pleated, layered and shaped to mimic the design shown on the cover of the program. By pleating the paper into fan-like layers created a ruffled appearance and added volume to the skirt. A waist sash made of recycled materials was sewn to add aesthetic appeal.

The materials that we used included recycled cardstock paper program covers, re-purposed cotton muslin from a draping class, silk remnants from a student project, and a left over invisible zipper. Hot glue was used to for construction of the paper portions of the dress.

Presentation Number 60

ABSTRACT:

Abstract Title:	Epileptic Seizures in a Computational Model of the Hippocampus and Anterior Thalamus.		
Presenter:	Jonathan Scott		
Mentor:	Dr. David Mogul		
Presentation Type:	Poster	**Major and College:**	Bioengineering/Engineering Architecture/ Honors
Category:	Engineering and Physical Sciences		

Introduction: Epilepsy is a neurological disorder characterized by recurrent, spontaneous disruptions of normal brain activity called seizures which affect 1-2% of people in the United States. Limbic seizures are the most common, and a significant quantity of research has occurred in trying to understand the mechanisms by which such seizures evolve. We sought to understand the role the connectivity between key structures may play in the genesis and transmission of the synchronous activity characteristic of such seizures. Recent experiments in our lab have shown a sharp increase in synchronous firing across the focal hippocampus and anterior medial nucleus of the thalamus (AMN) during the initiation and termination of kainic acid (KA) induced seizures in rats. The current study employs computational modeling to identify mechanisms capable of explaining these experimental observations.

Materials and Methods: The model consists of three regions, the focal hippocampus (FH) where KA was injected, the contralateral hippocampus (CH), and the AMN. Each region contains 1000 Izhikevich model neurons programmed to fire in physiologically-relevant patterns. All regions contained a recurrent connectivity and ratio of excitatory neurons to inhibitory interneurons consistent with recent physiological and anatomical observations. KA is believed to increase excitatory connection strength and decrease inhibitory strength. This was simulated by increasing excitatory connection strengths and decreasing inhibitory strengths of FH recurrent collaterals and efferents.

Results and Discussion: Preliminary results indicate that increasing excitatory connection weights and decreasing inhibitory weights within the FH alone caused a significant increase in synchronous activity and frequency in FH, but not in AMN and CH. Performing the same weight changes for the efferent projections of FH as well as its recurrent connections resulted in the increase in synchrony and frequency across regions that was observed experimentally.

Conclusions: An increase in the efferent excitatory connection from the FH to the CH and AMN results in both the synchrony and frequency increase observed in the in vivo rat model of KA-induced epilepsy. It is possible that manipulation of these efferent connections could prevent or abort seizures.

Acknowledgements: This work was supported by National Science Foundation Grant No. 0852048

Presentation Number 61

ABSTRACT:

Abstract Title:	Pesticides methoxychlor and DDT promote adult onset ovarian disease through transgenerational epigenetic inheritance		
Presenter:	Colleen Johns		
Mentor:	Dr. Michael Skinner		
Presentation Type:	Poster	**Major and College:**	Zoology/Sciences / Honors
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Environmental chemical compounds, such as the fungicide vinclozolin, have been shown to cause transgenerational inheritance of adult onset diseases in subsequent generations that have had no direct contact with the compound. Epigenetic modifications change how an individual?s DNA is expressed without directly changing the base sequence and may be passed on to offspring through the germ line. In this study, the transgenerational epigenetic effects on ovaries of the estrogenic pesticides DDT and methoxychlor are examined in rats. Gestating F0 generation females were treated with the compounds during fetal gonadal sex determination. Ovarian diseases such as primordial follicle loss and polycystic ovarian disease were examined in the F3 generation. The number of ovarian follicles at the primordial, developing or antral stage was determined in the F3 generation to assess the reduction in the ovarian reserve of follicles. Additionally, the number of both small and large cysts was examined to determine the presence of polycystic ovarian syndrome. Observations indicate a decreased number of primordial follicles in F3 generation females and an increase in the number of small cysts present in both lineages. This indicates that the pesticides methoxychlor and DDT promote adult onset ovarian disease transgenerationally.

Presentation Number 62

ABSTRACT:

Abstract Title:	Effects of Ethanol Withdrawal on Alcohol Self-Administration and Affect Characterized by Ultrasonic Vocalizations and Changes in Dynorphin		
Presenter:	Daniel Reis		
Mentor:	Dr. Brendan Walker		
Presentation Type:	Poster	**Major and College:**	Psychology / Liberal Arts / Honors
Category:	Molecular, Cellular, and Chemical Biology		

A fundamental characteristic of long-term alcohol exposure is the formation of negative affective states that coincide with the development of dependence and become apparent during withdrawal. Previous findings have suggested that some individuals may use alcohol to 'self-medicate' these negative affective symptoms which can lead to excessive alcohol intake. The neuropeptide Dynorphin (DYN) is thought to contribute to this negative emotional state by opposing the euphoria produced by alcohol consumption. The present investigation was designed to measure changes in negative effect, alcohol self-administration, and alterations in DYN levels during alcohol withdrawal. Alcohol dependence was induced in adult male Wistar rats via a chronic intermittent schedule of exposure to alcohol vapor. Animals were exposed to intermittent alcohol vapor for 14 hrs / day. Target blood alcohol levels for alcohol-dependent rats were 175 - 225%. After 8 weeks of vapor exposure, animals were evaluated for operant alcohol self-administration and negative effect. Negative effect was measured through the use of 22-kHz ultrasonic vocalizations (USVs). 22-kHz USVs have been shown to be indicative of negative effect, alarm states, and aversive situations in rats. Finally, using immunohistochemistry, the brains of alcohol- and air-exposed animals were also stained for the presence of DYN A. The results of this study show that alcohol-dependent rats had significantly higher alcohol self-administration and 22-kHz USV counts than air-exposed rats. It was also revealed that the brains of alcohol-dependent rats had notably higher levels of DYN A within the central nucleus of the amygdala and the Islands of Calleja. These brain structures have been linked to emotional and motivational pathways in the brain. These data indicate that negative effect, measured by USVs, is increased during spontaneous withdrawal in alcohol-dependent rats. They also indicate that increased DYN A accompanies withdrawal and identify two critical brain regions in which this increase occurs. This work provides a basis for the evaluation of the circuitry underlying negative affective behaviors associated with alcohol dependence.

Presentation Number 63

ABSTRACT:

Abstract Title:	The Role of Catecholamine and Orexin Neurons in Mediating the Feeding Response to Glucose Deficit		
Presenter:	Megan Elsarelli		
Mentor:	Sue Ritter		
Additional Authors:	Ai-Jun Li, Sue Ritter		
Presentation Type:	Poster	**Major and College:**	Neuroscience/Veterinary Medicine / Honors
Category:	Molecular, Cellular, and Chemical Biology		

Glucose-sensing is an essential and fundamental function of the brain. Glucose is the required metabolic fuel for brain tissue, however the brain itself does not store glucose. In previous experiments, hindbrain catecholamine neurons have been found to be required for responses, such as feeding, that are stimulated by glucose deficit (glucoprivation). Furthermore, orexin (ORX) neurons in the lateral hypothalamus have been discovered to be important fore feeding behaviors. The purpose of this project is to investigate the relationship between the hindbrain catecholamine neurons and ORX neurons during glucoprivation and to determine whether ORX neurons are important for glucoprivic feeding. First, we used immunohistochemical markers and determined that ORX neurons are innervated by catecholamine terminals. Next, we examined the expression of c-Fos protein in ORX neurons in Sprague Dawley rats subjected to the glucoprivic stimulus, 2-deoxy-D-glucose (2-DG) or to control saline injections. C-Fos protein is increased in neurons that are activated. We found that ORX neurons increase c-Fos expression in reponse to 2-DG, suggesting that they may be part of the pathway activated by catecholamine neurons in response to glucoprivation. To test this further, anti-DBH saporin (DSAP), a retrograde immunotoxin, selective for hindbrain catecholamine neurons, was microinjected into the lateral hypothalamus. This eliminated hindbrain catecholamine neurons innervating ORX neurons and attenuated 2DG-induced glucoprivic feeding. Innervation and activation of ORX neurons by catecholamine neurons and loss of the feeding response after eliminating DBH innervation of ORX neurons supports the hypothesis that ORX neurons participate in the glucoprivic feeding response initiated by hindbrain catecholamine neurons.

Presentation Number 64

ABSTRACT:

Abstract Title:	Dragons: the Monster and the Myth		
Presenter:	Chelsea Sutcliffe		
Mentor:	Rebecca Goodrich		
Presentation Type:	Poster	**Major and College:**	Creative Writing/Liberal Arts / Honors
Category:	Humanities		

My research encompasses the dragon as a mythical being across cultures, particularly focusing on its qualities as a monster. The particular character and shape of the dragon varies across time and societies. Some worshiped dragons as deities, some believed (and still believe) that dragons were bringers of good fortune, while others knew them as ferocious beasts to be slaughtered for gold, glory, and to protect the virtue of women. In recent times, dragons have faded as a threat from the mind of our culture onto the pages of fairy tales and popular novels, rarely even making it to the silver screen.

In conjunction with my research on the monstrosity of dragons, I have written the beginning of a full-length work of fiction based on my findings. This work examines, in a lighter, more entertaining way the intricacies of humans' relationship with the monsters they fear, specifically dragons. And more importantly, it takes into account the point of view of the monster. My creative efforts consider the question: who is the more monstrous, the beast itself or the people who create it? Also, they express the point of view of many myths and fairy tales: the things we fear often defy our expectations.

Presentation Number 65

ABSTRACT:

Abstract Title:	Analysis of Super-eruptions of Yellowstone through Titanium in Quartz		
Presenter:	Camden Nix		
Mentor:	Ben Ellis		
Additional Authors:	Ben Ellis, Michael Rowe		
Presentation Type:	Poster	**Major and College:**	Environmental Science/Sciences
Category:	Engineering and Physical Sciences		

The volcanic field of Yellowstone in WY, USA has experienced huge eruptions over the last 2 million years; the 2500 km3 Huckleberry Ridge Tuff ~ 2 Ma (million years ago), the 300 km3 Mesa Falls Tuff ~ 1.3 Ma, and the 1,000 km3 Lava Creek Tuff ~ 0.6 Ma that have virtually defined the term "super-eruptions." Recent research however, performed at Washington State University, indicates that the Huckleberry Ridge Tuff is actually composed of at least 2 distinct events, separated by 6,000 years. Differences in ages between members of Huckleberry Ridge Tuff are supported by variations in radiogenic and stable isotope composition of the different members. Quartz is a ubiquitous phenocryst phase in the products of the "super" eruptions from Yellowstone volcanic field and the trace element composition of quartz can provide information about magmatic conditions pre-eruption. Titanium is taken into the crystal structure of quartz in a temperature-dependent process, so by accurately analyzing the abundance of Ti, the temperature of the magma may be estimated. We used the electron microprobe at Washington State University to provide cathode luminescence (CL) images which illustrate qualitatively the amount of quartz in a sample and the spatial variation of Ti within a single quartz grain. Using the CL images as a guide we then quantitatively analyzed tens of quartz grains for Ti content. We then employed the recently developed Ti-in-quartz thermometer to estimate magmatic temperatures to compare the record from quartz grains to that determined via mineral equilibrium in previous studies. This work is the first step of a large effort to use mineral chemistry to test whether the eruptions from Yellowstone really were as "super" as is generally accepted and will lead to better understanding and perhaps improved prediction of future eruptions from the Yellowstone volcanic field.

Presentation Number 66

ABSTRACT:

Abstract Title:	Children Talk to Dickens About Their Own "Hard Times"		
Presenter:	Morgan Parker		
Mentor:	Dr. Susan Finley		
Presentation Type:	Poster	**Major and College:**	Public Affairs/Liberal Arts
Category:	Social Sciences		

The focus of this research narrative is children's perceptions of social class and their experiences of poverty as a social identity. Participatory action research that includes narrative reflection is demonstrated for its capacity and potential as a source of agency that may contribute to youths' academic, social, and political emancipation. In this research we analyze perceptions and attitudes about social class as these perceptions and attitudes are expressed by a group of children who are economically poor and who reside in an urban area in the Pacific Northwest. Our purpose has been to engage our students in a transformative educational process, with the further intention of deepening students' understandings of their own power to act in the world, or to "write their own futures". This readers' theater narrative has been scripted from personal, cultural texts that the co-authors (Susan and Morgan) selected from young people's writing in response to reading Charles Dickens' Hard Times and other period literature. The research takes place in the context of the At Home At School (AHAS) program at Washington State University Vancouver, directed by Susan Finley and where Morgan Parker is an undergraduate research assistant. One article from this data has been accepted for publication in the "International Review of Qualitative Research". This proposal is a continuation of this study.

Presentation Number 67

ABSTRACT:

Abstract Title:	Bioinformatic Analysis of the Novel Mycobateriophage Jobu08		
Presenter:	Nicholas Negretti and Joseph Lawhead		
Mentor:	Dr. Julie Stanton		
Additional Authors:	Alexander Bartkoski, James Bonner, Jason Breithaupt, Destinee Cone, Shannon Denny, Kaitlyn Geffen, Oscar Hernandez, Amanda Johnson, Chandler Keller, Emily Larson, Aiden Manning, Nichole Morgan, Dominic Niolu, Amy Nusbaum, Lucia Reyes, Kaitlyn Schubert, David Tran, Kamiah Webster, Adrienne Wilen		
Presentation Type:	Poster	**Major and College:**	Microbiology/Veterinary Medicine
Category:	Molecular, Cellular, and Chemical Biology		

Mycobacteriophages are bacterial viruses that infect hosts from the genus *Mycobacterium*, including *M. leprae* which causes leprosy, and *M. tuberculosis* which causes tuberculosis. Bacteriophages are vectors for the transmission of genetic information between cells, and they can provide insight on cellular processes as well as being a source of enzymes that are useful for studying the host cell. The genome of a mycobacteriophage is a mosaic, a feature which is thought to arise through illegitimate recombination. Each portion of the genome may have a distinct evolutionary history. Our project focuses on annotating the newly discovered Jobu08 genome, a mycobacteriophage that was recently isolated and purified from a soil sample collected from the Washington State University campus by a freshman biology student. Jobu08 is a Siphoviridae phage, it has double stranded DNA and a non-contractile tail. While the 51 kb genome of Jobu08 is unique, it shares similar features to the Cluster A mycobacteriophages. We are using DNA Master to annotate the genome of Jobu08, along with the tools Glimmer and GeneMark, which computationally determine gene coding potential, and predict open reading frames. Amino acid sequences from previously characterized proteins, and amino acid sequences from Jobu08 will be compared using BlastP, the Conserved Domain Database and HHPred in order to predict gene function. Comparing Jobu08's genome to other mycobacteriophage genomes will not only allow us to learn about our phage, but will help provide a better understanding of other Cluster A mycobacteriophages, and their effect on their *Mycobacterium* hosts.

Presentation Number 68

ABSTRACT:

Abstract Title:	Reversing withdrawal effects of two-week ethanol exposure using nor-BNI		
Presenter:	Louis Neira		
Mentor:	Dr. Brendan Walker		
Presentation Type:	Poster	**Major and College:**	Psychology/Liberal Arts
Category:	Social Sciences		

The kappa-opioid receptor (KOR) has been shown to play a role in the onset of symptoms associated with withdrawal from alcohol. Several previous studies have shown that the use of a kappa-opioid receptor antagonist prevents the onset of these symptoms. Previously in our lab, we have shown that rats exposed to ethanol vapor for two weeks show an increase in behaviors indicative of depression when compared to non-exposed rats, indicating the presence of withdrawal in these rats and confirming the validity of the two week vapor exposure model for inducing dependence. Behaviors associated with depression were measured using the Porsolt forced swim test. The behavior associated with depression is immobility, defined as activity consisting of only the movements necessary to keep the head above water. The present study seeks to use the two week exposure model to test the effects of a kappa-opioid antagonist. We will attempt to block the effects of withdrawal resulting from two-week vapor exposure by treating rats with the kappa-opioid receptor antagonist norbinaltorphimine (nor-BNI). The expected results are that ethanol-exposed rats treated with nor-BNI will have similar immobility times as control rats thus implicating the kappa-opioid receptor in the onset of withdrawal symptoms.

Presentation Number 69

ABSTRACT:

Abstract Title:	The effects of agriculture on West Nile Virus incidence in Washington State		
Presenter:	Emily Martin		
Mentor:	Dr. Jeb Owen		
Additional Authors:	Dr. Jeb Owen and Dr. David Crowder		
Presentation Type:	Poster	**Major and College:**	Biology/Sciences / Honors
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

West Nile Virus (WNV) is a mosquito-transmitted pathogen that was introduced into the United States in 1999 and emerged in Washington State in 2002. By 2008, the state was experiencing high numbers of cases among humans and horses, in whom infection causes flu-like symptoms and is potentially fatal. The prevailing hypothesis presumes that increased temperature and precipitation, which enhance mosquito breeding, promote mosquito abundance and, therefore, WNV transmission incidence. However, human land-use, such as irrigated agriculture, also produces standing water independent of climate factors, and we hypothesize that this will promote mosquito breeding and increase WNV incidence. To investigate the roles of land-use and climate on WNV, we used one data set analyzing human cases per county and another set from the Department of Health on WNV incidence from over 200 mosquito-trapping locations in 2009 and 2010. Using geographical information systems technology (GIS), we quantified the land-use and climate in each county and surrounding each trapping site. The results showed that greater acreage of orchards and vineyards in a county increased the number of human cases reported. Furthermore, mosquito and WNV incidence in a specific location increased with the area of orchards and vineyards. Precipitation and temperature were found to have insignificant effects. The project demonstrates that human-developed lands, particularly orchards and vineyards, create conditions conducive to mosquito breeding, thus increasing WNV incidence. One possible explanation is the presence of standing water from irrigation in this agricultural setting that provides an environment for mosquitoes to breed. A second explanation is the presence of specific bird species that are commonly fed upon by the WNV mosquito vector in the orchards and vineyards, therefore, causing amplification of the virus. These findings are significant because they will aid in effectively developing methods of monitoring the disease and managing potential outbreaks of the virus.

Presentation Number 70

ABSTRACT:

Abstract Title:	The World in a Suitcase: A Collection of Short Fiction		
Presenter:	Jared Brickman		
Mentor:	Rebecca Goodrich		
Presentation Type:	Poster	**Major and College:**	Journalism / Communications
Category:	Arts and Design		

College students consistently rank study abroad experiences as valuable and inspiring. The collection of short fiction "The World in a Suitcase" is a product of this inspiration. This creative project contains twelve selections of short fiction, one from each country I visited on my study abroad in fall semester of 2010 with the program Semester at Sea. Additionally, a nonfiction prologue and epilogue serve to place the stories in context and give my perspective on the adventure as a whole. This creative project illustrates a connectedness between the importance of setting and theme. While placing a story in Ghana or Japan creates distinctive visual details, the humanity of universal struggle or relief remains similar. One does not escape human problems by simply crossing a border. The aim of the collection is to ask readers to consider this balance of place and humanity. The collection stands within a specific genre of writing: the short story. Many authors from around the globe have tackled this nuanced form of fiction. Borrowing from this wealth of knowledge helped me to form the stories in the collection, especially pieces by authors from the countries written about. Research also included general advice and instruction from books on writing and craft. Writing of "The World in a Suitcase" began on the Semester at Sea voyage itself, and continued through the spring and summer of 2011, with editing taking place both concurrently and in the fall of 2011. Specific times for writing were not set due to my writing preferences, though deadlines were self-imposed. Reading other author's selections of short fiction and meditating on place and theme occurred between actual stretches of writing. In addition to adhering to the academic framework exploring setting and theme, each story carried some commentary on a world issue. Everything from stifling the creativity of children, to environmental concerns, and the human cost of war is touched upon in the collection. This mix of content creates a global connection beyond the simple concept of traveling the world. This collection is my world, tucked away in a suitcase.

Presentation Number 71

ABSTRACT:

Abstract Title:	Stem Cell Mediated Cardiac Myocyte Proliferation: The Effect of hMSC Number on Colony Formation		
Presenter:	Katrina Hansen		
Mentor:	Glenn Gaudette		
Additional Authors:	John Burford, Glenn Gaudette		
Presentation Type:	Poster	**Major and College:**	Bioengineering/Engineering Architecture
Category:	Engineering and Physical Sciences		

Introduction: Every year 7.9 million Americans have a heart attack, of these 500,000 results in severe heart failure. As cardiac myocardium cannot regenerate endogenously, options to restore mechanical function are limited to a heart transplant or a left ventricular assist device. Cell based therapies show potential to regenerate lost myocardium. One potential method is to proliferate autologous cardiomyocytes. Previous work by Acquistapace et al. (2011) and our lab have shown that direct co-culture of cardiomyocytes and human mesenchymal stem cells (hMSCs) leads to myocyte proliferation. However, how different amounts of hMSCs affect cardiomyocyte proliferation is currently unknown.

Methods: Adult rat cardiomyocytes were directly co-cultured with hMSCs in ratios of 0:1, 0.5:1, 1:1, 2:1, 5:1, and 10:1 hMSCs to cardiomyocytes. The formation of colonies was tracked using colony counts taken at day's 1, 4, 7, and 14 by three independent observers.

Results and Discussion: An increase in colony counts from day 1 to day 14 was seen in all ratios, except 0:1, which decreased. There was a significant difference between colony formations in each group at day 14, when compared to day 1. There was a significant difference in colony formation for all ratios when compared to the control on day 14.

To verify that hMSC migration does not contribute to the colonies, stem cells were quantum dot loaded and no quantum dot signals were found within the colonies. Also, when cultured alone, hMSCs did not form colonies. To confirm that cardiomyocytes, not fibroblasts, were forming colonies, fibroblasts and hMSCs were co-cultured and no colonies were formed.

Conclusions: These data suggest that stem cell mediated cardiomyocyte colony formation is not a dosage dependent process. This infers that the number of stem cells in direct contact does not limit myocyte proliferation. These data will be used to dictate future studies on growing cardiac cells in vitro to expand a cardiac biopsy. Additionally, this information will be useful in determining how many hMSCs will need to be delivered to an infarct to support cardiomyocyte regeneration.

Acknowledgements: The author would like to thank WPI and the NSF for funding (REU EEC754996).

Presentation Number 72

ABSTRACT:

Abstract Title:	Evaluating Larger Containers for Cryopreserving Semen in Rainbow Trout		
Presenter:	Jonathon Thomson		
Mentor:	Gary Thorgaard		
Presentation Type:	Poster	**Major and College:**	Zoology/Sciences
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Cryopreservation or long-term preservation by freezing of rainbow trout semen is potentially a useful tool for conservation and aquaculture applications. Examples of applications include the gene banking of semen from endangered populations and making crosses between strains that do not spawn at the same time of year. Cryopreservation is currently successful only in small containers, most commonly a 0.5 ml plastic straw originally developed for bovine semen, and the number of eggs fertilized is limited to approximately five hundred to one thousand. This limitation causes the process to be somewhat slow and cumbersome for large-scale projects. In order to transfer the technique out of the laboratory and into the "real world" a larger package in which to freeze the semen is required. We present work investigating the utility of 80.0ml bags designed for the cryopreservation of porcine semen. To date, our results are encouraging. Using the large bags, we have been able to fertilize batches averaging 4,040 eggs with fertilization rates of 43.7 percent compared to batches that averaged 916 eggs fertilized using the 0.5ml straws had a fertilization rate of 66.7 percent. We are currently attempting to increase the fertilization success of the large bags further by increasing the rate at which they are thawed. Unpublished data from previous work suggests that slow thawing rates may cause poor fertility success.

Presentation Number 73

ABSTRACT:

Abstract Title:	Analysis of BDNF Induced Dendritic Outgrowth in Hippocampal Neurons		
Presenter:	Elizabeth Graham		
Mentor:	Gary Wayman		
Additional Authors:	Adam Lesiak, Gary Wayman		
Presentation Type:	Poster	**Major and College:**	Neuroscience/Veterinary Medicine / Honors
Category:	Molecular, Cellular, and Chemical Biology		

The structure and shape of a neuron, the primary information carrying cell of the brain, is essential for making connections with other cells and for proper brain function. Failure to develop the appropriate connections leads to numerous cognitive deficits and is associated with disorders including depression, Down's syndrome, and Fragile X Syndrome. Brain derived neurotrophic factor (BDNF) is a molecule produced in the brain that stimulates growth in neurons and helps them to develop proper connections. The mechanism that BDNF works through to induce neuronal development is not well understood, and this project investigates the pathway that BDNF uses to stimulate the growth of dendrites. We hypothesize that the molecules Par6C and Rnd3, which are known to be regulators of neuronal structure, are involved in BDNF-induced neuronal outgrowth.

We show that BDNF, a known activator of dendritic outgrowth, induces a 25% increase in outgrowth in cultured hippocampal neurons over unstimulated neurons. We hypothesize that one way BDNF induces dendritic outgrowth is by inhibiting RhoA, a known inhibitor of outgrowth. Since it is known that BDNF treatment stimulates an increase in two molecules known to inhibit RhoA, Rnd3 and Par6C, we believed that the expression of both molecules might play a role in BDNF induced dendritic outgrowth. Here we show that expression of either Rnd3 or Par6C is capable of stimulating dendritic outgrowth to increase by approximately 50%, and that expression of both molecules is necessary for BDNF to induce outgrowth. Both Par6C and Rnd3 are known to inhibit RhoA by activating p190RhoAGAP, a direct inactivator of RhoA. When p190RhoAGAP is inhibited, it allows RhoA to be active and dendritic outgrowth does not increase significantly above control levels, despite BDNF treatment or co-expression of Par6C and Rnd3. Here we demonstrate that Rnd3 and Par6C are essential mediators of BDNF-induced dendritic outgrowth, and thus may play a crucial role in the development of the central nervous system.

Presentation Number 74

ABSTRACT:

Abstract Title:	Software Development for Data Analysis of Bacterial Adhesion and Surface Interaction		
Presenter:	Josue Orellana		
Mentor:	Nehal Abu-Lail		
Additional Authors:	Amer Hamdan, Troy Reardon		
Presentation Type:	Poster	**Major and College:**	Electrical Engineering/Engineering Architecture
Category:	Computer Science, Mathematics, Statistics, Information Sciences		

Atomic Force Microscopy (AFM) is a widely used nanoscience tool. As opposed to traditional microscopes, it is able to construct an image based on nano-scaled (contact or non-contact) interactions between a cantilever and the surface of interest. These interactions result on force vs. displacement measurements that provide information about the mechanical characteristics of a given sample. One of the main interests for using this tool in Chemical/Bioengineering is to study the nano-mechanical properties of cells. For instance, it is used to characterize the adhesion and virulence of different bacterial strains. The data obtained from the AFM is composed of two basic types: approach and retraction curves. At least 15 curves of each type are obtained for each cell, and many cells can be sampled during a single experiment. Due to the nature and subtle characteristics of each curve, all the data need to be analyzed individually by a trained user. The data analysis consists of identifying the retraction local maximum points, calculating energy of interaction, and obtaining parameters for different mathematical models. Before any interpretation can be done, the analysis of large amounts of these data is very tedious and time inefficient when using typical spreadsheet software. Hence the goal of this project is to develop a Matlab based software to reduce the analysis time. This program features an intuitive graphical user interface and has significantly decreased the average analysis time down to about 2-3 minutes per curve (70-80%). Currently the software can be used for retraction curve analysis (local maximum points, energy range), and approach curve analysis for Hertz and Steric mathematical models. Having this software tool minimizes the analysis time spent following each experiment; which leaves more time for data interpretation.

Presentation Number 75

ABSTRACT:

Abstract Title:	Long Term Wireless Monitoring and Behavior Correlation of EEG, Acceleration and Video in Post-Cardiac Arrest Animal Models		
Presenter:	Josue Orellana		
Mentor:	Nitish Thakor		
Additional Authors:	Udit Jalan, Elliot Greenwald, Yama Akbari, Nitish Thakor		
Presentation Type:	Poster	**Major and College:**	Electrical Engineering/Engineering Architecture
Category:	Applied Sciences		

Every year an estimate of 450,000 Americans suffer cardiac arrest. When able to be resuscitated and transported to the hospital, these patients enter a comatose state. At this point the outcome is uncertain between good recovery and brain death. Traditionally, measurements for the prediction of outcome have been limited to clinical signs as outlined in the Glasgow Outcome Scale. Hence, there is a need to reinforce outcome prediction/decision algorithms with more technological and quantitative measurements. Currently new tools such as electrophysiological, biochemical, and neuroimaging signs are being explored with the objective of minimizing false positives for poor prognosis. These new measurements are also aimed to help to assess the brain response to new arousal drugs and methods. The present project studies the use of EEG, acceleration, and video monitoring, as an integrative prognosis aid tool for post cardiac arrest experiments in rodents. For this purpose, a long-term wireless monitoring system was developed. This system is capable of recording convulsive/non convulsive seizures, and the spatial behavior of rats. It is composed of EEG and accelerometer sensors, microcontroller and wireless transceiver; fitted in a small backpack and helmet that are attached to the rat. The data are received by the computer and paired with video frames from a webcam. Data processing and correlation are performed using Matlab and optical flow video analysis in OpenCV. Post cardiac arrest experiments in rats using this device are currently being continued. Especially this tool is being used to quantify the brain and arousal impact of newly explored drugs that promote awakening. It has been hypothesized that the recorded measurements can further correlate to outcome, but more tests remain to be performed for statistical purposes.

Research Experience for Undergraduates (REU) summer 2011, Johns Hopkins University (JHU), Neuroengineering and Biomedical Instrumentation Lab. Josue Orellana: Washington State University, Electrical Engineering Senior; Udit Jalan: Indian Institute of Technology Bombay, Electrical Engineering Junior; Nitish Thakor: JHU Biomedical Engineering Professors and Principal Investigator; Elliot Greenwald: JHU Biomedical Engineering PhD candidate; Yama Akbari: JHU Neurocritical Care Fellow.

Presentation Number 76

ABSTRACT:

Abstract Title:	The Invisible Force in the Family		
Presenter:	Danielle Hartmann		
Mentor:	Lydia Gerber		
Presentation Type:	Poster	**Major and College:**	General Biology/Sciences / Honors
Category:	Social Sciences		

Female servants in China are underrepresented in history. They were a pivotal part of the workings of the family, especially with child rearing. Usually they became servants because they had no male in the family to support them or they were sold when youger because of hard times. Wet-nurses and nurse nannies came to love the children as their own and formed a lasting bond with the family. They raised the children and taught them moral and societal rules. Usually they stopped being servants when they are married off, or in some circumstances became a nun or committed suicide. A marriage for a servant could either be that of wife and husband, or more commonly they would become concubines to some male in the family. However, many of them kept in touch because of their strong ties with the family. Maids and nurses were much more than just common servants there to order around and treat as animals, they were a trusting support system for the family. By becoming a part of these families, it gave them a chance to support themselves and even raise their positions if they had good masters. Most of this information is not analyzed by many historians, so the majority of information is from novels based on cultural values. There are, however, a couple of books that are autobiographies translated and recorded by a second party. All these sources require personal analysis, while a couple other sources provide more concrete facts.

Presentation Number 77

ABSTRACT:

Abstract Title:	A Comparative Study of Helical Tomotherapy and Volumetric Modulated Arc Therapy (VMAT)		
Presenter:	Connor Holloway		
Mentor:	Dr. Darryl Kaurin		
Presentation Type:	Poster	**Major and College:**	Genetics and Cell Biology/Sciences
Category:	Engineering and Physical Sciences		

Cancer patients who are prescribed radiation therapy can receive their treatment in a variety of ways. Two of the more popular methods, referred to as modalities, include Helical Tomotherapy and Volumetric Modulated Arc Therapy (VMAT). Both systems use the same basic premises inherent to Intensity-Modulated Radio Therapy (IMRT) techniques; the shape and intensity of radiation beams are carefully modified and moved in a continuous, circular fashion across a target area, thereby minimizing the dose to surrounding tissue and maximizing the dose to the target. Because each machine accomplishes this in different ways and employs unique software, treatment plans cannot be directly transferred between them; each plan must be specifically optimized for its parent machine.

In this experiment, a VMAT-capable c-arm linear accelerator and Tomotherapy machine were used to execute a series of IMRT commissioning plans modified from the AAPM Task Group 119 report. The resulting data was examined to compare the treatment modalities on the basis of total treatment time, dose conformation, and the ability for each machine to execute its given plan. While clinical complications prevented methods of comparing treatment times from being implemented, planar dose measurements and homogeneity index data successfully indicated that Tomotherapy can provide better dose conformation to the target area and better sparing of organs-at-risk (OARs). The results also indicated that in most cases, Tomotherapy successfully executed its given plan more accurately than comparable VMAT plans. While not exhaustive, this experiment provides a basis for future comparative studies between the two modalities.

Presentation Number 78

ABSTRACT:

Abstract Title:	Synthesis of Hydroxy Proline-Based Nucleopeptides for Antisense Applications Synthesis of Hydroxy Proline-Based Nucleopeptides for Antisense Applications		
Presenter:	Ross Overacker		
Mentor:	Dr. Philip Garner		
Additional Authors:	Philip Garner, Chung-Min Park, and Ryan Joseph		
Presentation Type:	Poster	**Major and College:**	Chemistry/Sciences
Category:	Applied Sciences		

The goal of this research project is to create a nucleic acid surrogate that both targets mRNA and is able to translocate across cell membranes without the use of a delivery system. This will be done by attaching nucleobases to the side chains of amino acids at regular intervals along a peptide chain allowing base-pairing to mRNA. The peptide will also incorporate cationic amino acid residues to facilitate its transport across cell membranes. The result will be a synthetic nucleopeptide that can block the production of protein from the targeted gene. The 4-hydroxyproline scaffold was chosen because 1) it is readily available, 2) provides a point of attachment for the nucleobase, and 3) results in more stable nucleopeptides. The nucleopeptide incorporates four different nucleoamino acid building blocks that must be linked together in order to form the desired peptide chain. Each one of the four different building blocks are synthesized from commercially available trans-4-hydroxy-proline. I will describe our synthesis of the four building blocks needed to make the nucleopeptide.

Presentation Number 79

ABSTRACT:

Abstract Title:	Petrology and Mineralogy of the Gold Hill Syenite-Pyroxenite Intrusion, Potlatch Quadrangle, Northern Idaho		
Presenter:	Eric Cutler		
Mentor:	Michael Rowe		
Presentation Type:	Poster	**Major and College:**	Geology/Sciences
Category:	Engineering and Physical Sciences		

The Gold Hill Syenite-Pyroxenite complex lies approximately 5 miles northeast of Potlatch Idaho. Past mining and excavation of the area, have uncovered portions of this small and relatively rare alkaline intrusion, which is lies adjacent to the Idaho Batholith, a siliceous intrusion and the metamorphosed Belt Supergroup . Using this limited exposure, samples were collected in an attempt to adequately represent the variety in facies within the complex: coarse and fine-grained pyroxenite, syenite, quartz vein, and a mixed grain pyroxenite with abundant large biotite crystals. The samples were analyzed via thin section, whole rock data, and electron microprobe with the intention of understanding the exact chemical composition of the different facies and the relative timing of their formation. It has been proposed that the complex intruded the Belt Supergroup around the same time as the Idaho Batholith during the Laramide Orogeny (70-35 Ma), although the extreme contrast in mineralogy and high alkaline nature suggests otherwise. By analyzing the mineralogy and petrology of the Syenite-Pyroxenite complex in relation to the Idaho Batholith, I hope to provide a more concrete chronological timeline of the igneous bodies present in Eastern Washington, Idaho, and Montana.

Presentation Number 80

ABSTRACT:

Abstract Title:	The Impact of Competition when Parasites Affect Host Resource Use		
Presenter:	Zachary Colburn		
Mentor:	Dr. Dybdahl		
Presentation Type:	Poster	**Major and College:**	Biochemsitry/Veterinary Medicine
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Host fitness is reduced when parasites use host resources. Hosts infected with such parasites may respond in a number of ways, including investing their remaining resources in defense. Hosts may also alter their foraging rate. This is supported by previous empirical studies, which suggest that the reason some infected hosts increase consumption rate is to compensate for the increased demand by the parasites. Other studies have suggested that when infected hosts reduce consumption rate it is because the virulence of infection has reduced motility and therefore foraging ability. All models have ignored effects of competition despite the potential it has to affect many general properties of host-parasite interactions (e.g prevalence of infection, populations size, and virulence).

I developed an eco-evolutionary model in which a host trait (host defense) interacts with a parasite trait (exploitation rate). This model is novel because it incorporates parasite affects on host resources use. I looked at four scenarios: competition is either increased by increased resource use or decreased by reduced resource use and the strength of competition affects host population growth either by decreasing birth rate or by increasing death rate.

A comparison of the four scenarios revealed that while the manner in which infection changes foraging ability is significant because it leads to different levels of host defense, only minor differences resulted when the birth and death scenarios were compared for each change in foraging ability. I also looked at the effect of changing the intensity of competition by varying the host\s carrying capacity. The model reveals that prevalence of infection increases with carrying capacity, while virulence remains nearly constant, and evolutionary equilibria change significantly. Specifically, parasite exploitation decreases and host defense increases when infection increases resource use. The opposite is true when infection decreases resource use.

Including both host and parasite evolution is important in order to understand the outcome of the interaction. While most models assume that the evolution of host traits is negligible, this assumption does not apply when parasite life span is close to that of the host. This is true for many important parasites, such as macroparasites (e.g. metazoans animals like nematodes and trematodes) which are especially good examples of parasites with life spans approaching their hosts. Overall the model shows that it is important to consider parasite effects on host competition when attempting to understand the eco-evolutionary dynamics of host-parasite interactions.

Presentation Number 81

ABSTRACT:

Abstract Title:	**Evaluation of depolymerized lignin suitable for aqueous phase conversion to jet fuel range hydrocarbons**		
Presenter:	Scott Dawson and Katrina Peterson		
Mentor:	Dhrubojyoti D. Laskar		
Additional Authors:	Dhrubojyoti D. Laskar and Bin Yang		
Presentation Type:	Poster	**Major and College:**	Environmental Science: Sciences
Category:	Molecular, Cellular, and Chemical Biology		

The objective of this study is to evaluate the molecular weight range of depolymerized lignin during aqueous phase processing (APP) which can be suitably utilized for conversion to hydrocarbon via hydrodeoxygenation (HDO). The study involves depolymerization of lignin polymer from biomass via hydrothermal pretreatment with or without additives followed by selective hydrolysis of the C-O-C bond. Correspondingly, the molecular weight profiles in such depolymerization processes will be established by Gel Permeation Chromatography (GPC) of soluble and insoluble lignin/extractives in the aqueous phase. For the efficient use of both soluble and insoluble low molecular weight lignin fragments, we will explore HDO reactions for further conversion to hydrocarbons fuels. Significantly, these findings will lay the basis for deployment of processed lignin derived entities for potential conversion to jet fuel range hydrocarbons. Establishing such economically viable and environmentally benign aqueous phase processing of lignin to jet fuels, we can ultimately eliminate fuel imports and be able to wean the United States off fossil fuels both foreign and domestic.

Presentation Number 82

ABSTRACT:

Abstract Title:	Towards validating effective removal and competent recovery of lignin from plant biomass by hydrothermal flowthrough process		
Presenter:	Katrina Peterson		
Mentor:	Bin Yang		
Additional Authors:	Scott Dawson, Lishi Yan, Dhrubojyoti D. Laskar and Bin Yang		
Presentation Type:	Poster	**Major and College:**	Biology/Sciences
Category:	Engineering and Physical Sciences		

Lignin, the second most abundant natural compound after cellulose, owing to its rich aromatic nature and versatile functional groups offer a large number of opportunities for commercial application. If able to harness this compound, a new, biofuel energy source may be attained. However, the efficient recovery of lignin in its native form turns out to be more challenging than that of plant cell wall structural carbohydrates due to the enormous complexity in its polymeric framework. In fact, isolation of native lignin in an unaltered form is hindered by the tight physical binding and chemical linkages between cell-wall polysaccharides. Our objective is to develop an advanced flowthrough system for maximizing the selective removal and isolation of lignin fraction from plant biomass (poplar and switchgrass).

In this study, water only flowthrough pretreatment is employed under various time and temperature conditions (with or without additives) to achieve selective hydrolysis of hemicellulose and lignin cross-linkages for maximal removal of lignin. We observed that lignin fragments were swept out of the flow reactor under such flowthrough conditions, restricting the counterproductive condensation/re-polymerization behavior of lignin. This resulted in effective lignin release and allowed subsequent recovery of monomeric and oligomeric lignin in high yields from the aqueous stream of the flow reactor. Thus, the ultimate goal of this study is to derive the reaction chemistry and deduce the mechanism of delignification of lignocellulosuc biomass under the optimized hydrothermal flowthrough conditions. Overall, the availability of the information and technology will promote to validate a process system for valorization of lignin to realize complete biorefining of lignocellulosic biomass.

Presentation Number 83

ABSTRACT:

Abstract Title:	Ovarian Hormone Modulation of Supraspinal THC-Induced Analgesia		
Presenter:	Alisha McBride		
Mentor:	Dr. Rebecca Craft		
Additional Authors:	Alexa Wakley, Rebecca Craft		
Presentation Type:	Poster	**Major and College:**	Neuroscience/Liberal Arts / Honors
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Previous research has demonstrated that THC, the psychoactive component of marijuana, produces greater analgesia in female compared to male rats (Tseng & Craft, 2001). Females' increased sensitivity to THC depends on the stage of their reproductive cycle: late proestrous females (= around the time of ovulation) show greater THC-induced analgesia compared to those in estrus (after ovulation), and compared to males (Wakley & Craft, 2011). This study suggests that ovarian hormones may modulate the analgesic effect of THC in females. The aim of the present study was to determine which ovarian hormone -- estradiol, progesterone or both -- is responsible for reproductive cycle related changes in THC sensitivity in females.

Ovariectomized female rats received oil vehicle, estradiol (2 μg), and/or progesterone (500 μg) on a cyclic schedule (at 7 am & 5 pm on Days 3 & 7 after ovariectomy) to mimic the normal hormone fluctuation of intact females. Behavioral testing was conducted at 14, 21, or 38 h after the last hormone injection; rats were given an *i.c.v.* injection of vehicle (1:1:8 ethanol:cremophor:saline) or THC (100 μg). Then analgesia was measured as the latency to respond on the tail withdrawal and paw pressure assays at 5-180 min post-injection. Locomotor activity in 5-min periods was measured at 15-180 min post injection. Catalepsy (immobility) was measured at 15 & 30 min post-injection.

THC produced significant analgesia on the tail withdrawal ($F(1,182)=121.48, P<0.001$) and paw pressure assays ($F(1,182)=136.597, P<0.001$), as well as suppression of locomotor activity ($F(4,704)=105.80, P<0.001$). Estradiol (alone and in combination with progesterone) increased THC-induced paw pressure analgesia over the test period ($F(1,182)=4.71, p<0.05$). Therefore, the ovarian hormone estradiol appears to be acting in the brain to enhance females' sensitivity to the analgesic effects of THC. This interaction could be exploited to create a more effective medication for pain management in women.

Presentation Number 84

ABSTRACT:

Abstract Title:	Comparing the Environmental Efficiency of Cheese Production using Nubian Goats or Holstein Cattle		
Presenter:	Breoni Harkleroad		
Mentor:	John McNamara		
Additional Authors:	Robin White, and Dr. John McNamara		
Presentation Type:	Poster	**Major and College:**	Animal Science/Agricultural, Human, and Natural Resource Sciences
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

The global population is increasing, which calls for more environmentally efficient food production with a small use of land. Based on the fat and protein content of their milk, Nubian goats have the potential to produce a higher quality dairy product with a lower environmental impact than Holstein cattle. The objective was to create a mathematical model to compare the land and water use, and greenhouse gas emissions required to produce 500,000 T of cheese using milk produced by Nubians or Holsteins. Animal populations were categorized based on their age and production stage. Energy and protein requirements for each population were calculated based on those recommended by the National Research Council. Diets were formulated to meet those requirements and for maintenance, growth and lactation. Based on the diets required, three metrics of environmental impact were calculated: land use, water use and carbon footprint. Land use took into account the acreage needed for livestock production as well as the cropland necessary to feed the animal populations. Water use included water necessary to irrigate crops. Carbon footprint consisted of enteric methane, carbon dioxide, and nitrous oxide. The enteric methane was calculated based on the cellulose, hemicellulose, and non-fiber carbohydrate content of the diets. Carbon dioxide accounted for tillage, irrigation, and the spread and manufacture of fertilizer and herbicide. Three sites of nitrous oxide emissions (direct, leached and volatized) were calculated based on nitrogen excreted from each population. We found that it in order to produce 500,000 T of cheese, a total population of either 19,983,350 goats or 1,414,480 cattle were required. Based on the goat population, for each kg of cheese produced, 0.001 ha of land and 726 L of water were required. The carbon footprint was 6.01 kg per kg of cheese. For the cattle population, it would require 0.002 ha of land and 822 L of water to produce 1 kg of cheese. The carbon footprint for cattle was 6.27 kg per kg of cheese. Our results show that the use of Nubians for cheese production is more environmentally efficient than the use of Holsteins.

Presentation Number 85

ABSTRACT:

Abstract Title:	Enrichment and its Behavioral Effects: A Case Study on the Guppy (Poecilia reticulata)		
Presenter:	Alicia Netter		
Mentor:	Paul Verrell		
Presentation Type:	Poster	**Major and College:**	Zoology/Sciences / Honors
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

In the common aquarium, one can view fish in tanks filled with novelties such as pirate ships and treasure chests. People may call such things enrichment, making the fish more comfortable in its unnatural environment, but from the prospective of the fish, are these items meaningful? Given a choice, would fish choose an enriched tank over an empty one? Does the presence of any item in the tank affect the way they behave? Using the fish subject of the guppy for this experiment, the question of whether enrichment affects behavior and preference was put to the test.

Guppies were randomly allocated into three different types of treatment tanks with varying amounts of objects in the tank. The first treatment was a bare tank with nothing in it. The second was a "standard" tank that was based on local pet store models and had gravel substrate, one large rock, and two plants. The third treatment was an "enriched" tank that had gravel substrate, two large rocks, and six plants. The fish were in these treatments for three weeks before they were tested on their activity level, willingness to school, and preference of treatment type.

For the activity and schooling tests, the hypothesis was that guppies kept in the enriched treatment would behave differently than guppies kept in the bare treatment and that the standard treatment guppies would display an intermediate behavior. However, it was found that there was no difference between the behaviors of the guppies in the three treatments. In the preference test, all the fish from a single treatment were placed in a large tank and were able to choose between three compartments that were identical to the three treatments. It was expected that if enrichment had no effect on the guppies, then they would spend an equal amount of time in all three compartments of the tanks. Contrarily, it was found that all the guppies spent more time in the bare compartment than the enriched and standard compartments. Overall, fish enrichment is understudied and more research is needed to see if it affects a fish's wellbeing and behavior.

Presentation Number 86

ABSTRACT:

Abstract Title:	Effects of Competition on Native and Non-native Plant Germination in Eastern Washington Ponderosa Pine Forest and Palouse meadow Steppe		
Presenter:	Jennifer Richards		
Mentor:	Dr. Richard N. Mack		
Additional Authors:	Brian M. Connolly		
Presentation Type:	Poster	**Major and College:**	Biology-Botany/Sciences
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Biotic resistance describes an interaction (i.e. competition, parasitism, herbivory, predation) driven by native species that limit the establishment of a non-native species. Regionally, Ponderosa Pine forests display significantly lower non-native plant establishment than adjacent Palouse meadow steppe. My study assessed native plant competition as a possible mechanism of biotic resistance, a potential explanation of the disparate invasion history between meadow steppe and forest communities. To evaluate biotic resistance between these habitats, I measured native and non-native test species germination on intact plots (control) and plots where plant competitors had been mechanically removed.

In pine forest seed addition plots, native plant competition limits plant germination in naturalized Secale cereale (reduced ~50%) and invasives Cirsium arvense (reduced ~83%) and Bromus tectorum (reduced ~48%). Competition did not appear to affect the germination of native Agropyron spicatum in pine forests. In meadow steppe plant competition limited test seed germination in naturalized Secale cereale (reduced ~33%) and invasive Cirsium arvense (reduced ~50%). Competition did not appear to affect the germination of native Agropyron spicatum and invasive Bromus tectorum in meadow steppe.

My germination data suggest that release from native plant competition had a greater positive effect in pine forests than it did in meadow steppe. From my initial results, it appears that native plant competition may function as a biotic resistance mechanism and explain plant invasion history in regional pine forests and meadow steppe. Definitive community-level impacts will need to be assessed with test plant establishment data to be collected spring 2012.

Presentation Number 87

ABSTRACT:

Abstract Title:	Understanding the Balance of Energy Supply and Demand During Photosynthesis Using Biophysical Approaches		
Presenter:	Gordon Stack		
Mentor:	Asaph Cousins		
Presentation Type:	Poster	**Major and College:**	Biophysics/Sciences
Category:	Molecular, Cellular, and Chemical Biology		

During the light reactions of photosynthesis two different chemical forms of energy, ATP (Adenine triphosphate) and NADPH (Nicotinamide diphosphate), are produced. Changes in leaf metabolism cause variation in consumption of these two high energy molecules. An imbalance in the supply and demand of ATP or NADPH can lead to degradation of the photosynthetic machinery and sub-optimal carbon assimilation. There are several proposed mechanisms that maintain the energy balance between supply and demand; however, it is not clear how plants balance the supply of energy supplied by the light reactions with demand. Biophysical methods provide a unique toolset to study the in vivo mechanisms of energy balancing and overcome some of the limitations of destructive biochemical assays.

We modulated the demand of ATP and NADPH by changing light, CO2 and oxygen available to the leaf to investigate how the ratio of ATP and NADPH production is balanced to meet the changing energy demands. Additionally, we used measurements of leaf CO2 gas exchange to model the energy demand in comparison with in vivo leaf spectroscopy and chlorophyll florescence measurements to determine rates of ATP and NADPH production. Our preliminary data suggests that while NADPH supply is modulated to meet demand, ATP production remains constant despite changes in demand. These data provide important insights into the mechanisms plants use to maintain the energy balancing during photosynthesis by combining information from biochemical and physical measurements.

Presentation Number 88

ABSTRACT:

Abstract Title:	Moving-Mesh Partial Differential Equations for Modeling Neutron Star Binaries		
Presenter:	Briana Ingermann		
Mentor:	Matthew Duez		
Presentation Type:	Poster	**Major and College:**	Physics/Sciences
Category:	Engineering and Physical Sciences		

Studies of compact object binary systems reveal exotic properties of black holes and neutron stars. While the elusive nature of these objects makes them difficult to study observationally, computational work and theoretical models can provide insight into black holes and neutron stars and predict observable effects. We develop numerical code segments using a moving-mesh partial differential equation to aid in the simulations of compact object binary mergers. This method, which is new to astrophysical applications, provides resolution preferentially to locations of small-scale change and ameliorates the problem of accurately modeling effects on multiple length scales. A systematic comparison of a parabolic and hyperbolic form of the partial differential equation for several sample cases reveals differences in the speed of convergence upon the desired coordinate map. One-dimensional cases are studied, and applications to higher dimensions are discussed.

Presentation Number 89

ABSTRACT:

Abstract Title:	Disabilities as Viewed by Two Generations of Filipino-Americans		
Presenter:	Stella Mae Ong		
Mentor:	Dr. Ella Inglebret		
Presentation Type:	Poster	**Major and College:**	Speech and Hearing Sciences/Liberal Arts
Category:	Applied Sciences		

Professionals who provide services will benefit from increased knowledge of Filipino-Americans and their cultural beliefs. My research serves as a guide for professionals to work more closely with Filipino-American families who need services for disabilities. Nine Filipino Americans, from two generational groups, were individually interviewed and revealed their attitudes toward disabilities. The two groups were the first generation and the other was a group known as “1.5 generation.” A few differences were found in the perceptions of the two generations. A deeper understanding of the Filipino-American community may influence improved quality services.

Presentation Number 90

ABSTRACT:

Abstract Title:	Exploration of mitochondrial DNA markers for identification of Inland and Coastal forms of Rainbow Trout(Oncorhynchus mykiss)		
Presenter:	Benjamin Maxfield		
Mentor:	Gary Thorgaard		
Additional Authors:	Scott Parsons, Ross Rowsey, Joseph Brunelli, and Gary Thorgaard		
Presentation Type:	Poster	**Major and College:**	Ecology/ Evolutionary Biology/Sciences
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

Rainbow trout(Oncorhynchus mykiss) are a key fish species in the Pacific Northwest for ecological, social and cultural reasons, thus conservation of this species has become an emphasis for researchers and managers alike. Maintaining native populations adapted for the variety of environmental conditions is the focus of these conservation efforts. Characterization of native populations using molecular markers has become a central area in such research and has widely been studied. My research focused on distinguishing a genetic marker for potential use in identifying native inland(east of the Cascade Mountain range) and coastal(west of the Cascades) forms of O mykiss. Polymerase Chain reaction(PCR) and DNA sequencing techniques were done using mitochondrial DNA sequence. I, with contributions from Scott Parsons, Ross Rowsey and members of Dr Gary Thorgaard\s lab explored haplotype variation within a 508 bp fragment of the ND2 region within O. mykiss. 158 individuals were included in this study from a variety of sample locations in Western North America and the Kamchatka Peninsula. 19 haplotypes were characterized in total. Phylogenetic analysis revealed two relatively consistent haplotype groupings based on coastal and inland locality. A third common haplogroup was observed which included individuals from both inland and coastal localities. ND2 sequence data was compared to sequence published by Brunelli et al (2010) from mtDNA D-loop region and displayed similar patterns in haplotype grouping. However, the ND2 displayed less variability over the 508 base pair region with more consistent groupings based on geographic location than did the D-loop region. My results suggest that O. mykiss mtDNA variability is likely resultant of natural behavioral processes and/or human introductions of non native individuals. The evidence for patterns of variation based on location suggests ND2 could be used in accessing levels of genetic variation within populations, and may provide insight into levels of hybridization within Rainbow trout populations.

Presentation Number 91

ABSTRACT:

Abstract Title:	Field peas and poly(lactic acid) biocomposites: preparation and physical properties		
Presenter:	Deepak Venkateswaran		
Mentor:	Dr. Shyam Sablani		
Additional Authors:	Sumeet Dhawan, Shyam S. Sablani, Jinwen Zhang, Long Jiang		
Presentation Type:	Poster	**Major and College:**	Biology/University College
Category:	Engineering and Physical Sciences		

Bioplastics from renewable resources have gained interest in recent times due to concerns over environmental impact and energy security. Traditional polymers are often petroleum-based and therefore raise concerns about limited oil supply and sustainability. Polymers derived from renewable feedstock like poly (lactic acid) (PLA) have found useful application in the food service industry as an energy efficient alternative while being biodegradable. However, PLA alone would be an expensive replacement to traditional polymers. Field peas of low commercial values could be used as a possible source for developing bioplastics because of their inherent level of protein and starch. By developing bioplastics from field peas would help defray some of the costs while introducing a value-added product to the food service industry. The objectives of the study were to study the preparation of biocomposites using PLA and field peas and investigate the influence of glycerol on the physical properties of the PLA/pea composites. The composites were composed of pea/PLA in weight ratios of 50/50 and 65/35 (w/w), respectively, with glycerol level varying from 0, 10, to 20%.

The composites were compounded and extruded into sheets using a Leistritz twin screw extruder in two processes. Water absorption of the composite decreased linearly with increasing glycerol content. The result shows that it took ~40 hours of immersion in water for the composites with 20% to reach its equilibrium water absorption of ~12%. The DSC result shows three thermal transitions, i.e., glass transition, cold crystallization, and melting for all composites. Melting point of PLA in the composites was in the range of 145-155 ^{o}C and hence, could be used for food packaging applications involving such a temperature range. The glass transition temperature (T_g) of PLA in the composites was in the range of 48 - 51 ^{o}C which was lower than that of neat PLA. Also, the increase in level of glycerol led to a decrease in T_g which could be ascribed to the plasticizing effect of glycerol. Strength of the composites varied from 13.8 to 5.2 MPa, whereas the elongation from 20 to 60%. Addition of glycerol to the composites led to a decrease in strength and modulus. Strengths of the composites were significantly lower than that of neat PLA. However, these properties are comparable to other PLA biocomposites with natural polymers and fibers such as soy protein and sugar beet and hence, the developed structure could be used for fabrication of food service items.

Presentation Number 92

ABSTRACT:

Abstract Title:	Efflux pump accumulation is the probable mechanism responsible for high level florfenicol resistance in Salmonella enterica		
Presenter:	Jonathan Bliggenstorfer		
Mentor:	Dr. Douglas Call		
Additional Authors:	Lisa Orfe, Douglas Call		
Presentation Type:	Poster	**Major and College:**	Biology; French Sciences; Liberal Arts
Category:	Molecular, Cellular, and Chemical Biology		

Salmonella enterica is represented by over 2,500 different serotypes of which a subset is known to be pathogenic. Many of these pathogenic strains are also antibiotic resistant. Strain AM04528 is a S. enterica serovar Newport that harbors a 160 kbp multidrug resistance plasmid. Among the resistance genes encoded by pAM04528 is floR, an efflux pump that confers resistance to the antibiotics florfenicol (FF) and chloramphenicol. Typically, resistance is thought of as a fixed trait, whereby resistance is no longer effective above a given concentration of antibiotic. Consistent with this we found AM04528 to be inhibited in the presence of more than 200 #956;g/ml of FF. If, however, we extended the incubation period from 24 to 72 hrs we discovered that AM04528 would begin to grow. These 'breakout' populations, when serially passaged into greater concentrations of FF, were capable of growing in the presence of 1,200 #956;g/ml of FF, an amount greater than 50 times the concentration expected in tissue. We tested four alternative mechanisms that could explain these observations. 1) PCR amplification and sequencing demonstrated that there were no mutations in the promoter or coding regions for floR. 2) Quantitative real-time PCR demonstrated no evidence of differences in floR mRNA copy number at higher FF concentrations. 3) Quantitative western blot analysis demonstrated that there was no significant increase in the copy number of the 23S ribosomal RNA subunit, which is the target of FF. 4) Culture in the presence of Phenyl-Argenine-#946;-naphthylamide dichlorohydride, which blocks efflux pump activity, demonstrated that increased resistance was not due to expression of alternative efflux pumps. We hypothesize that increased resistance arises from accumulation of FloR pump in the bacterial membrane and we are currently taking steps to evaluate this. While it is unclear if this phenomenon of high-level resistance is clinically relevant, it clearly illustrates an additional mechanism by which pathogens can adapt to antibiotic selection pressure in a manner that is independent of other genes, mutations, or additive resistance mechanisms.

Presentation Number 93

ABSTRACT:

Abstract Title:	Can Imported Foods Serve as Vehicles for Transporting Antibiotic Resistance Genes?		
Presenter:	Deven Tokuno		
Mentor:	Douglas R. Call		
Additional Authors:	Lisa Orfe, Margaret Davis ,and Douglas Call		
Presentation Type:	Poster	**Major and College:**	Zoology, pre-medicine/Sciences / Honors
Category:	Molecular, Cellular, and Chemical Biology		

Antibiotic use in food animal production is considered a significant factor in the emergence, amplification, and dissemination of antibiotic resistant bacteria. Public health concerns could lead to policies that significantly curtail antibiotic use in U.S. food production. While such policies may be justified, they may not necessarily result in the expected public health benefits. One counter pressure is the use of antibiotics outside of U.S. borders where regulation may be negligible. Importation of food products from these regions could therefore introduce resistance elements into the U.S. We selected uncooked farmed shrimp from Thailand and Indonesia and fresh shrimp from Mexico and the U.S. for a preliminary survey of antibiotic resistance genes that might be transported via imported and domestic shrimp. We extracted bulk DNA from these products and introduced the DNA to a lab strain of Escherichia coli by electroporation followed by selection on antibiotic-containing agar plates. This procedure permitted recovery of antibiotic resistance gene-bearing plasmids that are capable of replicating in E. coli. Recovered plasmids were verified using plasmid profiling and genes are being identified using a genotyping microarray. To date, we have extracted and electroporated DNA from 100 product samples and we have recovered 76 E. coli that are resistant to at least one antibiotic. Several of these E. coli express multidrug resistance traits. Thus far, microarray results indicate that multiple antibiotic resistance genes are present with imported and domestic, farmed and wild shrimp being positive for antibiotic resistance plasmids. Our findings support the hypothesis that locally purchased imported food products can be contaminated with antibiotic resistance bearing plasmids that are capable of replication in enteric bacteria.

Presentation Number 94

ABSTRACT:

Abstract Title:	Construction of a Solid Hydrogen Target Cryostat for Positron Moderation Studies		
Presenter:	Chad Nixon		
Mentor:	Dr. Jacob Leachman		
Presentation Type:	Poster	**Major and College:**	Mechanical Engineering/Engineering Architecture
Category:	Engineering and Physical Sciences		

Positrons are the antiparticles of electrons produced in nuclear reactions. Despite the widespread use of positron technology in medical, scientific, and energy applications, the efficiency of positron source utilization remains less than 1 %. The low efficiency is due to positron destruction during moderation; emitted positrons must be filtered through a moderator material to restrict the re-emitted positrons to a useable and defined energy range. Ultra-high efficiency positron moderation with solid hydrogen has the potential to increase the efficiency of commercially available positron sources by an order of magnitude, an enabling advance for antimatter storage; however the characteristics of solid hydrogen as a positron moderator have never been investigated. This poster discusses the construction of an experimental cryostat to create solid hydrogen targets for positron moderation studies. Potential defect formation mechanisms in solid hydrogen are presented including phonon production from orthohydrogen-parahydrogen conversion, helium and isotopic impurities, phase metastability, crack formation from thermal-contraction, mechanical production via sample shearing, and grain boundary densities from crystal formation mechanism. The significance of these defects on characterizing solid hydrogen as a positron moderator is considered for future experiments.

Presentation Number 95

ABSTRACT:

Abstract Title:	Greenhouse Gases and Climate: Past, Present, and Future		
Presenter:	Chad Warren with Olga Martyusheva, Carly Winz, Brett Thompson		
Mentor:	George Mount		
Presentation Type:	Poster	**Major and College:**	Civil Engineering / Engineering and Architecture
Category:	Engineering and Physical Sciences		

In the wake of current issues involving climate change, it is imperative to know how to read and predict potential climate change due to greenhouse gases. To do so, this poster examines past recordings, present measurements, and future predictions of greenhouse gases and their effects on global climate. Past recordings were obtained from governmental databases such as National Oceanic and Atmospheric Administration (NOAA). Present measurements were gathered from National Aeronautic Space Administration (NASA). Future forecasts utilized a software tool, MAGICC, that incorporates several climate change models.

Presentation Number 96

ABSTRACT:

Abstract Title:	The genotypic and phenotypic variation among clones of Potamopyrgus antipodarum in both invasive and native ranges		
Presenter:	Suzan Stavitsky		
Mentor:	Mark Dybdahl		
Presentation Type:	Poster	**Major and College:**	Biology/Sciences
Category:	Molecular, Cellular, and Chemical Biology		

The main objective of my research is to study the evolution of traits that lead to the invasive ability, defined as the capacity of an alien species to grow, spread, and cause damage to natural ecological communities.

My research asks whether "invasiveness" traits in successful invaders pre-existed or evolved in their new range.

To address this question, I studied the clonally reproducing snail Potamopyrgus antipodarum, commonly known as the New Zealand mud snail (NZMS, abbreviated). Indigenous to New Zealand, this species is invasive worldwide, including the western U.S. In New Zealand there are 5 major evolutionarily related lineages (clades) of these snails . However, only three genotypes (H06, H05, H19) from only two of the clades (A and B) are invasive. My research was designed to determine whether invasive clones from the western U.S. differ from clones from the same genotype and clade in the native range. I chose to study a population (Back Creek) from the native range (New Zealand) that is dominated by different clones of the H06, clade B genotype.

Two studies were conducted to compare the life history traits related to growth and reproduction. The native Back Creek NZMS were then genotyped using allozyme electrophoresis to identify the different clones in this population.

This data will be analyzed empirically used to set up the next group of participants in the final study to compare the genotypes between generations and the differences that may occur especially between the Back Creek native mothers and their F1 progeny population and how rapidly their genotype changes in the lab environment and if this could give rise to invasive US1 snails.

Presentation Number 97

ABSTRACT:

Abstract Title:	Environments of Deadly Dust: Workers, doctors, policy makers, and the fight against asbestos disease in the shipyards of the Puget Sound region		
Presenter:	Ryan Scott		
Mentor:	Dr. Jeff Sanders		
Presentation Type:	Poster	**Major and College:**	History/Liberal Arts / Honors
Category:	Humanities		

The history of asbestos disease in the shipyards of the Puget Sound region, from early instances of exposure in the 1930s to the movement towards workers environmental justice in the 1970s, reveals a convergence of labor, public health, environment and region that effectively shaped responses to the diseases of asbestosis and mesothelioma. Based on court depositions, public health documents, and union records from archival research at regional institutions including the Puget Sound Regional Archives, the King County Records and Archives, and the University of Washington, this research reveals how the response to asbestos disease in the 1970s was itself a part of the environmental movement.

While health experts knew about the dangers of asbestos in the 1930s, little was done to protect current workers or treat former workers until the 1970s. Then, utilizing federal programs and dollars recently reserved for protecting the environment and fighting cancer, a group of environmentally minded medical professionals, policy makers, and workers successfully built awareness, developed a system to provide treatment for afflicted workers, and began the pursuit of environmental justice for laborers with asbestos disease. This movement transformed the medical and work landscape of the Puget Sound region into one that emphasized occupational healthcare, provided medical assistance to former workers, and ensured safer working environments for current and future workers.

In engaging scholars in the field of environmental history, the project emphasizes the connection between occupational health and the environmental movement. In the Puget Sound region, responses to asbestos disease culminated in the creation of a new occupational healthcare system that focused on work environments as the key cause of industrial disease. This new element of the medical infrastructure developed as a direct result of the new environmental ethic using federal funding and regulation as its base. In addition, this history emphasizes the importance of disseminating health information from experts to workers and the need for good policy that not only provides for profitable industry but also protects human health.

Presentation Number 98

ABSTRACT:

Abstract Title:	The birth and early life of mononucleotide microsatellite repeats: rapid and variable shortening of the poly(A) tract of LINE-1 insertions in a single generation in mice		
Presenter:	Fiorella Grandi		
Mentor:	Wenfeng An		
Additional Authors:	James M Rosser, Wenfeng An		
Presentation Type:	Poster	**Major and College:**	Biochemistry/Veterinary Medicine / Honors
Category:	Molecular, Cellular, and Chemical Biology		

A vast portion of the human genome is composed of two varieties of repetitive sequences: interspersed and tandem. Interspersed sequences are mobile DNA elements such as long interspersed element one (LINE-1) and short interspersed elements (SINEs); these elements are able to "copy and paste" themselves to new locations and constitute about one third of mammalian genomes. Microsatellites, tandem repeats of 1-6 base pairs, represent another distinct class of repetitive sequences which have a high susceptibility to mutation during their life cycle. The simplest microsatellites are mononucleotide repeats, the most abundant of these being stretches of repeated A's. One hallmark of LINE-1 insertions is the presence of a repeating adenosine DNA tract, termed a poly(A) tail, at the 3' end of each insertion. These LINE-1 associated poly(A) tracts represent one of the ways microsatellites can be "born" into the genome. Comparative genomic studies have established that such retrotransposon-associated poly (A) tracts can promote genesis of other A-rich microsatellite repeats through mutations. In this study, we sought to trace the birth and early life cycle of these poly(A) microsatellites in a mouse model. Individual LINE-1 insertions were generated from a unique LINE-1 transgene and propagated through the mouse germline for several generations. The genomic location of each insertion was mapped and the junction between the insertion and its 3' flanking sequence was amplified using a LINE-1 primer and a primer specific to the 3' genomic sequence. In all examined insertions, we observed significant shortening of the poly(A) tract in multiple individuals from each generation. Length variations were verified by cloning and sequencing. Our results provide, for the first time, direct evidence that retrotransposon-derived microsatellite repeats are subject to immediate shortening within a single generation in vivo. The rapid change of poly(A) length illustrates LINE-1's ability to create genetic variation in the genome, adding to the growing pool of polymorphisms between individuals. Such polymorphisms can be useful in mapping genomes and targeting specific alleles. Additionally, they demonstrate the genome's dynamic nature which creates variations among individuals, allowing for diversity and strength of the genetic pool.

Presentation Number 99

ABSTRACT:

Abstract Title:	Selective chemotherapeutic toxicity of a Pseudomonas aeruginosa exotoxin A fragment due to increased NAD levels		
Presenter:	Wing Wong		
Mentor:	David W. Koh		
Additional Authors:	Crystal M. Van Dyken, Jennifer Wilson, Gregory M.K. Poon, David W. Koh		
Presentation Type:	Poster	**Major and College:**	Pharmacy/Pharmacy
Category:	Molecular, Cellular, and Chemical Biology		

Pseudomonas aeruginosa exotoxin A (PEA) is a bacterial toxin that depends on the presence of the vitamin, nicotinamide adenine dinucleotide (NAD+), to produce cell death in its host. Using NAD+ as an essential component, PEA causes the stoppage of all protein synthesis in the cell, which leads to host cell death. Previously, we constructed a DNA construct, known as a plasmid, that overproduces PEA in the cell. By accomplishing this, we aim to improve cancer therapy by specifically killing cancer cells. Using this plasmid, our studies have shown that PEA increases the cell death of a non-cancerous cell line (HEK293 cells). Because PEA activity is dependent on NAD+, we pretreated these cells with nicotinamide, a precursor for NAD+ synthesis, which thus enhances NAD+ levels. We have shown that enhancing NAD+ levels in this way results in the increased cell death of these cells. Interestingly, analysis of NAD+ levels in cancerous versus non-cancerous cells shows that the Hela cancer cell line contains higher levels of NAD+ as compared to non-cancerous HEK293 cells. Also, through the aforementioned supplementation with nicotinamide (or tryptophan, which also is a precursor for NAD+ synthesis), these levels of NAD+ can be further increased in cancer cells, which is expected to enhance cancer cell killing by PEA. These studies thus identify the potential ability of utilizing PEA's dependence on NAD+ to selectively kill cancer cells, either by targeting cancer cells that contain higher levels of NAD+ or by enhancing NAD+ levels by supplementation with nicotinamide or tryptophan. Therefore, PEA offers the potential to be utilized in chemotherapy for the specific killing of cancer cells.

Presentation Number 100

ABSTRACT:

Abstract Title:	'Just a Luck Thing:' African American Homesteaders in the Inland Northwest		
Presenter:	Daniel Vickoren		
Mentor:	Dr. Robert Bauman		
Presentation Type:	Poster	**Major and College:**	History/Liberal Arts
Category:	Humanities		

While many historians have examined the westward migration of African Americans caused by the passage of the Homestead Act of 1864 as it regards the American Midwest, the experiences of these pioneers in the context of the Pacific Northwest has largely been ignored due to a lack of primary historical documentation. Through a close examination of several taped interviews from Washington State University's Black Oral History Collection, this research project seeks to expand our understanding of the physical and social challenges faced by African American homesteaders as they moved west and settled in what is today known as Western Idaho and Eastern Washington. In particular, this project seeks to analyze the oral histories of Frank D. King, Paul Thomas, and William King, recorded between October 1972 and April 1973, which are underutilized sources of historical knowledge from a group of individuals who left very little documentation in their wake and upon whom little historical scholarship has been focused. These oral histories show that African American homesteaders not only battled against a harsh and unfamiliar climate, but that they also faced discriminatory and exclusionary laws which further increased the hardships they faced. By improving our understanding of the challenges faced by these African American homesteaders, this research helps our society to better understand the settlement of the Inland Northwest, particularly as it related to the Homestead Act, and how this important historical process was experienced by African Americans at the turn of the 20th century.

Presentation Number 101

ABSTRACT:

Abstract Title:	Alkali secretion by the midgut of larval yellow fever mosquitoes Aedes aegypti and its control by serotonin.		
Presenter:	Hana Davis		
Mentor:	Dr. David Moffett		
Additional Authors:	David F. Moffett and Horst Onken		
Presentation Type:	Poster	**Major and College:**	Zoology/Sciences
Category:	Molecular, Cellular, and Chemical Biology		

Luminal alkalinization by the anterior midgut of yellow fever (Aedes aegypti) larvae: answers to two questions about the cellular mechanism and its control. A number of larval insects alkalinize their anterior midgut contents to pH 10 - 12. In yellow fever mosquito larva (Aedes aegypti) a V-type H+ pump in the basal membrane of midgut cells transports H+ from cytoplasm to hemolymph; the corresponding transporter(s) that mediate transapical acid absorption and/or base secretion were unknown. When the tissue is stimulated by the neurotransmitter serotonin (5-HT), activity of the V-ATPase increases, by a heretofore unknown mechanism. For these studies we used an isolated, doubly-perfused gut preparation. Luminal alkalinization was evaluated with infused m-cresol purple dye. With regard to the first question, we provide evidence that the apical membrane contains two distinct transporters for acid-base equivalents: an amiloride-sensitive H+/Na+ exchanger and a DIDS-sensitive HCO3-/Cl- exchanger. Either of these by itself can support alkalinization to pH values of at least 8.3. With regard to the second question, we show that the stimulatory effect of 5-HT on alkalinization is blocked by cytochalasins, inhibitors of assembly of cytoskeletal microfilaments. This result is consistent with a vesicle-fusion mechanism for modulation of cell-surface V-ATPase activity.

Presentation Number 102

ABSTRACT:

Abstract Title:	Isolation, Purification and Characterization of 21 Novel Mycobacteriophages		
Presenter:	Emily Larson		
Mentor:	Dr. Julie Stanton		
Co-Authors	Alexander Bartkoski, James Bonner, Jason Breithaupt, Destinee Cone, Shannon Denny, Kaitlyn Geffen, Oscar Hernandez, Amanda Johnson, Chandler Keller, Emily Larson, Joseph Lawhead, Aiden Manning, Nichole Morgan, Nicholas Negretti, Dominic Niolu, Amy Nusbaum, Lucia Reyes, Kaitlyn Schubert, David Tran, Kamiah Webster, Adrienne Wilen		
Presentation Type:	Poster	**Major and College:**	Biochemistry/Veterinary Medicine
Category:	Molecular, Cellular, and Chemical Biology		

Bacteriophages are a group of viruses that specifically infect bacterial cells. Approximately 10^{31} bacteriophage particles exist on earth and there are 10^{24} new bacteriophage infections per second. Many bacteriophages are specific for their hosts. For example, mycobacteriophages are a group of bacteriophages that only infect cells from the *Mycobacterium* genus, including *Mycobacterium smegmatis*, the host organism that was used for this study, *Mycobacterium tuberculosis* the virus that causes tuberculosis, and *Mycobacterium leprae* which causes leprosy. Through the study of the mycobateriophages it is hoped that more will be learned about how their genomic information determines their biological characteristics. One possible application of this work would be to learn how to use bacteriophages to fight disease-causing bacteria to prevent the spread of epidemic diseases. For example, bacteriophages could be used as alternatives to vaccines, using bacteria-specific viruses to help reduce occurrence of diseases.

To contribute to the understanding of mycobacteriophage biology, students in the Howard Hughes Medical Institute Science Education Alliance laboratory isolated, purified and characterized their own mycobacteriophage. Soil samples were collected from the Washington State University campus or other areas and single bacteriophage populations were isolated through enrichment and purification protocols using the model organism *Mycobacterium smegmatis*. The plaque morphology produced varied among populations, such as round and turbid, or oval and clear, with varying diameters. Mycobacteriophage titers were determined and ranged from $1.8x10^{7}$ to $5.8x10^{13}$ pfu/mL, and high titer lysates were harvested for other protocols such as transmission electron microscopy to visualize the structure of each bacteriophage. Mycobacteriophage DNA was also isolated and examined by enzymatic restriction digestion for comparison, to other known bacteriophages. We found that all of the bacteriophages but one belonged to the group Siphovirdiae, meaning they possess a non-contractile tail and most mycobacteriophage DNA was not extensively digested (similar to cluster K mycobacteriophages). Jobu08 was the bacteriophage chosen by our class to be sent to Virginia Commonwealth University for complete genomic sequencing. We are now studying the genome of Jobu08 using bioinformatics approaches.

Presentation Number 103

ABSTRACT:

Abstract Title:	1H NMR Metabolite Analysis of Light Inducible Genes in Neurospora crassa		
Presenter:	Nathan Richardson		
Mentor:	Kathleen McAteer		
Additional Authors:	Nicole Knabe, Jay C. Dunlap, Jennifer J. Loros, Scott E. Baker, and Kathleen McAteer		
Presentation Type:	Poster	**Major and College:**	Neuroscience/Veterinary Medicine
Category:	Molecular, Cellular, and Chemical Biology		

Nuclear magnetic resonance spectroscopy (NMR) is a valuable tool used to identify and quantify metabolites in complex chemical mixtures. Using the model fungal organism, Neurospora crassa, metabolites were analyzed from a wild type strain to evaluate biosynthetic products over the time-course of a light induction experiment. The organism was isolated from light for a period of 48 hours and then exposed to light for the following 2 hours. Samples were generated from time points of 0, 15, 30, 60, 120, and 240 minutes following light induction. Intracellular aqueous and lipid fractions were generated. Each of these samples was analyzed by NMR spectroscopy to determine how light induction influences levels of different metabolites over time. We are working to correlate levels of metabolites from our 1H NMR experiment with previously published transcriptome data (Chen et al.). Our comparative analysis lays the foundation for future research related to light influenced metabolite synthesis.

Presentation Number 104

ABSTRACT:

Abstract Title:	A Northwestern Desert Cure		
Presenter:	Hannah Robinson		
Mentor:	Jeff Sanders		
Presentation Type:	Poster	**Major and College:**	History/Liberal Arts / Honors
Category:	Humanities		

Picture a place free from disease, with pure air, and a humidity-free climate. Imagine a northwestern town with all the amenities of a city, but without the crowded streets, pollution, and overpopulation that accompany urban living. This place is Vineland, a highly planned city created by a group of Boston businessmen who owned the Lewiston Clarkston Improvement Company (LCIC). Vineland is now present day Clarkston, Washington a place not particularly known today as a health destination, but in the 19th century the boosters of Vineland promoted the health of the environment to attract Easterners and the money they brought with them. Health boosters catered to a wealthier class of ill people that could afford to travel great distances in search of healthier locales. The phenomenon of boosterism focused on health in Washington State is understudied. Analysis of advertisements published by the LCIC shows that the company promoted Vineland, through booster pamphlets that featured descriptions of Lewiston Valley's environment as beneficial to personal health. Comparison of advertisements from Vineland to advertisements in other western towns like Colorado Springs and Los Angeles show that the tactic of health boosterism was used for similar monetary motivations in Washington State. This project expands the historical knowledge of 19th century Washington booster tactics and settlement patterns. The Lewiston Clarkston Improvement Company engineered a "perfect" western town, a place healthy and close to nature but also economically bountiful because of irrigation

Presentation Number 105

ABSTRACT:

Abstract Title:	Discovery of Biomass Degrading Genes from Uncultured Rumen Microbes		
Presenter:	Erik Hawley		
Mentor:	Matthias Hess		
Presentation Type:	Poster	**Major and College:**	Biology/Sciences
Category:	Molecular, Cellular, and Chemical Biology		

Cellulosic plant material provides a renewable alternative to current fossil fuels. Microbial deconstruction of these plant materials has been shown to successfully produce biofuel products but problems lie in the efficiency of the enzymes currently available. The low activity of these enzymes towards biofuel substrates provides a hurdle which many scientists are trying to overcome. In order to find new cellulolytic enzymes, researchers have been looking into natural lignocellulolytic systems including the cow rumen, which is one of the most efficient biomass degrading ecosystems known today The microbial community of the cow rumen is able to convert grasses rich in hemicelluloses, celluloses and other polysaccharides into monomeric and dimeric sugars, but our inability to cultivate the majority of rumen microbes prevented the large-scale discovery of new biomass-degrading enzymes. With the recent decrease in sequencing costs and advanced analysis software direct sequencing of DNA extracted from an environmental sample (known as Metagenomics) has been proven to be a very efficient approach to i) identify several thousands of biomass-degrading enzymes and to ii) assemble genomes from the microbial community that inhabits the cow rumen (Hess et al, 2011).

In the project presented here, we analyze four of the assembled biomass-degrading genomes in more detail. In particular, we are interested in the metabolic pathways encoded in these genomes and the genes that underlie the biomass-degrading phenotype of these rumen microbes that have not been cultured until today. Functional assays to determine the physicochemical properties of the heterologously expressed biomass-degrading genes will be performed to evaluate their potential for industrial biomass conversion.

Presentation Number 106

ABSTRACT:

Abstract Title:	Characterization of Differentially Expressed Genes in Apple (Malus x domestica)		
Presenter:	Ryan Christian		
Mentor:	Amit Dhingra		
Additional Authors:	Scott Schaeffer, Amit Dhingra		
Presentation Type:	Poster	**Major and College:**	Agricultural Biotechnology/Agricultural, Human, and Natural Resource Sciences
Category:	Molecular, Cellular, and Chemical Biology		

In 2010, the full genome of the domesticated apple (Malus x domestica Borkh.) was published by an International Consortium. However, knowing the genome is one task; understanding it and making sense of it is another task altogether. Characterization of the genes, particularly through transcriptomics, remains to be explored fully, and is where the effort to fully understand the genetics truly lies. A transcriptomics analysis of Honeycrisp and Royal Gala apples identified a multitude of genes that were differentially expressed between the two varieties. These genes were subsequently isolated, amplified, and sequenced. Finally, bioinformatics methods were utilized to test the sequence and predicted protein against known genes and proteins to determine putative functions. Of the four genes that this project has focused upon, the bioinformatics work predicted a 'purine permease' from castor (Ricinus communis) and a 'cinnamyl alcohol dehydrogenase' from Poplar (Populus trichocarpa). The other two genes turned up predicted proteins with no known function. Moreover, none of these genes have been characterized to determine their function in the ripening of fruit. Understanding the function of unknown genes could potentially increase the efficiency of Rosacea fruit breeding by identifying desirable or undesirable characteristics that can be utilized in targeted breeding assisted by genetic analysis. Each of the four genes that were identified was subsequently amplified utilizing PCR, and used to transform E. coli to create constructs for tobacco (Nicotiana tabacum) transformation using particle bombardment. The bombarded leaves were placed on antibiotic selection media and grown via tissue culture until large enough to transplant into soil. The predicted purine permease gene has been successfully used to transform tobacco already, and although there have been no obvious phenotypic differences; it is far too early to be able to definitively describe phenotypes and describe functions of the gene. Further work with the permease gene will be done in Arabidopsis to determine if the gene will complement permease knockout mutants. The remaining three genes are being prepared for tobacco transformation, and resulting transgenic plants will be phenotyped to assess the function of these unknown genes.

Presentation Number 107

ABSTRACT:

Abstract Title:	Olivine: Unearthing Magma Evolution at Springerville Volcanic Field, Arizona		
Presenter:	Kaitlyn White		
Mentor:	Michael Rowe		
Additional Authors:	Michael Rowe, Scott Boroughs		
Presentation Type:	Poster	**Major and College:**	Enivronmental Science/Sciences
Category:	Engineering and Physical Sciences		

Springerville volcanic field is the third largest monogenetic field in the United States. It consists of about 400 vents in a 1,200 sq mi radius. Volcanic activity occurred approximately 3.08-0.75 m.y., and during this time Springerville's locus of active volcanism moved from west to east, coincident with a shift in lava composition from tholeiitic to alkali-olivine basalt. Springerville is located in eastern Arizona at the southern margin of the Colorado Plateau. By combining whole rock and trace element geochemistry, we hope to interpret magma evolution and potential variations in mantle sources for Springerville volcanism in order to unravel the dynamics of what is driving volcanism in this tectonically complex area.

We analyzed olivine from nine samples on a JEOL 8500F field emission electron microprobe for major and trace (Mn, Co, Ni, Ca, Al) elements. These samples include six different basalt types based on variations in mineralogy found within the Springerville volcanic field. Group 1 (olivine-rich) has a range of forsterite (Fo) from 85.5-49.5 mol % and trace elements varying from 8418-1378 ppm Mn, 5987-1335 ppm Ca, and 1843-72 ppm Ni. Trace element abundances are generally lower in Group 2 (picritic) although Fo contents are higher (87.6-64.2 Fo mol %). Group 3 (plagioclase-olivine) and Group 4 (hornblende-olivine) are generally more evolved with lower Ni and Fo values (less than Fo 82). Groups 5 (pyroxene-olivine) and 6 (diktytaxitic) have similar trace element compositions to the other groups but generally less variability in forsterite (Fo 83-69).

Olivine phenocrysts are significant probes of parental melt composition for two reasons. First, olivine is often the first phase to crystallize at low pressures in most mantle delivered magmas. Second, olivine crystallizes over a range of temperatures. Therefore olivine compositions may be used to track magma evolution. Sobolev et al. 2007 previously estimated the mixing proportions of melts delivered from different geodynamic settings and found that trace element abundances in olivine can be utilized to quantify variations in mantle composition (peridotite versus pyroxenite). Thus variations in olivine composition in conjunction with whole rock data may indicate changes in mantle sources and different magma evolution prior to eruption.

Presentation Number 108

ABSTRACT:

Abstract Title:	Role of Interleukin 16 in the Induction of Primordial to Primary Ovary Follicle Transition		
Presenter:	Amanda Feeney		
Mentor:	Michael Skinner		
Additional Authors:	Eric Nilsson, Michael Skinner		
Presentation Type:	Poster	**Major and College:**	Neuroscience/Veterinary Medicine / Honors
Category:	Molecular, Cellular, and Chemical Biology		

The follicles in the arrested primordial follicle pool in mammals undergo transition from the arrested primordial to the growing primary stage over a female's reproductive lifespan. After primordial to primary follicle transition, a follicle will continue to develop until it undergoes atresia, or ovulation occurs. Menopause occurs when the pool of primordial follicles has been depleted. Previously, a gene bionetwork analysis was conducted to determine what genes were regulated in the ovary during follicle transition. Interleukin 16 (IL-16) appeared to be highly connected and regulated in concert with many other genes involved with follicle transition. IL-16 has been shown to participate in cell proliferation as a growth factor. The current study was conducted to investigate the effect of IL-16 on primordial follicle transition. Ovaries were removed from 4-day old rat pups and then cultured whole for ten days with three individual concentrations of the IL-16 protein (20 ng, 100 ng, and 500 ng). Observations indicate that treatment of these ovaries with IL-16 increases the proportion of growing follicles as compared to the non-treated controls. When an immunohistochemical staining procedure was preformed, IL-16 as well as its CD4 receptors was detected in granulosa cells associated with developing follicles. Together, these data support the hypothesis that IL-16 plays a regulatory role in follicle transition. Understanding the regulators of early follicle development could lead to a solution for infertility in mammals.

Presentation Number 109

ABSTRACT:

Abstract Title:	Acute Desensitization of Afferent Vagus Nerve Activation by Cholecystokinin (CCK) at the CCK-1 Receptor		
Presenter:	Marcus Lacey		
Mentor:	Dr. James Peters		
Additional Authors:	Dr. James Peters, Dr. Steve Simasko		
Presentation Type:	Poster	**Major and College:**	Neuroscience/Veterinary Medicine
Category:	Molecular, Cellular, and Chemical Biology		

The gut peptide cholecystokinin (CCK) has a key role in the process of satiation by an action on vagal afferent neurons. The CCK-1 receptor has both high and low affinity sites and is reported to rapidly desensitize following activation. Insight into the mechanism(s) of CCK receptor desensitization in vagal afferent neurons could provide important information for preventing and treating obesity. To study CCK-1 receptor desensitization at both high and low affinity sites we used measurements of intracellular calcium levels via fluorescent imaging techniques on cultured nodose neurons (vagal afferent cell bodies). CCK concentrations (0.1, 1, 10 nM) were each applied for multiple lengths of time (5, 10, 20 min). The Kd values for high and low affinity sites are approximately 0.1 and 1 nM, respectively, therefore, at each concentration studied, CCK would activate a proportion of the high and low affinity sites allowing us to quantify site-specific changes. In ~30% of neurons CCK produced a dose-dependent increase in cytosolic calcium. At 1 and 10 nM CCK the responses showed an initial calcium spike which rapidly decayed to a plateau at ~60% of the peak value; suggesting acute desensitization. In contrast, the response at 0.1 nM was smaller, largely lacked the initial spike, and produced oscillating calcium transients. The time-course for recovery from desensitization was determined by testing a CCK challenge at various times following the initial exposure. Recovery from desensitization occurred over 5 to 10 min. Lastly, we found the initial spike can be re-activated during the plateau period by introducing 10 nM CCK during the plateau phase of a 1 nM challenge; suggesting additional receptors can be recruited to increase the response despite constant perfusion with 1 nM CCK. Our findings suggest low and high affinity binding of CCK at CCK-1 receptors can be distinguished by response magnitude and differences in acute desensitization; with the spike produced by an action at the low affinity site and the plateau via the high affinity site. These distinct signaling profiles may arise via different cellular signaling cascades and could initiate different reflex processes mediated by the vagus.

Presentation Number 110

ABSTRACT:

Abstract Title:	Comparative Analysis of Countries in Need of "Potable Water Product Solutions" Using a Decision Matrix		
Presenters:	Vance Creekpaum, Haydn Ritter, Lina Romero, Craig Murchison, Ramya Ramanathan, Curran Scott, Anil Shah, and Hue Xiong		
Mentor:	Tracy Morgan		
Presentation Type:	Poster	**Major and College:**	Mathematics / College of Sciences
Category:	Social Sciences		

This project analyzes twenty countries around the world in need of potable water. The availability of potable water has a strong positive impact on human capital and stable political development. Identifying which countries are in most dire need of potable water is essential for socially responsible businesses and humanitarian NGOs seeking to improve of water quality and address its scarcity world-wide. Using country commercial guides and world health agency data, a decision matrix readily identifies which countries are in most dire need of potable water product solutions and technologies. This signifies a philosophical shift in identifying business opportunities in emerging markets: one based on the greatest need in lieu of those with the greatest profit margin.

Presentation Number 111

ABSTRACT:

Abstract Title:	C-Nitroso Reagents as New Activators for Thioacid Amidation		
Presenter:	Ethan Rosser		
Mentor:	Ming Xian		
Presentation Type:	Poster	**Major and College:**	Chemistry/Sciences
Category:	Engineering and Physical Sciences		

Amide bonds are abundant in many highly important biological molecules such as peptides, glycopeptides, and proteins. Due to their biological importance, a great deal of attention has been focused on developing efficient methods of accessing amide bonds. Traditional methods have some limitations such as slow reaction rates and difficulty in obtaining a final product with the correct chemical structure. However, recent studies have revealed thioacids to be useful precursors for amino acid synthesis. Reports in literature have demonstrated many advantages of thioacid-based methods compared to traditional methods such as faster reaction rates, milder conditions for operation and good desired product recovery. Dr. Xian's research group, with whom I have been conducting my undergraduate research, has recently developed a new strategy to utilize thioacids in amino acid synthesis. My research with Dr. Nelmi O. Devarie in the Xian laboratory has been focused on testing this strategy with various substrates and reaction conditions to optimize and expand the scope of the reaction.

Presentation Number 112

ABSTRACT:

Abstract Title:	Population Projections Using Age- and Stage-Based Vital Rates		
Presenter:	Spencer Payton		
Mentor:	Richard Gomulkiewicz		
Presentation Type:	Poster	**Major and College:**	Theoretical Mathematics/Sciences
Category:	Organismal, Population, Ecological, and Evolutionary Biology		

A common method of population projection is to determine vital rates for a population based on the ages of the individuals in the population. These rates are then organized in what is called a Leslie matrix and are used to determine the population size after t time intervals. This is commonly used, as vital rates often vary over age in many populations. Another similar method is to determine the vital rates based on the stages or sizes of the individuals, such as in plants, insects, or fish. The organized matrix from these stage-based vital rates is called a Lefkovitch matrix. In a perfect situation, these methods are combined and result in a Goodman matrix composed of vital rates based on age and stage. However, this method can often be impractical or infeasible. These vital rates are incredibly difficult to attain, and often times are never even known for sure. In this case, we must settle on using only age or stage based vital rates for our projections. This study aims to determine, in the case where we must settle for one method or the other, which is the more reliable method.

Presentation Number 113

ABSTRACT:

Abstract Title:	Insects of Washington		
Presenter:	Claire Walsh		
Mentor:	Laura Lavine		
Presentation Type:	Poster	**Major and College:**	Digital Technology and Culture/Liberal Arts
Category:	Arts and Design		

I have made a professional poster of the “Insects of Washington State” as an informational and marketing tool for the WSU James Entomological Museum. This has tapped into my talents as a graphic designer and produced a poster for outreach for the Museum. The WSU Museum has over 3 million insects, many of which are from Washington that I have used to put together the graphics and basic information for the poster. I have taken photographs, collaborated with Dr. Merrill Peterson at Western Washington University, and designed the poster layout itself.

Arthropods are completely fascinating in their composition. Their message and symbolism is also distinct as insects are universal. Everyone across the globe should know what an ant looks like and everyone in Washington state should know what the common and beautiful insects of this state are. This poster shows insects from Washington state and gives brief information on their biology and habitats in order to bring people in and understand the insects living around them and how they affect their everyday life.

Presentation Number 114

ABSTRACT:

Abstract Title:	Fuel Cells as Auxiliary Power Units in Commercial Aircraft		
Presenter:	Quinn Langfitt		
Mentor:	Dr. M. Grant Norton		
Presentation Type:	Poster	**Major and College:**	Mechanical Engineering / Engineering Architecture / Honors
Category:	Engineering and Physical Sciences		

As fossil fuels rise in cost and environmental concerns surrounding their combustion become more intense, Boeing is looking for cleaner and more efficient ways to use their fuel aboard commercial aircraft. Currently, most aircraft use jet turbines as auxiliary power units (APUs), however these are highly inefficient and pose health concerns for airport workers due to runway emissions. Looking to the future Boeing would like to use fuel cells as a replacement for jet engine APUs. These fuels cells would still run on Jet-A fuel, but be capable of producing more electricity, more efficiently, and with far fewer harmful emissions than our current APUs. A critical requirement for developing a commercially viable APU is the development of a catalyst that can convert fossil fuel-based aviation fuels into a form that can be used by a fuel cell. The solution is to use molybdenum dioxide-based catalysts which represent a transformative approach to fuel-flexible fuel cell technology because of their ability to reform and electrochemically oxidize fossil fuels.

Presentation Number 121

ABSTRACT:

Abstract Title:	The Use of Color to Announce Enrichment to Pigs		
Presenter:	Eugenia Lo & Erik Walker		
Mentor:	Ruth Newberry		
Presentation Type:	Poster	**Major and College:**	Animal Sciences/Agricultural, Human, and Natural Resource Sciences / Honors
Category:	Applied Sciences		

The swine industry is in need of an easily implemented method that reduces pig stress when encountering humans. We hypothesized that the appearance of a person wearing distinctively-colored clothing could act as a cue for pigs, letting them know that a pleasant experience was going to occur. We used access to a preferred form of environmental enrichment, rope, as the pleasant experience. We hung a cotton rope in each of 8 experimental pens twice a day, for 5 minutes on each occasion, while a person in an orange vest stood beside the pen. In 8 control pens, pigs were given continuous access to the cotton rope enrichment, and a person wearing an orange vest stood beside each pen twice a day for 5 minutes. Half the pens on each treatment were exposed to one person and the remaining pens were exposed to a second person. Both people wore blue overalls under the orange vest, typical of those worn by the animal care staff. After 5 to 7 days, we observed the time taken for the first and fourth pig in each pen to make contact with a person standing in the pen. We made observations under four conditions, when the person in the pen was either familiar (same person seen previously) or unfamiliar (the other person), and wearing an orange vest or no vest (i.e. just wearing blue overalls). The order of exposure to these four conditions was balanced across pens. We did not find any consistent differences in responses of the pigs to the people under these four conditions, or depending on whether or not the pigs were given the chance to associate access to the rope with the orange vest. It is possible that responses to a person in an orange vest outside the pen were not generalized to the same person or clothing when inside the pen.

Presentation Number 122

ABSTRACT:

Abstract Title:	Water level drawdown is a hot moment for methane ebullition in a small eutrophic reservoir, Lacamas Lake, Washington		
Presenter:	Maria Glavin		
Mentor:	John Harrison		
Additional Authors:	Bridget R. Deemer, John A. Harrison		
Presentation Type:	Poster	**Major and College:**	Biology/Sciences
Category:	Engineering and Physical Sciences		

Methane (CH4) is a potent greenhouse gas responsible for approximately 20% of the global greenhouse effect. Recent work suggests that lakes and reservoirs are a significant source of CH4, and direct bubble flux from reservoirs to the atmosphere (ebullition) is likely to be a very important pathway for CH4 transfer. Currently, however, magnitudes and controls of this CH4 flux pathway are poorly characterized, particularly in temperate zone reservoirs. The main goals of this project were: (1) to obtain estimates of summertime methane ebullition rates in a temperate reservoir, and (2) to quantify the effects of a controlled reservoir drawdown on methane ebullition. To accomplish these goals, we constructed four in situ bubble traps capable of recording ebullition events at high frequency and deployed these traps at both shallow and deep water sites between 9 Aug and 27 October 2011. Gas samples were collected at least weekly and were analyzed for CH4 on a Hewlett Packard gas chromatograph.

Between 8 and 15 September 2011, the water level in the lake dropped by approximately 1.5 meters and this event coincided with a 36-fold increase in CH4 ebullition rates (whole lake average was 2.07 mg CH4 m-2 d-1 pre-spill and 75.87 mg CH4 m-2 d-1 during-spill). Although bubble flux increased during dam spill across all sites monitored, there was substantial variation amongst sites, with highest bubble fluxes observed in the shallow parts of the lake, and significantly lower fluxes observed in the deepest part. A comparison of summertime and dam spill CH4 ebullition rates suggests that as much as 80% of total summertime CH4 ebullition occurred during a one week spill event. These results highlight the potential role of reservoir management in controlling reservoir-to-atmosphere fluxes of an important greenhouse gas.

Presentation Number 123

ABSTRACT:

Abstract Title:	The Functional Role of NR3C1 in Ovarian Biology		
Presenter:	Hannah Balash		
Mentor:	Dr. Jim Pru		
Additional Authors:	Elizabeth W. Cashell, Cindy A. Pru, James K. Pru		
Presentation Type:	Poster	**Major and College:**	Basic Medical Sciences; Spanish Sciences; Liberal Arts
Category:	Molecular, Cellular, and Chemical Biology		

The three stages of the ovarian cycle (i.e., folliculogenesis, ovulation, and luteinization) are regulated by hormones released by the hypothalamus and pituitary. Glucocorticoids (GCs), which signal by activating the nuclear GC receptor (NR3C1) are involved in a number of biological processes and act on tissues by regulating gene transcription, including the ovary. Local tissue availability of GCs is regulated by two enzymes that increase (i.e., 11beta-hydroxysteroid dehydrogenase 1, HSD11B1) or decrease (11beta-hydroxysteroid dehydrogenase 2, HSD11B2) the availability of GCs. NR3C1, HSD11B1 and HSD11B2 are dynamically expressed in the ovary. The exact role and requirement of GC signaling in the ovary remains unclear. While much has been studied regarding excessive GC signaling in the ovary, no studies have evaluated the consequences of eliminating GC signaling. Therefore, the objectives of our studies were to: 1) study ovarian expression of NR3C1, HSD11B1 and HSD11B2; and 2) determine the functional requirement of NR3C1 using conditional gene knockout (cKO) approaches. Gene expression studies revealed that NR3C1 is up-regulated in antral follicles and remains elevated during luteinization. Real time RT-PCR data confirm that Hsd11b2 is expressed predominantly in small preantral follicles, while Hsd11b1 becomes up-regulated with Nr3c1 around the time of ovulation. The expression data suggest that GC signaling is important for ovulation. To test this idea, we completed cKO studies for NR3C1 using two approaches. First, floxed Nr3c1 mice (Nr3c1fl/fl) were crossed with a second transgenic mouse that expresses cre recombinase in ovarian granulosa cells. Deletion of Nr3c1 in granulose cells of early follicles in these mice revealed no effect on ovulation or fertility. However, when Nr3c1fl/fl mice were crossed with another transgenic mouse line conditionally deleted Nr3c1 in mature follicles and luteal tissue, we noted a 30% decrease in the number of pups born to cKO female mice compared with control females. Ongoing studies will determine if these cKO female mice are defective in ovulation and what genes are ultimately regulated by GCs in the ovary. These studies have implications for the livestock industry and are meaningful for human reproduction, in finding ways to combat infertility and failed pregnancy.

Presentation Number 124

ABSTRACT:

Abstract Title:	**Determining Soil Spatial Variability Using Electric Conductivity to Further Understand and Better Manage Orchards in the Pacific Northwest.**		
Presenter:	Patrick Colbert		
Mentor:	Jim Durfey		
Presentation Type:	Poster	**Major and College:**	Agriculture Technology and Management: Agricultural, Human, and Natural Resource Sciences
Category:	Applied Sciences		

Washington State's tree fruit producers have long known that within their orchard systems there are many variables that affect the quality, quantity, uniformity and the cost of production for their fruit. Typically the most important and influential variable within the orchard is the productivity of the soil. Within a single block of trees, soils can range from sandy/gravely on the hillsides to fine alluvial silts and clays in the bottoms. Understandably these soils do not produce evenly. Despite the large amount of soil variability in PNW orchards, growers typically apply their expensive inputs equally across a given block. This research project is designed to determine how much variability exists by using a soil electric conductivity (EC) sensor. The EC sensor is able to detect soil conductivity, which directly relates to its fertility as well as its production capabilities. Four orchards from around the State were sampled and analyzed. The EC sensor connects to a personal handheld computer and is then pulled through each row of the orchard behind a 4 wheeler. The sensor sends information to the handheld computer, which is additionally recording the exact location in the field at a frequency of every 2 seconds. This information is then processed using precision agriculture software and made into soil quality zone maps. These maps allow for the collection of soil samples within these zones that further enhances our understanding of that soil's qualities, as well as its needs. This level of information makes it possible for the grower to apply inputs variably across the block using a technique known as variable rate fertilizing (VRF). VRF works using precision agriculture software and equipment to automatically apply different concentrations of fertilizer as it moves across the field. This system of application has been shown to use fertilizer inputs more cost effectively, promote greater orchard uniformity, and even increase total production. In addition to soil productivity gains, EC readings in combination with soil samples give the grower important information about soil pH, water holding capacity, structure, and organic matter content, all of which can be used to better manage a commercial orchard system.

Presentation Number 125

ABSTRACT:

Abstract Title:	Separations and Flow Regimes in Continuous Counterflow Centrifuges		
Presenter:	Justin Bahrami		
Mentor:	Dr. Cornelius Ivory		
Presentation Type:	Poster	**Major and College:**	Mechanical Engineering Engineering and Architechture
Category:	Engineering and Physical Sciences		

Separations performed in centrifuges play an integral role in biological research. The next generation of centrifuges must achieve high resolution with simple processing. Continuous counterflow centrifuges show promise to meet this need by creating equilibrium positions for target cells, balancing the high gravitational field against drag from continuous fluid flow. Our project is to build an innovative centrifuge chamber that utilizes Coriolis forces to encourage fluid mixing not seen with low Reynolds numbers. This mixing will overcome the undesirable laminar flow conditions and provide uniform flow necessary for separation to occur.

Presentation Number 126

ABSTRACT:

Abstract Title:	WRITING REVISION IN THE MAJOR		
Presenter:	Timothy McCord with C. Calhoun, A. Burns, H. Maeda		
Mentor:	L.D. Bruya		
Presentation Type:	Poster	**Major and College:**	Kinesiology / Business
Category:	Applied Sciences		

Revision provided opportunity to define arguments and find interconnections between pieces of information. But, since writing in the discipline of Kinesiology was not uniform, a system of text-specific feedback was required. The purpose of this study was to examine the effect of revision opportunities on gender.

Participants: University students were divided into a group of males ($G1_M$; n=11) and females ($G2_F$; n=11).

Instrumentation: Trained undergraduate Teacher Assistants scored papers. Assignment protocols were explained by the instructor. Previous drafts were stapled in sequence to the newest revision. This provided augmented feedback. **Statistics.** A two tailed t-test was used to observe differences between male and female attempts at revision ($\alpha = 0.05$).

Results: Females recorded a higher number of revisions. No statistical differences were found (p=.08). The hypothesis was accepted. **Discussion.** Students were provided the opportunity to revise a written assignment as frequently as time would allow (usually 5-6 times). In addition, TA training seminars and workshops were conducted immediately prior to grading sessions in which grading rubrics were discussed and practiced. Over-all, females demonstrated a slight advantage in number of revisions. Explanation for this slight variation was related to long held expected gender bias. "…[Males] remain[ed] unmotivated and demonstrate[d] a particular resistance to revisiting and revising… written work (Jones & Myhill, 2007, p. 458).

REFERENCES

Jones, S. & Myhill, D. (2007). Discourses of difference? Examining gender differences in linguistic characteristics of writing. *Canadian Journal of Education, 30*(2), 456-482.

Presentation Number O-1

ABSTRACT:

Abstract Title:	Using Animal Assisted Therapy in Speech Language Pathology: A Review		
Presenter:	Erin Sebring		
Mentor:	Dr. Phyllis Erdman		
Presentation Type:	Oral	**Major and College:**	Speech and Hearing Science/Liberal Arts / Honors
Category:	Social Sciences		

The goal of this research was to determine whether using animal assisted therapy (AAT) in the field of speech language pathology is effective and to examine the possible benefits and risks. To accomplish this, a review of relevant published literature was conducted. A number of general benefits to animal assisted therapy as well as outcomes related more specifically to speech language pathology were discovered. The general benefits include lowered stress, anxiety, depression, and loneliness and better physical health. The advantages of AAT in speech and language therapy are increased verbal interaction, possible improvements in language development, improved nonverbal interactions, increased social interactions, behavioral improvements, and a variety of aspects that enhance therapy sessions for the client. It was also found that there are risks of animal assisted therapy including safety, sanitation, fear of animals, allergies, and extreme attachment to animals. These risks need to be addressed in order for an AAT program to be successful. It was concluded that while there are many advantages to animal assisted therapy in speech language pathology, there are also a number of limitations to the research including small sample sizes, lack of research that addresses the long term results, programs that are mislabeled as AAT, and the difficulty of showing quantitative results.

Presentation Number O-2

ABSTRACT:

Abstract Title:	New York Counterpoint: Exploring the Techniques of Taped Music		
Presenter:	Graham Dart		
Mentor:	Dr. Shannon Scott		
Presentation Type:	Oral	**Major and College:**	Music Performance - Woodwind Option/Liberal Arts / Honors
Category:	Arts and Design		

Steve Reich is one of the most renowned American composers of the post-modern era. Using a style that is generally referred to as minimalism, Reich has affected the perception of music and has influenced many contemporary composers. Among his compositions is New York Counterpoint (1985), written for one live performer on clarinet and recorded sound. In the recorded part there are ten clarinets, three of them doubling bass clarinet. The piece is challenging if one chooses to create the recorded part, as encouraged by the composer, because of the repetitive nature of the recorded parts, some of which contain a single short phrase that is repeated for an entire movement. With current recording technology, the process can be simpler by recording the core materials of each part in each movement, then multiplying and editing those materials together to create whole parts. Work began on analyzing and identifying the core materials. Once identified, recording and editing commenced in the Washington State University Recording Studio. Early concerns about the legitimacy of this method, such as attaining the smoothness and most natural sound out of each edited part and the managing of dynamics, did not materialize as the recording studio could capably and easily edit the core materials into large parts. In five recording sessions, all materials were recorded and edited and a final copy of the recorded sound for the piece was created. The piece was presented successfully at a Full Convocation at the School of Music on April 12, 2011, and at a degree-required senior recital on April 19, 2011. The project was deemed a success based on the efficiency and relative ease of creating the recording, and it is hoped that this process will encourage other performers with the technological capability to program this composition.

Presentation Number O-3

ABSTRACT:

Abstract Title:	The Customer is Not Always Right: Categories of Customer Service Sabotage		
Presenter:	Gerardo Anaya		
Mentor:	Dr. Dogan Gursoy		
Presentation Type:	Oral	**Major and College:**	Hospitality Business Management / Business
Category:	Social Sciences		

Research in studies of customer behavior has revealed the emergence of deviant customer behaviors that ruin the service experience for others. Particularly, this research discovered a new concept called customer service sabotage: an act by a customer that negatively affects the service experience for themselves, other customers, and employees. This study categorized types of customer service sabotage by analyzing anecdotal responses collected from affected customers and employees. Secondary data included stories which were collected from various customer-related websites. Findings revealed seven categories of customer service sabotage, and ranged in deviant behavior. Through examining these categories, service managers can identify customer service sabotage behaviors in customers, and implement preventive measures to preserve service experiences.

Presentation Number O-4

ABSTRACT:

Abstract Title:	Personal Life History Project		
Presenter:	Steven Baldwin		
Mentor:	Dr. R. Charles Weller		
Presentation Type:	Poster	**Major and College:**	Public Relations / Communication
Category:	Humanities		

For my personal life history project, my goal was to write an essay about my life. I wanted to set up the essay like a book with different chapters and central themes that have shaped my character to what it is today. I wanted readers to truly engage themselves in the essay and become interested in my story like it was a movie. It explains why each chapter begins with a movie quote from some of my favorite films. Each chapter deals with pivotal times in my life where I was confronted with challenges and became the person I am today. In addition, I also included the greatest moments of my life in the essay where people could relate to the same stories with their friends and family. I felt by adding lows and highs of my life, I could go back and remember those moments and share them with the readers of my story. I would love for everyone to read my life history essay because of the effort I gave and the sincere admiration I held towards the project. I have never gotten the opportunity to write about myself in this much detail. Moreover, I wanted people to read my story as an inspiration so they could remember their own life changing moments. I know each person has dealt with difficult times in their lives and my overall goal was to show everyone that if you work hard and are kind to people, then great things can come in any direction. I really believe with the hardships and obstacles I have faced in my life, I am more willing than ever to work hard for my desires. This may seem too far away to think about, but four years from now, I believe this project might still stand as my favorite assignment from a professor.

Presentation Number O-5

ABSTRACT:

Abstract Title:	Gender and Exile in the French Reformation: The Experiences of Refugee Women in Calvin's Geneva, 1541-1544		
Presenter:	Kristen Coan		
Mentor:	Jesse Spohnholz		
Presentation Type:	Oral	**Major and College:**	History/Liberal Arts
Category:	Humanities		

Intense religious persecution in sixteenth century France caused several thousand followers of the burgeoning Reformed faith to flee in search of religious freedom and toleration. Many of these refugees settled under the spiritual leadership of John Calvin in nearby Geneva. A critical participant in the Reformation and a refugee himself, Calvin had been afforded a sort of spiritual and religious primacy by the city of Geneva in the 1540s. Calvin saw the experience of exile as a critical feature of proper faith, a tribulation required by God for the elect to reach ultimate salvation. The ecclesiastical institution of the consistory was key to Calvin's efforts to reform the Genevan population and its constant influx of refugees.

The experience of female refugees in Calvin's Geneva is an example of a critical reformation experience that currently lacks in historic scholarship, making the utilization of gender as a historical category of analysis particularly beneficial. Gendered history is a useful method because it not only seeks to make women visible as active historical participants but also debases the belief that women are a homogenous group because of biological characteristics. A gendered approach allows for the analysis of women as a multifarious group with varied motives and historical experiences.

By employing the analytical category of gender, this research project seeks to rectify historical deficiency through investigating exile in Geneva by utilizing Calvin's commentaries on the Christian Bible in conjunction with early consistorial records. Calvin's understanding and explanation of the experience of exile varied on the basis of gender not only in his theological messages and prescriptive gender roles but also in the actual experiences of women in Geneva. He was incredibly demanding of Geneva's female inhabitants, offering few models of female exiles while simultaneously enacting a gendered double standard that few, if any, women could live up to. Women in Calvin's Geneva experienced exile in distinctive ways from men with regard to the attainment of citizenship, the toleration of domestic abuse, the application of the doctrine of predestination, and the crucial idea of suffering as related to religious exile.

Presentation Number O-6

ABSTRACT:

Abstract Title:	Comparative analysis of countries in need of “potable water product solutions” using decision matrix and current country commercial guides		
Presenter:	Vance Creekpaum		
Mentor:	Tracy Morgan		
Presentation Type:	Oral	**Major and College:**	Mathematics/Sciences
Category:	Social Sciences		

This project analyzes twenty countries around the world in need of potable water. The availability of potable water has a strong positive impact on human capital and stable political development. Identifying which countries are in most dire need of potable water is essential for socially responsible businesses and humanitarian NGOs seeking improvement of water quality and address its scarcity world wide. Using country commercial guides and world health agency data, a decision matrix readily identifies which countries are in most dire need of potable water product solutions and technologies.

Presentation Number O-7

ABSTRACT:

Abstract Title:	**Palouse-Clearwater Environmental Institute Playscape**		
Presenter:	David Hewitt and Brianna Martensen		
Mentor:	Kathleen Ryan		
Presentation Type:	Oral	**Major and College:**	Landscape Architecture/Agricultural, Human, and Natural Resource Sciences
Category:	Arts and Design		

Our design workshop unites community members and university students from several disciplines in the design and development of a playscape master plan for the Palouse-Clearwater Environmental Institute. Located in a rural landscape, the playscape experience focuses on providing children with direct contact to nature through the configuration of earth, materials and plant forms with the ultimate goal of education and exploration. Playscape activities are intended to appeal to a child's innate curiosity rather than prompting typical play activities such as swinging or sliding. Children are encouraged to interact with the forms and concepts derived from the natural materials which corresponds to the increased awareness that access to nature through benefits the social and educational development of children. Our first step was to organize a design charrette (workshop) between PCEI, affected children and students from landscape architecture, interior design, architecture, construction management, and kinesiology to identify problems and seek out solutions in creating an engaging playscape. Teams comprised of each discipline designed solutions to meet both play behavior outcomes and appropriate motor skill development. As a result, students discovered the value of inter-disciplinary team-work and expressed a desire to work within these parameters again. The design workshop as a venue was successful in allowing students from multiple disciplines to work together, mirroring a cross-disciplinary project in the professional design world and producing a playscape that will benefit the community of the Palouse while influencing the lives of children for years to come.

Presentation Number O-8

ABSTRACT:

Abstract Title:	Teases on the silver screen: A comparison between teases in movies and in real life		
Presenter:	Elizabeth Janney		
Mentor:	Nancy Bell		
Presentation Type:	Oral	**Major and College:**	General Linguistics/Liberal Arts / Honors
Category:	Humanities		

Sociolinguistic studies of teasing have investigated who teases whom, what the teases entail, their purpose, as well as the degree of aggression found within teases and what this can mean for building relationships. These studies have focused on naturally occurring teases that occur in conversation and therefore offer a good example of what teases look like in real life. My research investigates the possibility of studying teases from a different source, the media. Linguistic research of the speech acts in films has shown that a correlation exists between movie speech and real life speech. These correlations can be useful in linguistic research, or in second language classrooms to teach about norms, idiosyncrasies and other oddities that vary between languages.

My research investigates teasing in films to see whether and to what extent the teases in movies imitate teases in real life as determined by previous studies of teasing. For the purposes of my research I define teasing as a non-serious speech interaction for which the target, the person being teased, is present, and the content of the tease could be interpreted as aggressive but due to playful framing is not.

I collected examples of teases from movies that were no more than fifteen years old and portrayed present-day people in real life scenarios, which ensured that the interactions between characters were correct representations of real life. The tease interactions were then transcribed using modified conversational transcription conventions and coded for the various aspects that make up the structure of a tease such as content, relationship of participants, contextualization cues and the response to the tease.

My results showed that by in large teases in movies imitate teases in real life in regards to structure and purpose, but movies deviate from real life in regards to cross gender teases and ever so slightly in the relationship between participants of a tease. Responses to teases also imitated naturally occurring responses from targets. It follows from my findings that movies could be used for further research of teasing interactions and even in language classrooms as examples for students to learn from.

Presentation Number O-9

ABSTRACT:

Abstract Title:	Wheat Exporting Company Business Plan		
Presenter:	Stefan Lungren and Eric Riedinger		
Mentor:	Kalvin Joshi		
Presentation Type:	Oral	**Major and College:**	Accounting/Business
Category:	Social Sciences		

The purpose of our research project was to determine the viability of a wheat exporting company specializing in wheat grown in the Palouse area and primarily exported to Japan. What we have come up with is a business plan that outlines not only expenses, but projects when the business will be able to pay off debts, generate returns for investors, and projected expansion. Our research highlights potential problems that will be faced and how to circumvent them. Through the financial analysis, multiple safeguards have been emplaced to ensure attractiveness to investors as well as profitability for the company.

Presentation Number O-10

ABSTRACT:

Abstract Title:	RE.M. Accesories		
Presenter:	Arianna McInnes		
Mentor:	John Osiri		
Presentation Type:	Oral	**Major and College:**	Social Sciences/Liberal Arts
Category:	Social Sciences		

In our Marketing 490 course, the goal of the class was to create a business plan or idea to pursue. For our project, we decided to start an accessory business. Recently among young women, there has been a demand for a new hair tie trend. The hair tie consists of colored elastic that is simply tied together. What sets this apart from regular hair ties that you might find at the drug store is our hair ties do not damage your hair, they are stylish and fun and they last longer than most hair ties. Currently, there are similar prototypes in small boutiques and salons, but from our market research we have found that our product very difficult to find. Thus, our goal is to make our product more easily accessible and offer more designs. We have performed market research, surveyed, obtained a business license, networked around campus, sold over 1,000 products to customers, and started a website. We have been very pleased with our data we have gathered and plan to expand our small business.

Presentation Number O-11

ABSTRACT:

Abstract Title:	Mothers in Tang China Compared to Exemplary Han Dynasty Mothers		
Presenter:	Kathryn Myers		
Mentor:	Dr. Lydia Gerber		
Presentation Type:	Oral	**Major and College:**	Biology/Sciences / Honors
Category:	Humanities		

This study explores the representations of exemplary Chinese mothers in the Han (202 BC to AD 220) and Tang (AD 618-907) dynasties and analyzes whether representations of mothers in the Tang dynasty reflect the characteristics and traits of exemplary mothers in the Han dynasty. Using English translations of Han and Tang biographies of exemplary mothers as well as Tang epitaphs, this project identified key characteristics of the exemplary mother in both dynasties and discovered that among the range of examples, mothers influenced their sons to live morally, advised their grown sons, changed their sons through educating them, and used their own wisdom to teach their sons life lessons. Remarkably, even though 400 years of history separated these dynasties, with the advent of Buddhism as one of many developments between the Han and Tang dynasties, this project discovered strong similarities between traits of good mothers over time, with the added qualification that some Tang mothers were praised for their Buddhist piety.

In exploring the reason for this similarity, two possible explanations are considered: One possibility is that there could indeed be a strong continuity of what makes a good mother between these two dynasties and possibly beyond. Alternatively, the fact that the majority of these biographies were written by the Confucian scholars who compiled dynastic histories may be chiefly responsible for the continuity of images of ideal motherhood. Han and Tang exemplary mothers alike exhibited similar strategies and characteristics as they strove to raise moral, successful sons and in this way leave their own mark on history. As mothers were infrequently recognized during their lives for the vital roles that they played in raising and influencing their children, this project contributes to our understanding of notable women's lives in Chinese history.

Presentation Number O-12

ABSTRACT:

Abstract Title:	"Embracing Cultural Empathy: a Paradygm Beyond Skills" a Workshop for Exporters		
Presenter:	Ramya Ramanathan		
Mentor:	Tracy Morgan		
Presentation Type:	Oral	**Major and College:**	Finance/Business / Honors
Category:	Social Sciences		

The one thing we can trust to be constant is change. No matter how we resist it, our world is only becoming smaller. Our neighbors are no longer the bordering cities and states; they are our bordering countries. It's important we realize that here in the workforce we are now simultaneously interacting with numerous cultures and without perspective through a global lens we are limiting our education. I believe that becoming a global citizen through volunteering, educating and constantly learning is the best way to give meaning to one's life and bring about a fruitful community. In order to achieve this, we must strive to become aware of our differences and embrace change. Not only will we be able to become closer with those we interact with but be able to better serve our society and soon the world. This pilot project is to design a workshop to promote cultural empathy abroad for those who are new to export. Simply learning cultural etiquette will no longer suffice. Learning to authentically connect with others from any background is a necessity for export business professionals. Tools for building empathy are discussed and demonstrated. We constantly worry about how to help our own race, but what about the race no one can deny they are a part of, the human race.

Presentation Number O-13

ABSTRACT:

Abstract Title:	Wu Zhao: The Scheming Confucian Wife		
Presenter:	Amanda Scott		
Mentor:	Lydia Gerber		
Presentation Type:	Oral	**Major and College:**	Communication/Communication / Honors
Category:	Social Sciences		

Wu Zhao of the Tang dynasty was both a devoted Confucian wife and a brilliant, scheming politician. She would later use her power to become the only woman emperor of China, which would have lasting effects on the view of women in that society. Having researched multiple biographies on the life of Wu Zhao and studied primary Confucian material, there is without a doubt a pattern of deliberate influence as the Confucian wife that cannot be mistaken. She used this to gain trust and power politically with the Chinese people. From her marriage and relationship to Emperor Gaozong, her ability to raise the status of her family name, her children, her weaving of networks within the inner palace women and other examples, all combine to create a character of great force and one worth exploring in further detail.

Presentation Number O-14

ABSTRACT:

Abstract Title:	The Architectural Language of Park51: Understanding Cultural and Historical Connections		
Presenter:	Samantha Sudy		
Mentor:	Phil Gruen		
Presentation Type:	Oral	**Major and College:**	Architecture/Engineering Architecture/ Honors
Category:	Arts and Design		

The 2010 proposal of the Park51 Community Center has sparked debate concerning the prospect of building an Islamic community center two blocks from the Ground Zero site in New York City. The debate seems to have polarized into two camps: those who are opposed to the construction of Park51 on the grounds of cultural insensitivity, and others who support its construction for cultural unification. Much of the press attention suggests that the painful memories associated with the September 11th, 2001 attacks have formed barriers of intolerance amongst many Americans in accepting the erection of this Islamic center. For some, Park51 might serve as too strong a reminder of the devastation caused by terrorism. And yet, if Park51 is built in such close proximity to Ground Zero, it could also symbolize an American gesture of tolerance towards Islam, embracing it in an area just blocks from where practitioners of Islam have been accused of acts of religious extremism.

In the shadow of these debates, what has been largely overlooked is the design of the proposed building - that is, the architecture of Park51. The importance of the design and, in particular, the aesthetics of the facade, which likely will be the most publicly visible characteristic, should not be underestimated. The built environment holds meaning long after controversies dwindle; others may interpret meanings initially intended by the architect differently. Some observers, for example, may have long-standing experiences with certain motifs, materials, colors, or forms, while others may make specific historical associations that produce radically different interpretations. In the case of Park51, the contexts of the proposed design raise issues that could be understood as equally controversial, although such issues were either buried or non-existent in the face of the cultural controversy that surrounded its 2010 proposal. This thesis sets out to explore some of these contexts surrounding the controversial issues dealing with Park51. Should the center be completed, architectural form will ultimately remain as the most lasting, physical reminder of a crucial period in American history. Park51's architecture will hold importance well beyond the rhetoric that initially surrounded its proposed construction.

Presentation Number O-15

ABSTRACT:

Abstract Title:	The Facebook Me: Online Audience Evaluation and Identity Presentation		
Presenter:	Katie Wheeler		
Mentor:	Dr. Kristin Arola		
Presentation Type:	Oral	**Major and College:**	Digital Technology and Culture/Liberal Arts / Honors
Category:	Humanities		

This research investigates whether operating on Facebook changes the way that college students evaluate the audience(s) of their actions and therefore changes the way they present their social identity. It tests the hypotheses that:

- The ever-widening user base of Facebook beyond college students will cause students to present a more favorable social-self online than their offline social self.
- The immediate co-presence of an audience during some actions online will force students to be more authentic to their offline self in those instances.

This question merits investigation because college students conduct a significant amount of time on Facebook. Although Facebook was originally only open to college students, it now contains users from almost every demographic. Thus, exploring the ways this widening audience alters college student's self-representations is of increasing interest. Furthermore, this research will help determine if the co-presence of an audience in time or space affects the way college students present their social self online. Finally, the body of research on Facebook, online identity, and group formation is growing, indicating that these topic areas are considered worthy of study by current scholars.

The behavior on Facebook of six of college students was studied to determine what social group they most presented themselves belonging to online. This was compared with confidential survey responses to establish if their online social self was congruent with the self they present offline. Finally, the types of audiences that these college students believe visit their profile and the relationship between this perception and their presentation of self online was examined.

I found that college students do not misrepresent themselves on Facebook, but rather under-represent themselves. Whatever main social group they claim to be part of offline was almost always represented as their main pursuit on Facebook. They did not, however, describe every activity on their Facebook they claim to participate in offline. Furthermore, these college students did not seem to consider the co-presence of an audience when presenting their identity. Finally, the fact that this audience may contain people besides their peers did not significantly change the accuracy of a college student's online self.

Presentation Number O-16

ABSTRACT:

Abstract Title:	The Necessity of Integrating the Social Mission with the Business Model for Domestic and Export Businesses		
Presenter:	Craig Murchison and Juan Fuentes		
Mentor:	Tracy Morgan		
Presentation Type:	Oral	**Major and College:**	Entrepreneurship / Business
Category:	Social Sciences		

There has been cultural shift among consumers, such that, they're purchasing decisions are heavily influenced by business relationships. New generation's view their interactions with businesses as being relational and overwhelmingly subscribe to an economic model that seeks to holistically consider all stakeholders. 41% of people purchased a product because of a cause [or its social mission] and 61% of consumers will purchase a new or unknown brand because of a cause (Cone 2010). This consumer group expects businesses to join with and participate in their endeavors to meet the needs of the community more than other groups. Additionally companies who effectively connect with customers' social mission (need to participate in/aid the community) and assist in customers' efforts to do so will see fiscal benefits when executed in a manner that aligns with the businesses business model (Ross, and McGiverin-Bohan). In fact, to succeed in business abroad, the emphasis on relationships is also often perceived as having priority over financial gain. Therefore, the concept of integrating a social mission into the export business plan is also viable; not solely because it is a financially sound and sustainable strategy but because it greatly enhances the relationships we enjoy while doing business beyond borders.