Proceedings

of the

Oregon Academy of Science

VOLUME LXIX

Concordia University

2010

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PROCEEDINGS OF THE OREGON ACADEMY OF SCIENCE

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ELIZABETH ATKINSON, OAS TREASURER
LINFIELD COLLEGE, DEPARTMENT OF CHEMISTRY, UNIT #A468
900 SE BAKER ST., McMinnville, OR 97128

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THE OREGON ACADEMY OF SCIENCE

Keynote Address

Dr. Kent Thornburg

Oregon Health & Science University

How to make a durable heart in the womb

Dr. Kent Thornburg is Professor of Cardiovascular Medicine, and Director of the Heart Research Center and Oregon Health and Science University in Portland Oregon. He also holds the M. Lowell Edwards Chair in the Department of Medicine. Dr. Thornburg earned his Ph.D. in developmental physiology from Oregon State University in Corvallis, followed by post-doctoral research at Oregon Health & Science University and Washington University in St. Louis. He is the author of over 100 books and research articles and has received numerous awards for excellence in teaching. Dr. Thornburg’s research focuses on heart development and prenatal origins of adult heart disease. His laboratory is involved in studying how mechanical forces alter gene expression in the developing heart and his models are designed to study the roles of shear and wall stresses as signals to developing cardiac structures. His presentation at the 69th Annual Meeting of the Oregon Academy of Science is titled “How to make a durable heart in the womb.”
The Oregon Academy of Science's Outstanding Scientist Award is awarded in recognition of significant research contributions to the natural, physical, or social sciences, notable reputation in science education, and meaningful contributions in the application of science research. Recipients of this award must have been Oregon residents during the time they made the distinguished contributions for which they are recognized. Past recipients of the Outstanding Scientist Award are listed below:

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The Oregon Academy of Science's Outstanding Teacher Award is awarded to Oregon teachers with a demonstrated record of excellence in teaching in any of the subject areas represented in the Academy. Recipients of this award must have been Oregon residents during the time they made the distinguished contributions for which they are recognized. Past recipients of the Outstanding Teacher Award are listed below.

1992    Bea Epperson
1993    Stephen Boyarsky
1994    Roy Chambers
        Andrea Hyslop
        Elizabeth Nirschel
        Jan Heaton
1995    Ford Miyashita
1996    Edith Anderson
        Pamela Lopez
1997    Mary Omberg
        Terry Favero
1998    Rosa Hemphill
        Joel Kuyper
        Diane Nelson
1999    Dwight Kimberly
        Bill Lamb
2000    Becky A. Houck
        Richard Duncan
2001    Patty Toccalino
        Kathleen Wickman
2002    David Damcke
2003    Kenneth M. Doxsee
        James E. Hutchison
        Ralph Schubothe
2004    Gwen Schusterman
        John Gibbs
        Chris Murray
2005    Richard P. Taylor
        Gail Gederman
2006    Peter Langley
2007    Tamina Toray
        Dan Jamsa
2008    April Ann Fong
        Terry Tucker
2009    Charles Kunert
        Michael Geisen
2010    Charles (Kip) Ault
        Jean Ames
THE OREGON ACADEMY OF SCIENCE

Outstanding Educator Award
Higher Education

Dr. Charles (Kip) Ault

Lewis and Clark College, Portland

Dr. Kip Ault is a Professor of Education at Lewis and Clark College and teaches in the Graduate School of Education. He earned his Ph.D. in science and environmental education from Cornell University following several years as a middle school and elementary school teacher. Thus, he understands both the practical as well as theoretical basis for good teaching and is an outstanding mentor for students in Lewis and Clark’s Master of Arts in Teaching program. In addition to a heavy teaching load, Dr. Ault is a very active scholar in the area of science education and is the author of many publications in his field. Dr. Ault has been a primary motivator and strong advocate for science education in Oregon. He has been worked with numerous task forces and other groups aimed at improving science education in the State of Oregon including OMSI, OHSU, NORCUS, PRISM and OAS.

As one of his colleague notes “In my thirty plus years associated with higher education, I have seen few faculty who love/practice science at this level and feel very comfortable teaching middle school children in a local school. Kip has the complete package. In our university we are evaluated on three criteria - teaching skills, scholarship, and community service. Dr. Ault matches all these expectations at the highest level and models for us what each could be.”

The Oregon Academy of Science congratulates Dr. Ault as the 2010 Educator of the year (Higher Education). The Academy is proud to be able to recognize him for his contributions to science, and his leadership in advocating for improved science education in the state of Oregon.
Outstanding Teacher Award
K-12
Ms. Jean Eames

Benson Polytechnic High School, Portland

Ms. Jean Eames has been an outstanding science teacher (chemistry and biology) at Benson Polytechnic High School in Portland since 1985. She has been recognized for teaching excellence by several other organizations including receiving the Outstanding Biology Teacher Award from the National Biology Teacher Association in 2005. She has taught both honors and regular science classes with distinction and provides a learning environment, which encourages her students to think and become self-reliant learners.

Ms. Eames’ courses are legendary as some of the most challenging classes at Benson, yet after completing them, many students look back fondly on her as one of their most caring teachers. Many of her past students have noted the positive effect she has had on their lives and future careers. As a perceptive mentor, Jean is willing to stay late to help students learn a difficult concept, prepare for a test or provide counseling as they prepare for life’s big decisions.

Ms. Eames is tireless in providing stimulating learning opportunities for students outside the science classroom, including serving as faculty advisor for the MESA (Mathematics Engineering Science Achievement) program, Science Bowl, Ocean Bowl and participating in ISEF Science Fairs. Several times each year she takes students to the University of Oregon for a weekend, where her students can interact with college faculty and college students. During their visit students are guided through college-level laboratory experiences and other activities which strengthen their understanding of concepts learned in the classroom.

Ms. Eames is committed to student participation in research, and she encourages her students to become involved in scientific research and to prepare science fair projects. She has been a strong supporter of student participation in Oregon Junior Academy of Science activities for over a decade. Several years ago she was awarded a summer fellowship through the M.J. Murdock Charitable Trust’s Partners in Science and Engineering program and spent several summer carrying out research at the University of Portland.

The Oregon Academy of Science congratulates Ms. Eames as the 2010 Educator of the Year for K-12 teaching.
ABSTRACTS
FOR THE POSTERS AND ORAL PAPERS
PRESENTED DURING
THE SECTION MEETINGS AT
THE SIXTY-NINTH ANNUAL
CONFERENCE OF
THE OREGON ACADEMY OF SCIENCE

February 27, 2010

Concordia University
Portland, Oregon
TROPHOBLAST GLYCOPROTEIN (5T4) IS EXPRESSED ON RENAL CELL CARCINOMA AND COLORECTAL TUMOR CELLS AND RECOGNIZED BY CYTOTOXIC T LYMPHOCYTES, Shoko Satoh¹, Scott S. Tykodi², Edus H. Warren², ¹Concordia University, Portland, OR; ²Clinical Research Division, Fred Hutchinson Cancer Research Center, Seattle, WA.

Renal Cell Carcinoma (RCC) and Colorectal Cancer (CRC) rank among the top 10 most common cancers in the United States. In 2009, it is estimated that there will be 146,970 and 57,760 new cases of CRC and RCC respectively [1]. Trophoblast Glycoprotein (TPBG), also known as 5T4 is a 72kDa tumor-associated antigen expressed on the majority of RCC and CRC. Given that 5T4 is highly expressed on tumors but has restricted expression on normal cells, a cancer vaccine targeting 5T4 was previously created as a recombinant vaccinia virus (MVA-5T4) [2]. RCC and CRC patients vaccinated with MVA-5T4 have shown to elicit 5T4-specific humoral and cellular immune responses; however, the 5T4-specific T cells’ antitumor effects have not been characterized in vitro. We developed a semi-quantitative real-time Polymerase Chain Reaction (RT-PCR) assay to analyze 5T4 transcript expression in tumor cells and a normal tissue array. The RT-PCR demonstrated preferential 5T4 transcription within tumors, which 5T4 protein expression was also confirmed by flow cytometry in corresponding RCC and CRC tumor cells. Cytotoxic T lymphocyte (CTL) clones specific for an HLA-A2 binding peptide from 5T4 were then tested in Chromium Release Assays for recognition of MVA-5T4 infected target cells and 5T4-expressing tumor cell lines. The assay demonstrated robust anti-tumor lytic activity of tumor cells. These results validate 5T4’s potential as a target for T cell based immunotherapy and contributed to better understanding of 5T4 expression for the advancement of MVA-5T4 cancer vaccine.
DISSECTING THE MOLECULAR BASIS OF TRIM32 AND PIAS PROTEIN INTERACTION. Brendon Hart1 and Dr. Molly Kulesz-Martin2.
1Department of Biology, George Fox University, Newberg, OR 97132.
2Department of Dermatology, Oregon Health and Sciences University, Portland, OR 97239.

Trim32 is an E3-ubiquitin ligase and a member of a family of scaffold proteins involved in both cancer and human development. Our laboratory has associated Trim32 activation with cancer through carcinogenesis studies in mouse skin keratinocyte models (Horn et al., 2003) and has preliminarily confirmed this association in human squamous cell carcinoma (SCC). Moreover, we have identified Piasy as a substrate protein targeted for degradation by Trim32 ubiquitylation. Piasy is a pro-apoptotic E3-SUMO ligase involved in regulation of tumor suppressor p53 and of NFkB cellular survival pathways, and Piasy is capable of inducing apoptosis in CML cells, human fibroblasts and mouse keratinocytes. In contrast, we found that Trim32 protects keratinocytes from apoptosis induced by the carcinogen UVB and synergized by the inflammation factor TNFa and further, that Trim32 and Piasy expression levels are inversely correlated in human SCC (Albor et al., 2007). These data suggest a direct role of Trim32 activation and Piasy degradation in epithelial carcinogenesis and tumor progression. We propose that the Trim32 protein mediates the degradation of Pias proteins and, conversely, that Trim32 is regulated through differential sumoylation by Pias proteins. My project aims are to: 1) Define the specific interaction domains in Trim32 and Pias proteins using purified recombinant proteins from deletional mutants of Trim32 and Piasy, 2) Determine whether Trim32 protein is sumoylated by Pias proteins using immunoblotting approach and in vitro sumoylation assay, and 3) Define the biological activities associated with Trim32 sumoylation (keratinocyte proliferation, apoptosis), comparing SUMO defective mutant and wild type Trim32 and Piasy proteins. Knowing the interaction domains could lead to the design of peptide inhibitors to test predicted anti-tumor outcomes of accumulation of Piasy, and aid in the discovery of small molecule therapeutics.

ENERGY INVESTMENT DURING COURTSHIP BY MALE VS. FEMALE RED-SIDED GARTER SNAKES (THAMNOPHIS SIRTALIS PARIETALIS). Jessi-Ann B. Michaelson1, Donald R. Powers1, Chris R. Friesen2, Robert T. Mason2, 1Department of Biology, George Fox University, Newberg, OR 97132, 2Department of Zoology, Oregon State University, Corvallis, OR 97331.

Male red-sided garter snakes (Thamnophis sirtalis parietalis) sustain large energetic costs during reproduction (about 18X SMR) due to prolonged courtship of females and direct male-male competition. This is not surprising since reproductive success is a primary component of male fitness. In most sexually reproducing species energy expended during reproduction differs between males and
females as females spend more energy on production of young. However when many males court females it might also be necessary for females to spend energy on courtship activity in order to increase fitness through female choice. If true then interesting evolutionary questions arise as we try to understand what reproductive success means to females when faced with fixed energy availability. We assessed energy expenditure of males and females and ventilation patterns (VP) of females during courtship and mating. Trials involved either a receptive or nonreceptive female that was courted by either a small (6 males) or large (12 males) mating group. Metabolic rate (MR) was measured using open-circuit respirometry (VO$_2$) and VP measured using whole-body plethysmography. Females did not upregulate their MR or change their VP in response to male courtship. Thus courtship and mating does not appear to be a major component of a female’s reproductive costs. Further, if females are exercising choice in mate selection then they are likely doing so by some other means. Males courting receptive females had MR > 2X males courting nonreceptive females. This adds support for the importance of chemical cues provided by females in the efficient selection of potential mates.

ACTIVIN REGULATES AXON PATHFINDING TO PROMOTE TILING OF R7 AXON TERMINALS IN THE DROSOPHILA VISUAL SYSTEM.
Jennifer Salamé$^1$ and Tory Herman$^2$, $^1$Department of Psychology, George Fox University, Newberg, OR, 97132 $^2$University of Oregon, Institute of Molecular Biology, Eugene, OR 97403-1229.

How is overlap between adjacent axon terminals prevented during development? This non-overlapping is called “tiling”. To identify the molecular mechanisms involved in tiling, R7 photoreceptor axons in the Drosophila visual system were analyzed. R7s select synaptic targets in two phases. 1) Adjacent R7s extend their axons to adjacent target regions. 2) Each R7 terminal forms synapses with non-overlapping targets. We previously found that Activin signaling is required for R7 axon tiling. Does Activin act and regulate during phase one or phase two of synaptic target selection? Two research methods were employed: (1) Determine if the tiling defect of R7s lacking the Activin pathway could be eliminated by removing the ability to form synapses. To do so, a double mutant chromosome was created that contained mutations in imp-$\alpha_3$ and disy-$d$. Imp-$\alpha_3$, disy-$d$ double mutant R7 axons overlapped with their neighbors. It is concluded that the tiling defect of R7 axons lacking Activin signaling is not caused by excessive synapse formation. (2) Determine if causing R7 axons to form excessive synapses is sufficient to cause a tiling defect. To do so, a mutant chromosome was created containing a deletion of the rsy-$l$ gene. This mutation did not cause an R7 axon tiling defect and it is concluded that excessive synapse formation is not sufficient to cause a tiling defect. In conclusion, Activin signaling is not preventing excessive synapse formation in its regulatory role.
Therefore Activin signaling must be acting during the axon pathfinding phase of tiling in *Drosophila* R7 photoreceptors.

**THE INTRACELLULAR LOCALIZATION OF NOVEL PROTEIN ΔNASPP2.** Patricia Clevenger 1, Charles Lopez MD, PhD2. Department of Biochemistry and Molecular Biology, Lewis and Clark College, Portland, OR, 2Department of Hematology and Oncology, Oregon Health and Science University, Portland, OR 97239.

ΔNASPP2 is an important tumor suppressor, which is often down-regulated in human breast cancers. Since ASPP2 is generated from a complex locus, it follows that alternate gene products generated from the ASPP2 allele may play a key role in the regulation of ASPP2 levels in wildtype cells. The Lopez lab has recently identified a novel protein generated from this locus, which is missing the amino terminus of full-length ASPP2. Preliminary data show that this new gene product, ΔNASPP2, is up-regulated in human breast tissues, suggesting that ΔNASPP2 may promote tumorigenesis and/or resistance to therapy. The aim of our study was to identify the intracellular localization of this intriguing protein in a H1299 cell line. Our results show that ΔNASPP2 is cytoplasmic in both the presence and absence of exogenous p53. Further probing of the protein’s localization may suggest that ΔNASPP2 enters the nucleus in a p53-dependent manner after exposure to stress induced by proteosome inhibitor, Bortezomib.

CHARACTERIZING A NOVEL HIF-1Α INTERACTING POLYCOMB PROTEIN. Marie Lafortune, Janet Pittsenbarger2, and David Qian2, 1Department of Chemistry, Lewis and Clark College, Portland, OR, 97219, 2Division of Hematology and Medical Oncology, Oregon Health and Science University, Portland, OR 97239

Hypoxic conditions are prevalent in tumors due to minimal vascularization. Cancer cells have adapted to these conditions by accelerating glycolysis. This increase in glycolysis is primarily mediated by HIF-1α induced upregulation of glycolysis genes, including hexokinase 2 (HK2). In order to understand the manner in which HIF-1α mediates cellular hypoxia response, we performed a Yeast 2-hybrid assay and identified a novel HIF-1α interacting protein – EPC2. In both peptide pull-down and protein co-immunoprecipitation assays, EPC2 interacts with methylated histone
3 lysine 4 (me-H3K4), a part of the chromatin structure that is associated with active gene transcription. Chromatin immunoprecipitation assays revealed that me-H3K4 is abundant in the HK2 promoter HRE region that is occupied by HIF-1α during hypoxia; EPC2 binds to the same region under both normal and hypoxic conditions. RNA interference (RNAi) against EPC2 significantly disrupts the basal and hypoxia (HIF-1α) induced HK2 expression and glycolysis. The loss of HK2 expression due to EPC2 RNAi can also be recapitulated by the reduction of me-H3K4 in the HK2-HRE. Taken together, these data suggest that EPC2 recognizes a specific chromatin histone code in the HK2 promoter and is essential to the basal and upregulation of this hypoxic responsive gene.

Figure 1. EPC2 binds to the triple-methylated histone of HK2, mediating the binding of HIF-1α and by extension regulating the expression of HK2.

LARVAL COLORATION IN THE SPOTTED TUSSOCK MOTH, LOPHOCAMPA MACULATA: GEOGRAPHIC VARIATION AND INSTAR-SPECIFIC PIGMENT LOSS. Kenneth G. Strothkamp, Department of Chemistry, Lewis & Clark College, Portland, OR 97219

The Spotted Tussock Moth, Lophocampa maculata Harris (Lepidoptera: Arctiidae) is found across North America on both sides of the US/Canadian border, along the Pacific coast, and in both the Appalachians and Western mountains of the US. The goal of this project is to understand the evolution and migration of L. maculata and other Lophocampa species in response to the end of the last Ice Age and the reforestation of North America. Population genetics will be correlated with both the changing climate after the Ice Age and geographic factors to understand the present day characteristics of this species. This report presents initial data on the distribution of the species, larval coloration, and the discovery of instar-specific loss of pigmentation observed in individuals from several populations. Larval coloration is the most dramatic variation among populations of L. maculata. The setae of late instar larvae of the “Eastern” form are black at both ends with a yellow central region and a variable number of black dorsal spots. A small number of longer, white setae are found at both ends. The “Western” form is similar except the central region of the body is orange and, typically, dorsal spots are lacking. Rare individuals in both wild populations, and those reared under controlled conditions, exhibit
partial loss of normal pigmentation for one or two successive instars. This is followed by return to normal pigmentation in the final, fifth instar. Such a temporary, instar-specific loss of pigmentation appears not to have been previously observed in this species, or in other Lepidoptera.

THE ROLE OF THE C-MYC DESTRUCTION COMPLEX IN CARCINOGENESIS. Erik Grimstad¹, Amy Farrell², Charles Scanlan², Arun Krisshnamoorthy², Xiaoli Zhang², Rosalie Sears². ¹Department of Biology, Linfield College, McMinnville, OR, 97128. ²Department of Molecular and Medical Genetics. Oregon Health and Sciences University, Portland, OR 97239.

The c-Myc transcription factor is a potent regulator of cell fate. Over-expression of c-Myc is prevalent in a wide range of human tumors and withdrawal of c-Myc in animal models often results in tumor regression. A better understanding of c-Myc protein stability is necessary for the development of more effective therapies that directly target c-Myc for degradation. The ubiquitin-mediated degradation pathway of c-Myc is tightly regulated by Ras activated kinases. Phosphorylation of Serine 62 by ERK stabilizes c-Myc, allowing for the cell to enter G1. As the Ras signal decreases GSK-3β is activated, phosphorylating Threonine 58, and destabilizing c-Myc. This event allows Pin1 prolyl-isomerase to catalyze a cis to trans isomerization at Proline 63, permitting the removal of the stabilizing S62 phosphate by protein phostaphatase PP2A via binding by the c-Myc specific B56α subunit. In this state an E3 ubiquitin ligase (SCF^Fbw7) poly-ubiquitates c-Myc, targeting it for proteasome destruction. The scaffold protein Axin1 concentrates the players in the degradation pathway around activated c-Myc. My research tests the hypothesis that if this degradation complex is disrupted then c-Myc-induced tumorigenesis will become more prevalent. Thus far, stable human breast cell lines (MCF10A-Myc) with PP2A-B56α and Axin1 knocked-down have been created using constitutively expressed shRNAs. These shRNA’s have been validated. The tumorigenic capacity of these cells lines is being measured using an in vitro cellular transformation assay that measures the ability of cells to form colonies in soft agar, indicating anchorage-independent growth. This model has been shown to correlate well to in vivo carcinogenesis.

THE ISOLATION OF CHICK EMBRYONIC ENDOCARDIAL CELLS FOR THE STUDY OF HEART DEFECTS. Brett Honda, Darcie Babcock, and Monica Hinds, Oregon Health and Sciences University, Portland, OR 97239.

Congenital heart disease kills 1% of all infants each year and is the leading non-infectious cause of death among newborns. The outflow tract (OFT) is an important structure in the developing heart as it connects the heart to the rest of the arterial system via the aortic sac.
The OFT is the origin at which many cardiac defects occur. In humans, while genetic abnormalities are known to cause cardiac defects, the causes of the majority of cardiac defects are unknown. We hypothesize that atypical hemodynamic conditions on the endocardial cells (ECs) of the OFT can induce cardiac malformations. Currently, little is known on the impact of hemodynamics on ECs and the role that it plays in mechanotransduction. Consequently, in this study, ECs from the OFT of embryonic chick hearts during the stages HH21-HH24 were isolated and monolayers were plated on 32mm petri dishes coated with collagen type I. Cell health, migration, and confluency were dependant on the firm contact between the OFT and collagen, hydration of the OFT, and media composition. The ability to culture monolayers of ECs in vitro enables the investigation of the role of hemodynamics on both gene and protein expression which will provide critical insight on the causes of heart defects.

THE QUEST FOR EXON 2: A COMPARATIVE ANALYSIS STUDY TO DETERMINE THE MUTATION CAUSING AN OVINE LYSOSOMAL STORAGE DISEASE. Aneesa Al-Soodani, Amelia Ahern-Rindell. Department of Biology, University of Portland. Portland, OR 97203.

GM1 gangliosidosis (GM1) is a severe neurodegenerative disorder with no cure. It is caused by mutations in the GLB1 gene and results in a deficiency of beta-galactosidase (beta-gal), the acid hydrolase responsible for cleaving terminal galactose residues from macromolecules. The ovine GM1-like model in this study is unique because it also presents with a secondary lysosomal deficiency in alpha-neuraminidase (alpha-neur) activity. The association of beta-gal and alpha-neur with a third protein, protective protein Cathepsin A (PPCA), to form a lysosomal multienzyme complex (LMC), is essential to prevent the premature degradation of these enzymes. We hypothesize that the sheep model of GM1 has a unique mutation that interferes with the formation of the LMC. The purpose of this investigation was to determine the sheep exon 2 sequence of GLB1 and to compare it to the mutated exon 2 sequence in GM1-affected Portuguese Water dogs (PWD). Ovine sequence was successfully amplified using PCR primers based on the evolutionarily-related bovine sequence since the ovine GLB1 gene has not been cloned. Using an RFLP assay, it was determined that the PWD mutation is not present in the ovine model. In order to confirm our findings, PCR products from normal and GM1-affected sheep were sequenced and compared. The normal and affected ovine exon 2 sequences were found to be identical, therefore, the ovine mutation does not lie within exon 2 of the GLB1 gene. The ovine mutation most likely is in a GLB1 exon that, when translated, interferes with how beta-gal interacts with PPCA, thus altering the LMC.
INVESTIGATION OF CELL FUSION BETWEEN BONE MARROW-DERIVED CELLS AND IMMUNE CELLS OF THE INTESTINE. Patsy O’Brien¹, Trevor Levin², Melissa Wong². Departments of Dermatology, Cell and Developmental Biology. Oregon Health and Sciences University, Portland, OR 97239.

Cell fusion occurs during fertilization and embryogenesis and is necessary for the differentiation of many tissue types. Outside of its developmental significance, the purpose of cell fusion is not well understood. Experimental evidence of cell fusion has been found in investigations of somatic tissues using bone marrow transplantation. Our laboratory has demonstrated fusion between bone marrow-derived cells (BMDCs) and the intestinal epithelium (Figure 1). Further, preliminary data suggests that cell fusion also occurs in the intestinal mesenchymal compartment. To test the hypothesis that fusion between BMDCs and intestinal mesenchymal cells occurs in response to injury, two experimental paradigms were employed using irradiated mice. Both a genetic approach relying upon Cre recombinase activity stimulating expression of a Cre reporter in fused cells, and co-expression of dual markers defining fusion confirmed that cell fusion occurred between BMDCs and intestinal immune cells. Interestingly both the myeloid and lymphoid population accommodated the fusion event revealed by lineage marker analysis and immunohistochemical analysis. Preliminary studies using directed gamma-irradiation to the abdomen, long bones or whole body provided suggestive evidence that this fusion process is mediated by injury. These studies have important implications on the response of the immune system to irradiation injury and potential impact on the regenerative process.

Figure 1: Fusion of Bone Marrow Derived Cells with Epithelium in the Villi

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colocalization of markers in recipient epithelium
THE MICROTUBULE REGULATOR STATHMIN IS REQUIRED FOR AXONAL TRANSPORT IN *DROSOPHILA MELANOGASTER*. Nikki Lytle¹, Louise Parker², Lawrence SB Goldstein³ and Jason E Duncan¹. ¹Willamette University, Salem, OR 97301, ²University of California Berkeley, Berkeley, CA 94720 and ³University of California San Diego, La Jolla, CA 92093

Neurons utilize a microtubule-based transport system to bidirectionally transport proteins, vesicles, and organelles between the cell body and the synaptic terminal through the axon. We have identified the protein stathmin (stai), which regulates the dynamics of the microtubule cytoskeleton, as a component necessary for axonal transport in *Drosophila*. Several mutations in stai have been isolated that exhibit phenotypes consistent with severe defects in axonal transport. In mutant third instar larvae, the posterior body segments sharply flip up after each peristaltic contraction during the crawling cycle, indicating paralysis of the posterior musculature. In addition, axons of the longitudinal segmental nerves that emerge from the brain and bilaterally innervate the body wall musculature of each larval segment contain focal swellings and accumulations of transported components. Western blot analyses of these larvae indicate dramatic reductions in the levels of tubulin protein, yet we observed only minor alterations in the microtubule architecture of both segmental nerve axons and cells of the body wall musculature. Mutant larvae also have reduced levels of the conventional kinesin heavy and light chain motor components. A small percentage of stai mutants survive to the adult stage but have significantly reduced life spans. These adults have severe movement defects, often dragging their hind limbs as they walk. Unexpectedly they also exhibit a progressive, age dependent seizure phenotype, characteristic of the ‘bang sensitive’ mutants that have altered neuronal excitability. Electrophysiological analysis indicates these animals have a lower evoked seizure threshold than wildtype animals. Collectively, our data demonstrate that stai is essential for microtubule-based axonal transport, and uncover a novel role in the regulation of neuronal excitability.

OBESITY INDUCES CARDIAC ARRHYTHMIAS: ROLE OF CARDIAC SYMPATHETIC NERVES. Virginia L. Brooks¹, Jennifer Houle², Asako Itakura¹, Belinda H. McCully¹, Department of Physiology and Pharmacology, Oregon Health & Science University, Portland, OR 97239, ²Department of Biology, Willamette University, Salem, OR 97301.

Obesity is linked to an increased incidence of cardiac arrhythmias. However, the mechanism by which this occurs is unknown. This project tested the hypothesis that increased sympathetic innervation—resulting from elevated cytokine levels due to obesity-induced systemic inflammation—was responsible for the increased incidence of cardiac arrhythmias. First, it was determined if obese rats from an animal model of diet-induced obesity were more likely to develop cardiac arrhythmias than lean rats. Conscious obesity-resistant (OR) and obesity-prone (OP) rats were challenged with four
intravenous bolus doses of epinephrine (0.625 µg/kg, 1.25 µg/kg, 2.5 µg/kg, and 5.0 µg/kg). When challenged, OP rats exhibited arrhythmias at lower epinephrine doses. With the same dose, OP rats had a significantly longer arrhythmia duration compared to OR rats at 1.25 µg/kg (P < 0.05), 2.5 µg/kg (P < 0.05), and 5.0 µg/kg (P < 0.05). These data indicated that this rat model of diet-induced obesity is appropriate for this experiment. To elucidate whether OP rats had increased sympathetic innervation of the heart, immunocytochemistry and RT-PCR were used. Using tyrosine hydroxylase (TH) as a marker for sympathetic nerves, immunocytochemical analysis of OP and OR rat hearts showed no apparent difference in TH density. RT-PCR was used to determine whether OP rats had greater amounts of TH per nerve compared to OR rats, but likewise, no significant difference was found. These findings indicate that, while OP rats exhibit an increased propensity for arrhythmias, OP rats do not have increased sympathetic innervation compared to OR rats. Therefore, increased sympathetic innervation does not appear to be responsible for the higher incidence of cardiac arrhythmias in obese individuals.

**BIOLOGY - POSTER PRESENTATIONS:**

**CAM KINASES REGULATE AKT AND PROSTATE CANCER CELL SURVIVAL** Samantha Smith, Brendon Hart and John M. Schmitt Department of Biology, George Fox University 414 N. Meridian St., Newberg, OR 97132

The cellular enzyme AKT and its substrate BAD have been shown to promote prostate cancer cell survival. Agonists, such as carbachol, and hormones that increase intracellular calcium concentration can activate AKT leading to cancer cell survival. The LNCaP prostate cancer cells express the carbachol-sensitive M3 subtype of GPCR’s that cause increases in intracellular calcium and activation of the family of Ca2+/Calmodulin-dependent Protein Kinases (CaM Ks). One type of CaM Kinase, CaM Kinase Kinase (CaM KK), phosphorylates several intracellular substrates including AKT on threonine 308. AKT phosphorylation and activation can enhance cell survival through phosphorylation BAD protein and the subsequent blockade of caspase activation. Our goals were to examine the mechanism of carbachol activation of AKT and BAD in LNCaP prostate cancer cells and evaluate whether CaM KK may be mediating carbachol’s activation of AKT and cell survival. The results suggest that carbachol triggered phosphorylation of both AKT and BAD in LNCaP cells. AKT and BAD phosphorylation were blocked by the selective CaM KK inhibitor, STO-609, as well as siRNA directed against CaM KK. Taken together this data suggests a role for CaM KK in the pathway. In addition, the bacterial toxin anisomycin triggered caspase activation in LNCaP cells that was blocked by carbachol treatment. Finally, our results suggest that
carbachol treatment of LNCaP cells promoted cell survival through CaM KK and its phosphorylation of AKT.

USE OF MITIGATED MEADOWS BY RESIDENT ELK (*CERVUS ELAPHUS ROOSEVELTI*) AT HAGG LAKE, WASHINGTON COUNTY, OREGON: DATA FROM 2006–2010. Michael Garcia, Jeffrey Lee, Angela Massey, Rodney Racaza, Ryan Seiffert, Edmond Alkaslassy, Pamela Lopez, Department of Biology, Pacific University, Forest Grove, OR, 97116.

Henry Hagg Lake was created in 1975 when Scoggins Dam was constructed. As a result meadows that had been used by resident elk for forage during the winter months were flooded. The loss of these meadows was mitigated by construction of new meadows (n = 10) above the new water level. The meadows vary in size (from 3.5 acres to 29.5 acres), proximity to the paved road that surrounds the lake, solar exposure and composition and state of vegetation (from a mowed mix of non-native and unpalatable species to recently disked and planted with non-noxious grasses and clovers). Each meadow was sampled for elk scat using plot and transect methods every two weeks from October through February in 2006/7, 2007/8, 2008/9 and 2009/10. Patterns of meadow use have been fairly consistent over these four sampling seasons and we will describe and offer explanations for those patterns.

BACTERIOLOGICAL WATER QUALITY MONITORING, COMPARING DRY AND RAINY DAYS, IN FOUR TRIBUTARIES OF THE SANDY RIVER Elijah Kolmes, Lake Oswego High School, Lake Oswego, OR 97034, and University of Portland, Portland, OR 97203.

Four separate streams, all of them on Mount Hood and all of them direct or indirect tributaries to the Sandy River, were tested for *Enterococci, Escherichia coli* (*E. coli*), and total coliform concentrations, specifically on dry and rainy sampling dates. Sixteen total sites were selected to give a balanced look at each of the four streams. Water samples were collected on July 6, July 13, July 27, August 3, and September 5, 2009, with the third and fifth data sets having been taken on rainy days. Enterolert® and Colilert® measurement systems were used to determine bacterial concentrations. Whenever it rained, the number of fecal contaminants were predicted to be higher; increased bacterial counts following precipitation were predicted and observed.

AMPLIFICATION AND COMPARISON OF EXON 6 FROM OVINE GLB1 GENE WITH BOVINE AND HUMAN GLB1 GENES. Nicole Iranon, Amelia Ahern-Rindell, Department of Biology, University of Portland, Portland, OR, 97203.

GM1 gangliosidosis (GM1) is a fatal lysosomal storage disorder marked by a deficiency in lysosomal β-galactosidase activity,
resulting in a corresponding buildup of GM1 ganglioside. The disease is inherited as an autosomal recessive mutation in the GLB1 gene, which codes for β-galactosidase. This research focuses on a unique ovine model of GM1 that has an additional partial deficiency of α-neuraminidase, which complexes with β-galactosidase in the lysosome. We hypothesize that a novel mutation in the affected sheep GLB1 gene may alter the lysosomal complex and lead to the dual enzyme deficiencies. A number of GLB1 mutations that result in human GM1 occur in the sixth exon of the gene; consequently, this region is plausibly a hotspot with a high rate of mutation. The sixth exon of the ovine GLB1 gene was amplified, sequenced, and analyzed in normal and GM1 affected sheep in an attempt to find the mutation responsible for this unique version of ovine GM1. Because the ovine GLB1 gene has not yet been sequenced, bovine genomic DNA was used to create the PCR primers. We found that the ovine GLB1 gene consists of 180 nucleotides and that there were no base differences between the affected and normal ovine sequences. This finding indicates that the mutation that causes ovine GM1 does not occur in the sixth exon. In addition, the sequence of the sixth exon from sheep was compared to the equivalent bovine and human sequences and found to have 94% and 75% base pair identity, respectively.

ISOLATION, AMPLIFICATION, AND COMPARISON OF OVINE GLB1 EXON 15 VIA KNOWN BOVINE β-GALACTOSIDASE SEQUENCE. Emily Sorenson, Sarah Ringold, Amelia Ahern-Rindell, Department of Biology, University of Portland, Portland, OR, 97203.

GM1-gangliosidosis (GM1) is a rare, autosomal-recessive lysosomal storage disease described by increased levels of GM1 ganglioside and galactosyl oligosaccharides in cells and tissues. Clinical symptoms associated with GM1 include neurodegeneration, skeletal deformities, and lack of muscle control. The disease is caused by mutations in the GLB1 gene which causes reduced levels of β-galactosidase activity. This study uses a unique model of GM1 that displays combined enzymatic deficiencies of both β-galactosidase and α-neuraminidase. An explanation for this difference may be helpful in designing future treatments for GM1, such as gene therapy. By sequencing and comparing exon 15 of wildtype and GM1-affected sheep, we hypothesized that a new mutation that is unique to this ovine model would be found, explaining this novel form of GM1. Exon 15 has been cited as a potential hotspot for nucleotide substitutions, based upon the high frequency of mutations found throughout other animal and human models. Ovine DNA from normal and GM1-affected liver tissue was isolated, amplified using bovine-DNA PCR primers, sequenced, and analyzed. When comparing the normal and affected exon 15, a potential missense mutation was found exhibiting a nucleotide change from adenine to guanine, resulting in an amino acid substitution from lysine to arginine. The nucleotide substitution
is comparable to a published human mutation, which is unexpected, considering the additional $\alpha$-neuraminidase deficiency in the ovine disorder. Due to this finding, and imperfect sequence analysis, we intend to verify the presence of this mutation by designing a new set of PCR primers and re-amplifying exon 15.

COMPARATIVE ANALYSIS OF SPECIES RECRUITMENT AT FAIRVIEW MITIGATION WETLANDS. Shonnessy Gilmore, Sara Fischer, Jaime Patzer, C. Ben Crabtree, and Susan Kephart. Department of Biology, Willamette University, Salem, OR 97301.

Monitoring of the vertebrate and invertebrate species at Fairview wetlands reflects diversity and species recruitment since observations began. Fairview Mitigation Wetlands are converted agricultural lands replanted in 2004 as part of restoration efforts and monitoring activities. Arthropod samples collected using pan traps and sweep samples show relative abundance and richness to be dependent on microhabitats and seasonal conditions. In May 2006, sweep sampling yielded high numbers of arachnids and coleopterans, while hemipterans displayed the largest invertebrate presence in July of the same year. Pan traps were high in hymenopteran species, which reached their greatest abundance in July. Aquatic studies through 2009 reveal a decreasing number of introduced bullfrogs, *Rana catesbiana*, possibly from control measures instituted at the tri-annual vertebrate monitoring. Concurrently, populations of native *Taricha granulosa* increased from 2006 to 2009. Small mammal trapping began in 2009 using pit traps and Sherman traps; these samples show prevalence of typically urban fauna, mainly *Peromyscus maniculatus*. Low mammalian diversity may reflect the isolated nature of the wetlands, or potential sampling bias with the techniques employed. Other mammalian species observed as the wetland diversifies include deer, raccoon, skunk, opossum, and nutria. The changing vertebrate and invertebrate populations at Fairview Wetlands, based on species richness and diversity measures, encourages continued restoration efforts and contributes to our understanding of the ecological value of mitigated wetlands.

THE MICROTUBULE REGULATOR STATHMIN IS REQUIRED FOR AXONAL TRANSPORT IN *DROSOPHILA MELANOGASTER*. Nikki Lytle¹, Louise Parker², Lawrence SB Goldstein³ and Jason E Duncan¹. ¹Willamette University, Salem, OR 97301, ²University of California Berkeley, Berkeley, CA 94720 and ³University of California San Diego, La Jolla, CA 92093

Neurons utilize a microtubule-based transport system to bidirectionally transport proteins, vesicles, and organelles between the cell body and the synaptic terminal through the axon. We have identified the protein stathmin (stai), which regulates the dynamics of the microtubule cytoskeleton, as a component necessary for axonal transport in *Drosophila*. Several mutations in *stai* have been isolated
that exhibit phenotypes consistent with severe defects in axonal transport. In mutant third instar larvae, the posterior body segments sharply flip up after each peristaltic contraction during the crawling cycle, indicating paralysis of the posterior musculature. In addition, axons of the longitudinal segmental nerves that emerge from the brain and bilaterally innervate the body wall musculature of each larval segment contain focal swellings and accumulations of transported components. Western blot analyses of these larvae indicate dramatic reductions in the levels of tubulin protein, yet we observed only minor alterations in the microtubule architecture of both segmental nerve axons and cells of the body wall musculature. Mutant larvae also have reduced levels of the conventional kinesin heavy and light chain motor components. A small percentage of stai mutants survive to the adult stage but have significantly reduced life spans. These adults have severe movement defects, often dragging their hind limbs as they walk. Unexpectedly they also exhibit a progressive, age dependent seizure phenotype, characteristic of the ‘bang sensitive’ mutants that have altered neuronal excitability. Electrophysiological analysis indicates these animals have a lower evoked seizure threshold than wildtype animals. Collectively, our data demonstrate that stai is essential for microtubule-based axonal transport, and uncover a novel role in the regulation of neuronal excitability.

CHEMISTRY

Section Chairs:

Angela Hoffman
University of Portland

Tom Munson
Concordia University

CHEMISTRY - ORAL PRESENTATIONS:

OBTAINING OPTIMUM SURFACE ENHANCED RAMAN SCATTERING OF PROTEINS BY INVESTIGATING THE LINK BETWEEN MEDIA ACIDITY AND pI. Dylan Sorber, Dr. Brian Gilbert, Department of Chemistry, Linfield College, McMinnville, OR 97128.

Surface-enhanced Raman spectroscopy (SERS) is an important tool in the characterization of proteins, which can lead to vital information pertaining to biological functions. Spectra of lysozyme, bovine serum
albumin (BSA), catalase, and hemoglobin were obtained using SERS on silver colloids using sodium or magnesium sulfate as the aggregating agent. Optimization of the SERS was attempted through adjustment of the acidity of sulfate aggregating agent. A link was investigated between the pI of the proteins and the pH of the solutions needed for optimum SERS. It was found that any pH higher than the pI (pH at which a particular molecule or surface carries no net electrical charge) of the protein would not result in well-defined Raman bands. SERS of each protein were obtainable at any pH below the protein’s pI and were enhanced until reaching a pH of approximately two. At any pH lower than two, SERS were not possible because of inability of the aggregating agent to work in extreme pH conditions.

SILICON AND TIN OXIDE NANOWIRES FOR NANOELECTRONIC DEVICES AND SENSOR APPLICATION. Hoang Tran, Joo Chan, Allen Chapadraza, Shankar Rananavare, Department of Chemistry. Portland State University, Portland, OR.

Nanowires have been widely studied as nanoscale building blocks for nanoelectronics including transistors for future integrated circuits, low power density electronics, optoelectronic devices. Many contemporary synthetic methods have been employed for nanowire synthesis such as chemical vapor deposition, sol-gel, hydrothermal/solvothermal synthesis including laser ablation. These methods can produce single crystalline nanowires that can be doped by co-flowing appropriate dopants. This talk will focus on two different types of semiconductor nanowires: silicon and tin oxide. A novel, inexpensive green method of duo-chamber glass vessel is used to create a low-pressure environment where SiNWs are grown through vapor-liquid-solid mechanism using gold nanoparticles as a catalyst. The method can also be employed to produce doped silicon nanowires, carbon nanotubes. Nano-junctions amongst wires were observed and are important for the grid architecture of nanoelectronics. Quasi one-dimensional nanowires of tin oxides are promising for the development of nanodevices and sensor application as they do not corrode in environment. Bulk-scale synthetic method for n-doped tin oxide nanomaterials will be presented. Preparation, morphological and electrical characterizations of doped and undoped SnO$_2$ nanowires are highlighted as a promising material for porous electronic devices for ultra sensitive gas detectors.
IDENTIFICATION AND FUNCTIONAL ANALYSIS OF THE PYRALOMICIN BIOSYNTHETIC GENE CLUSTER. Patricia M. Fiatt, Taifo Mahmud. 1Department of Chemistry, Western Oregon University, 012 Natural Science Building, 345 N. Monmouth Ave, Monmouth, OR 97361. 2Department of Pharmaceutical Sciences, Oregon State University, 203 Pharmacy Building, Corvallis, OR 97331,

The pyralomicins are a group of antibiotics with unique chemical structures, a benzopyranopyrrole chromophore containing a nitrogen atom, which is glycosylated by C7 cyclitols (pyralomicins 1a-1d) or by glucose (pyralomicins 2a-2c). The core benzopyranopyrrole of pyralomicin is proposed to be a rearrangement product of a pyoluteorin-like intermediate, whereas the cyclitol structure is similar to the valienamine moiety of the antidiabetic agent acarbose and the antifungal agent validamycin. A gene cluster responsible for the biosynthesis of the pyralomicins was identified from Nonomuraea sp. using a number of homologous and heterologous probes. Sequencing and analysis of a 42 kb DNA bearing the cluster revealed genes related to the biosynthesis of C7-cyclitol moiety, genes encoding non-ribosomal peptide synthetase (NRPS), polyketide synthase (PKS), and tailoring enzymes, as well as genes related to the regulatory and transport mechanisms. The function of a number of these genes including that of the 2-epi-5-epi-valiolone synthase (PyrA), which catalyzes a committed step in the biosynthesis of the C7-cyclitol, will be discussed.

THE EXTRACTION OF TAXANES FROM A HAZELNUT MOLD. Robert Bruce, Dr. Angela Hoffman, Department of Chemistry, University of Portland, Portland, OR, 97203.

Paclitaxel (Taxol®) is a mitotic inhibitor used in cancer chemotherapy that inhibits the normal dissolution of microtubules. Taxol is currently obtained in a long and expensive process by isolating it from Yew trees. It has also been isolated from hazelnut trees. A mold isolated from a hazelnut, HNM3a3, has shown promise in the production of taxanes. Its considerably shorter life cycle would provide faster production of Taxol. HNM3a3 was grown in liquid potato dextrose medium for three weeks and subsequently macerated. Taxol was then extracted from the fungal material-dextrose broth mixture with dichloromethane then later analyzed via LCMS. Previous procedures indicate that taxanes are found within the cellular material as well as in the culture medium. The work was supported by a grant from the National Science Foundation (MRI 051648).
CHEMISTRY – POSTER PRESENTATIONS:

ANALYZING FOR MELAMINE IN POWDERED MILK PRODUCTS.
Naotaka Sekiguchi, Tom Munson, Ph.D. Math Science Department, Concordia University, Portland, OR 97211.

In 2007 and 2008, there were some incidents in the United State and China having to do with melamine contamination in powdered milk products and pet food. Many pets and some infants died. The objectives of this study were: (1) to investigate why these incidents happened and to learn about the toxic health effects of melamine; (2) to adapt a published method for the trace-level analysis of melamine in powdered milk products for use in our laboratory; and (3), using this GC/MS method, to analyze various milk products for melamine. Our poster will present information from the three objectives of this study. According to FDA, the TDI of melamine is 2.5 ppm excluding infant formula and assuming that 50% of the diet is contaminated by melamine. The GC/MS SIM method for the analysis of melamine will be described in detail as well as the extraction, cleanup, and derivatization procedures required. Eleven different samples were analyzed using this GC/MS method. Every sample was found to have melamine contamination but far below the TDI except for one sample which contained about 2.0 ppm melamine.

MITOCHONDRIAL THIOL PROTEIN LEVELS STUDIED BY ISOTOPIC LABELING AND MASS SPECTROMETRY-BASED PROTEOMICS. Jing Wang, Claudia S. Maier, Department of Chemistry, Oregon State University, Corvallis, OR 97331.

Mitochondrial thiol proteins have key roles in regulating mitochondrial functions. During stages of increased oxidative stress, such as inflammation, cancer and aging, the redox imbalance causes accumulation of protein oxidative modifications, which can potentially lead to mitochondrial dysfunction. Thiol proteins are one type of commonly putative targets of oxidative stress-mediated modifications. The goal of this research is to determine the changes in thiol protein content in cardiac interfibrillary mitochondria (IFM) that occur as a result of aging. In this work, we have used a differential isotopic labeling approach in combination with mass spectrometry-based proteomics to compare thiol protein levels present in IFM isolated from young (3 months) and old (24 months) rat hearts. A total of four biological sample replicates were analyzed in this study. There were about 50 proteins repeatedly identified from more than 3 replicates. A total of 11 proteins showed statistically significant differences in thiol levels from two age groups. The qualitative and quantitative information on protein thiols obtained in this study may provide helpful clues regarding the molecular mechanisms underlying oxidative and age-related changes in heart mitochondria.
TIN OXIDE NANOWIRE SYNTHESIS AND CHARACTERIZATION. Hoang Tran, Jorge Rosas, Allen Chapadraza, Shankar Rananavare, Department of Chemistry. Portland State University, Portland, OR.

Tin oxide is a wide band gap semiconductor finding wide-ranging applications in transparent electronics, gas sensor and as a catalyst. The symmetry and the finite size effects on the nanometer scale modulate its electron transport properties and energy spectrum. Bulk-scale synthetic methods for doped tin oxide nanomaterials are presented. Furthermore, we differentiate the structural, optical and electrical properties of undoped and doped SnO$_2$ nanowires (NWs). The latter display characteristic red shift in photoluminescence spectra and higher conductivity. Recently, the first room temperature Cl$_2$ gas sensor using NPs of Sb-doped SnO$_2$ was demonstrated. Replacing NWs with NPs offers a reduced the number of electron tunneling events between electrodes and therefore, it should lead to a better dynamic range for the sensor. Thus, doped SnO$_2$ nanowires are promising materials for porous electronic devices and for ultra sensitive gas detectors.

FACILE PYROLYTIC SYNTHESIS OF SILICON NANOWIRES. Hoang Tran, Joo Chan, Shankar Rananavare, Department of Chemistry. Portland State University, Portland, OR.

One-dimensional nanostructures such as silicon nanowires (SiNWs) are attractive candidates for low power density electronic, optoelectronic devices including sensors. A new facile method for SiNW bulk synthesis is demonstrated in this work. This method is inexpensive and uses low toxicity material thereby offering a safe, energy efficient and green approach. The method uses low flammability liquid phenylsilanes, offering a safer avenue for SiNW growth compared with using silane gas. A novel, duo-chamber glass vessel is used to create a low-pressure environment where SiNWs are grown through vapor-liquid-solid mechanism using gold nanoparticles as a catalyst. The catalyst decomposes vapors of diphenylsilane and triphenylsilane to provide silicon which precipitates through gold nanoparticles as a single crystal SiNWs. These NWs appear to grow parallel to the substrate surface as shown by crosssection SEM. This opens up possibilities of synthesizing nano-junctions amongst wires important for the grid architecture for nanoelectronics as proposed by Likharev. Even bulk synthesis of SiNW is feasible using sacrificial substrates such as CaCO$_3$ that can be dissolved post-synthesis. Furthermore, by dissolving appropriate dopants in liquid diphenylsilane, a controlled doping of the nanowires is realized without use of toxic gases and expensive mass flow controllers. Upon boron doping, we observe a characteristic red shift in photoluminescence spectra. In summary an inexpensive and versatile method for SiNW synthesis is presented that makes these exotic materials available to any lab at low cost.
THE FIRST SYNTHESIS OF A GRAPHITE FLUORO-
TRIS(PENTAFLUOROETHYL) BORATE INTERCALATION
COMPOUND. Bahar Özmen-Monkul, Michael M. Lerner, Oregon State
University, Department of Chemistry/ Materials Science, Corvallis, OR 97331.

Graphite intercalation compounds (GICs) of composition
C\textsubscript{x}[FB(C\textsubscript{2}F\textsubscript{5})\textsubscript{3}]\cdot\delta F are prepared for the first time by the intercalation of
fluoro-tris(pentafluoroethyl)borate anion, [FB(C\textsubscript{2}F\textsubscript{5})\textsubscript{3}], under ambient
conditions in 48\% hydrofluoric acid containing the oxidant,
K\textsubscript{2}[MnF\textsubscript{6}] by chemical method. Powder XRD data indicate that
products are of mixed stages 2 and 3 after reactions for 1-20 h, with a
gallery height of 0.87 nm. The intercalate orientation is modeled
using an energy minimized anion structure. Microwave digestion
followed by B and F elemental analyses, along with
thermogravimetric analyses provide compositional \(x\) and \(\delta\)
parameters for the GICs obtained. In addition,
C\textsubscript{x}[FB(C\textsubscript{2}F\textsubscript{5})\textsubscript{3}]\cdot\delta CH\textsubscript{3}NO\textsubscript{2} with stage 2 is prepared by electrochemical
method in a nitromethane solution and characterized similarly.

TEMPERATURE-DEPENDENT CRYSTAL STRUCTURE STUDY OF A
SMALL HETEROBICYCLE, C\textsubscript{9}H\textsubscript{12}O\textsubscript{4}. Truc-Vi Duong and Edward J.
Valente, Department of Chemistry, University of Portland, 5000 N. Willamette
Blvd, Portland, OR 97203

1,7,7-Trimethyl-2,6-dioxabicyclo[2.2.2]octan-3,5-dione is a
dipseudoacyl ketal formed by a double intramolecular
dehydration/cyclization of 2-carboxy-3,3-dimethyl-5-oxohexanoic
acid. The compound is a volatile, colorless crystalline solid (mp
137\(^\circ\)C) which forms prisms and plates from ethanol by slow solvent
evaporation. The two crystalline morphologies are each
orthorhombic, space group P2\textsubscript{1}2\textsubscript{1}2\textsubscript{1} (#19),
a = 8.0557(2) Å, b =
10.3545(3) Å, c = 10.7583(3) Å, \(V = 897.37(11)Å^3\) (101K).
The crystal and molecular structure has been determined on a single
prismatic specimen at 280K, 250K, 200K, 150K and 101K (±1K).
The ostensibly rigid molecule possesses mirror symmetry, which is
not retained in the solid state. Each six-membered ring is in a boat
conformation, with torsions -0.2\(^\circ\), 1.3\(^\circ\), -2.7\(^\circ\) (101K).
Carbonyl
groups are eclipsed with a common methine C-H bond, and the
OCC(H) bond angles are enlarged to 126.9\(^\circ\), 127.0\(^\circ\), while the
intraring CCO angles are contracted to 112.4, 112.6\(^\circ\) (uncorrected
for libration). The coefficients of thermal expansion are 3.34 x 10\(^{-4}\)Å/K,
6.97 x 10\(^{-4}\)Å/K and 6.54 x 10\(^{-4}\)Å/K for the three crystallographic
axes. A single rigid-body librational model was fit to the anisotropic
librational parameters for the 280K structure, a fit which grows
somewhat worse at lower temperatures, suggesting additional
librational influences may be more apparent.
The work was supported by a grant from the National Science
Foundation (MRI 0618148) supporting diffraction equipment.
CHARACTERIZATION OF THREE NOVEL POLYOXOTUNGSTATES BY LANGMUIR-BLODGETT AND ELECTROCHEMICAL TECHNIQUES.
Michele Wong, Dr. Elizabeth J. Osburn Atkinson, Department of Chemistry, Linfield College, McMinnville, OR 97128.

This work characterized a novel class of organically modified polyoxotungstates of the anion parent group \( P_2W_{17}O_{61}^- \) by Langmuir-Blodgett and electrochemical techniques. The anion was derivatized by covalently attaching organo silyl groups of different lengths to produce amphiphilic properties. Polyoxometalates (POMs) possess a unique combination of properties such as tunable redox behavior and properties, which make them excellent coatings, membranes, and thin films. These can be built into highly ordered monolayers of amphiphilic molecules at an air-liquid interface by the Langmuir-Blodgett technique. Langmuir-Blodgett studies showed hydrophobic group length had no significant effect on the average area per molecule and revealed similar, stable pressure-area isotherms. Varying the compression speed at the air-liquid interface exhibited little affect on the isotherms. Variation in the amount of solution deposited caused island formation on the aqueous sub phase at higher volumes. Five reversible reductions for each compound were observed by cyclic voltammetry.

CIS-2,5-DIAMINOBICYCLO[2.2.2]OCTANE, A NEW SCAFFOLD FOR ASYMMETRIC CATALYSIS VIA SALEN-METAL COMPLEXES. Subrata Shaw, James D. White, Department of Chemistry, Oregon State University, 153 Gilbert Hall, Corvallis, OR-97331.

Racemic dicarboxylic acid 1 was synthesized in five steps from benzoic acid, resolved via its brucine salt and was converted to diamine 2 by double Curtius rearrangement of the corresponding bis acyl azide. The salen derivative obtained from 2-formed complexes 3 with a variety of metals, which catalyze asymmetric induction in reactions such as Hetero Diels-Alder reaction, Conia-ene cyclization and Nozaki-Hiyama-Kishi coupling. See image on proceeding page.
PMMA-SILICA HYBRID FILMS: EFFECT OF SILICA CONTENT ON THERMOMECHANICAL PROPERTIES. Morgan L. Ferguson¹, Dr. Philip R. Watson¹, Department of Chemistry, Oregon State University, Corvallis, OR, 97331.

Hybrid inorganic-polymer materials were prepared from pre-hydrolyzed tetraethoxysilane and poly (methyl methacrylate) in an acid catalyzed sol-gel process. The glass transition temperature ($T_g$) and the modulus increased with SiO₂ content. The variation of $T_g$ was modeled effectively by the Fox equation using an adjusted PMMA $T_g$. The modulus was modeled most effectively using the Voigt equation using an adjusted PMMA modulus. FTIR spectra gave insight into the structure property relationship seen between the constituents. Issues arising from retained solvent and hydrolysis products are considered with respect to the unexpectedly low $T_g$ values and the use of adjusted PMMA values in the models.
DEVELOPING A GIS 3-D LINEAR REFERENCING MODEL OF ROADS IN THE BULL RUN WATERSHED. David Argast, City of Portland Water Bureau, Portland, OR 97204.

The 102 square-mile Bull Run watershed has been a City of Portland water resource since 1895. The Bull Run Management Unit is primarily owned and managed federally by the Mt. Hood National Forest. Through an inter-agency agreement with the US Forest Service in December of 2007, the Portland Water Bureau assumed responsibility for the approximately 400 miles of roads within the Management Unit. An enterprise GIS represented the ‘best practice’ in managing data related to the roads and other watershed assets. The objectives were to: (1) build a scalable model that establishes a long-term data management business solution; (2) identify procedures and practices that efficiently and accurately build graphical objects representing watershed assets; (3) develop a simple user-interface that adopts current watershed maintenance practices. A linear referencing model will accurately store assets based on their relationship to road (or stream) milepost locations and/or GPS coordinates. To ensure 3-dimensional accuracy, road measurements are calculated using a LIDAR elevation model. The use of ‘dynamic segmentation’ will automate the graphical representation of those assets.

THE SOCIAL AND ENVIRONMENTAL IMPLICATIONS OF ECUADOR’S COMMERCIAL TUNA FISHING INDUSTRY. Nate Bellinger, Department of Geography, University of Oregon, Eugene, OR 97403.

This paper explores the local, national, and international factors that led Manta, Ecuador to become the most important location for commercial tuna fishing in Latin America and then considers some of the social and environmental implications of Ecuador’s expanding tuna fishing industry and the more general impacts on urban development in Manta. Social factors, such as examining who works in the fishing industry, potential health problems associated with
work in the fish processing factories, and implications for Ecuador’s traditional fishing communities are considered as are environmental concerns such as over-fishing, declining fish sizes, and by-catch. Given the uncertain future of free trade agreements between the United States and Ecuador and the increased interest of Ecuador’s government to explore other trade options such as the Bolivarian Alliance for the Peoples of Our America (ALBA) or Mercosur, a clear understanding of the factors that led to Ecuador’s current position as Latin America’s leading exporter of tuna fish is critical. Furthermore, as Ecuador’s new government takes steps, such as passing a new constitution in 2008, to increase government responsibilities, expand environmental protections, and protect labor rights, the commercial tuna fishing industry offers a look into the effectiveness of these reforms. This paper argues that the commercial tuna fishing industry in Manta, Ecuador has played an integral role in the development of Manta but that it has also contributed to new social and environmental concerns for Manta’s residents.

THE TRANSNATIONAL NETWORKS OF CULTURAL COMMODITIES: PERUVIAN FOOD IN SAN FRANCISCO. Kelsey Brain. Geography Department, Portland State University, Portland, OR 97207-0751.

In a setting of increased movement, communication, and flows across space, conditions of transnationality are becoming increasingly more common. Commodity chains have proved to be an effective way of studying the processes and meanings created by this transnational space. Food is an important commodity to transnational communities as they endeavor to maintain connections with their home country. Building on Appadurai’s idea that following the movements and social lives of things is a meaningful way to study society (1986), the goal of this research is to examine the networks that bring foreign cuisine ingredients to the Peruvian transnational community of San Francisco, California in order to provide commentary on the social and cultural dimensions of global commodity flows. By foreign cuisine ingredients I am referring to ingredients readily available in Peru that are commonly used in traditional Peruvian cuisine dishes and that must be imported to California. This paper maps the network bringing selected Peruvian food items to San Francisco, identifies who controls and benefits from the movement of these items, and analyzes differences in the movement and consumption of these items by three categories of end users in San Francisco: expensive restaurants, moderate restaurants, and Peruvian home cooks. It provides a narrative discussion of migrant groups’ cultural eating habits and the resulting transnational food networks.

Understanding changes in streamflow as it relates to climate variability and change has significant implications for adaptive water resources management. Recent studies found that spring snowmelt could arrive earlier, and that summer flows may be depressed in many Pacific Northwest streams in a warming climate. We assessed changing runoff patterns in Oregon streams using streamflow records from 21 U.S. Geological Survey unregulated gauging stations. Nine indices – annual, seasonal, monthly streamflow, center timing of runoff, top 5%, 25%, 50%, 75%, and 95% runoff – were used to identify trends in streamflow. According to the Mann-Kendall’s test, annual streamflow declined in 18 stations, but only three stations showed significant changes at the 5% significance level. In dry season, September streamflow declined in 20 stations with 16 stations showing significant trends. March streamflow increased in 10 stations, but only one station showed a significant trend. The 75% (bottom quartile) average annual flow declined in 20 stations, with eight showing significant trends. The 95% (the bottom 5%) flow declined in 20 sites with 10 of them showing significant trends. The center timing of flow became earlier during the study period, but the trends were not significant in most sites. The annual and dry season runoff are closely related to El Niño Southern Oscillation (ENSO) and Pacific Decadal Oscillation (PDO) cycles with higher than normal streamflow during La Niña and cool phase PDO years and lower than normal streamflow during El Niño and warm phase PDO years.

ALTERNATIVE FOOD NETWORKS AND LAND USE IN WASHINGTON COUNTY, OREGON. Joshua Cousins, Geography Department, Portland State University, Portland, OR 97207-0751

This study examines the role of alternative food networks (AFNs) in preserving agricultural landscapes and livelihoods in Washington County, Oregon. Focusing on small scale agricultural landscapes where the producer sells at farmers markets or through community supported agriculture (CSAs), the researcher explores farmers’ concerns about urbanization and farmland preservation, their relationship to urban markets, motives to become a farmer, engagement with the surrounding environment, and their difficulties participating in AFNs. In addition, I explore farmers market managers’ insights into the development of AFNs and how they see their markets supporting small scale farmers. Complementary to these interviews is a survey where the researcher examines consumer motives to ‘buy local’ and consumer concerns about farmland preservation. Interpretive frameworks drawn from political ecology, rural studies, and landscape are used to analyze the role of particular ideas and imaginaries of the rural countryside in supporting
agricultural livelihoods and preserving agricultural lands. In so doing I argue that both urban and rural contexts are important in the development of AFNs, but also that a better understanding between city and country and how urban demand for local food can help preserve an agricultural landscape close-in to an urban locations. The research will be useful for incorporating the experiences, aspirations, and impact of small-scale farmers into urban and regional planning.

WHAT DETERMINES URBAN RESIDENTIAL WATER CONSUMPTION BEHAVIOR? RESULTS FROM A HOUSEHOLD SURVEY IN HILLSBORO, OREGON. Lily House-Peters, Geography Department, Portland State University, Portland, OR 97207-0751.

Increases in urban residential water demand, due to population growth, and the threat of reduced supply, from drought and anthropogenic climate change, have resulted in renewed attention to both indoor and outdoor water conservation. However, for implementation of conservation measures to be economically efficient and culturally acceptable, the key factors that either encourage or constrain people from engaging in resource conservation efforts and environmentally sustainable behaviors must be more comprehensively understood. This research utilizes results from a household level survey (n=75) to examine indoor and outdoor water consumption patterns in Hillsboro, Oregon, a rapidly growing suburb in the Portland metropolitan area. The following research questions are addressed: 1) Is there a correlation between demographic variables and the quantity of indoor and outdoor water consumed in each household? and 2) How do households that have invested in water conservation devices vary from those that have not? Responses to the survey questions are used to quantify the amount of indoor and outdoor water consumed by each household. Statistical analysis employing the non-parametric chi-squared test find that indoor water consumption is significantly correlated with household income, family size, age of residents, and investment in low flow faucets and showerheads, while outdoor water use is positively correlated with single-family detached housing. Interestingly, in contrast with the existing literature, indoor consumption is not significantly correlated with education level, the age of the house, or with investment in low water use dishwashers or washing machines and outdoor consumption is not correlated with ownership of a sprinkler system.

POSSIBLE CHANGE IN DROUGHT OCCURRENCE PROJECTED BY MULTI-MODEL SIMULATION IN THE WILLAMETTE RIVER BASIN, OREGON. Il-Won Jung, Heejun Chang (changh@pdx.edu), Geography Department, Portland State University, Portland, OR 97207-0751.

Drought is an extreme climate event that causes greater economic impacts than any other natural hazards. The outcomes of drought
reach a wide range of water-related sectors: water resources management, agriculture, ecosystems, and hydroelectric power generation. Recent studies address that dry years are becoming more severely dry across the Pacific Northwestern region. If it continues, the potential for water conflicts and water scarcity will increase. We investigate possible changes in future drought patterns over the Willamette River Basin (WRB). To provide future precipitation change, statistically downscaled 16 future climate simulations (8 GCMs with 2 emission scenarios) are aggregated into 216 sub-basins in the WRB that are relevant for water resources management. Standardized Precipitation Index (SPI) and Standardized Runoff Index (SRI) were employed to assess intensity and duration of drought at four different lasting time scales, 1-, 3-, 6-, 12-month. The Precipitation Runoff Modeling System (PRMS) model is used to assess changes in runoff under future climate conditions. SPI and SRI values for two 30-year future time slices were computed with respect to the reference period (1960-1989) in order to assess the changes in drought frequency. The results of this study show an increase in the frequency of short-term extreme drought, such as lasting 1 and 3 month drought but long-term droughts are expected to have no significant changes. This is attributed from the summer precipitation and streamflow decrease but prompt earlier snowmelt and winter runoff increase. Additionally, we assess the uncertainty in future drought projection caused by GCM structure, emission scenarios, and drought indices. This result could be beneficial for long-term water resource management and planning.

PATHWAYS AND FENCES: VIOLENCE, GENDER, AND MOBILITY IN EL PASO DEL NORTE. Rene G. Kladzyk. Geography Department, University of Oregon, Eugene, OR 97402.

Together, the cities El Paso, Texas and Juarez, Mexico form the largest international border metropolis in the world. While El Paso consistently ranks among the safest cities in the USA, Juarez’s recent and extreme escalation of violence has produced one of the world’s most dangerous locales. This starkly differentiated and transnational urban conglomeration forms a striking example of the complex geographies shaped by globalization. The economic landscape of El Paso and Juarez has been substantially reconstituted by the growth and waning of neoliberal industry, and by the disruptive force of Mexico’s exceptionally violent and chaotic war between rival drug cartels. Consequently, a gendered renegotiation of public and private spaces is occurring, with profound implications for the personal mobility of women in particular. My study situates the recent dynamics of this transnational city within a framework of feminist and economic geographies of globalization. To what extent are the daily economic geographies of women confined and reconstructed in a context of violence, and in turn, how is the presence of violence in Juarez connected to the neoliberal economic reconfiguration of the
city? I seek to uncover linkages between globalization and violence through an analysis of mobility and economic activity among female laborers in Juarez and recent migrants to El Paso, whose displacement is often linked to danger in Juarez. This research will amplify the voices of women living in a locality as it reels from transnational forces, and will contribute to a critical discourse on gender and borderland identity.

PRESENTING CATALONIA TO THE WORLD: CULTURAL IMAGES AND UNDERLYING TERRITORIAL IDEAS. Matthew W. Landers, Geography Department, University of Oregon, Eugene, OR 97405

Sites of cultural and historical importance to the Catalan nation have been designated UNESCO World Heritage Sites, assigning a universal value to places that have strong links to regional conceptualizations of identity. The past three decades have seen the Spanish autonomous region of Catalonia renegotiate its sense of place within Spain. The objective of this study is to examine how the Generalitat, or regional government, advances particular images of Catalan identity as presented in the Statute of Autonomy, as well as to assess the extent to which these images are influenced by long-standing political-territorial ideas about representing a nation and its past. Three territorial themes are identified in the presentation of heritage by Turisme de Catalunya and the Statute of Autonomy: 1) that Catalonia is home to a distinct cultural group, 2) that Catalonia has a long history as a territorial unit, and, 3) that Catalonia has a long history of self-government. This study is relevant to the current debate being played out in Spain over the definition of Catalonia as a nation in the 2006 reform of the Statute of Autonomy.

GETTING A HANDLE ON LAKES. Richard Lycan, Population Research Center, Portland State University, Portland, OR 97225

Assume you are a water quality scientist and you want to add data for a particular lake to the PNW Water Quality Exchange Database (PNWWQX). If the lake is named “Lower Eddeeleo”, it is clear what lake is intended. If the name is “Blue Lake”, there are 17 Oregon lakes with “blue” in the name and even two Blue Lakes in Multnomah County. The Geographical Names Information System (GNIS) is the official catalog of place names and contains the names of over 5,000 Oregon lakes, of the approximately 70,000 water bodies in the state. The GNIS provides a latitude and longitude coordinate point location for each name. This should allow the use of GIS “inside” or “near” operators to link the place name to a vector polygon representation of the lake. However a high proportion of the GNIS coordinates for lakes are not located within the lake polygons in the National Hydro Database (NHD). Some place name label points are located nearer to some other water body than the one they
represent. Thus, many lake and reservoir features in the NHD are not attributed with the GNIS number and name and some lake features carry an incorrect name. Thus there is a problem in selecting lakes by name in the PNWWQX and in entering, retrieving, or analyzing data. This paper will illustrate some of the problems with the GNIS place names representation in the NHD and suggest some steps that can be taken to improve the situation.

**URBAN PRACTICE IS EVERYDAY SPACES: THE MULTIPLE USES OF URBAN FARMS IN DAR ES SALAAM, TANZANIA.** Leslie McLees, Geography Department, University of Oregon, Eugene, OR 97403.

There is a fundamental shift in the way people are living on the planet. Over half of the world’s population now lives in urban areas, yet many cities struggle to provide basic services and infrastructure. In recognition of the growing urban crisis, urban agriculture (UA), long considered an inappropriate use of urban space by planners and government leaders, is being recognized as a vital part of city landscapes around the world. In Dar es Salaam (DSM), Tanzania, urban farmers produce-fifty percent of the food consumed within the city, and approximately 1.2 million residents engage in some form of UA. In 2000, the Tanzanian government formally incorporated UA into zoning guidelines, one of the only countries in Africa to do so. Yet there are no places zoned for UA in DSM, and the practice of forty-percent of the population remains illegal. This project proposes to examine the roles that farms play as specific spaces that fulfill multiple needs to reveal the wider purposes of peoples’ practices in, and engagement with, urban space. This research proposal uses a conceptual framework combining urban geographies that are critical of the economic and developmentalist lens through which African cities are often framed with Henri Lefebvre’s theorization of how everyday practices influence peoples’ use of space in cities. I will explore these themes through a combination of methods: interviews with various stakeholders involved in UA in DSM, a new method in human geography called photo voice that will incorporate focus groups, and qualitative mapping.

**HIRED GARDENS AND URBAN LANDSCAPES: A CRITICAL ANALYSIS OF PERSONAL "FARMS" IN SAN FRANCISCO AND SEATTLE.** Lindsay Naylor, Geography Department, University of Oregon, Eugene, OR 97403.

In the past two years businesses have been established in the United States that can be hired to create and maintain a food garden on personal property. The primary goal of this presentation is to analyze who is utilizing hired garden services, where and why. The secondary goal is to look at the more theoretical questions of what issues these gardens raise for understanding access to fresh local food, the distribution of food and spaces of resistance. The intent of
this research is to further scholarship on the discourse of local food, food security, urban social hierarchies and spaces of resistance on the urban landscape.

THE SPATIALITY OF URBAN GRAFFITI: A CASE STUDY IN THE CITY OF PORTLAND. Brett Peters, David Banis, Hunter Shobe. Geography Department, Portland State University, Portland, OR  97207-0751

The Spatiality of Urban Graffiti is a small part of a larger study whose aim is to reveal spatial patterns of urban graffiti along eight major corridors in Portland. Additionally, the project assists in discovering and analyzing meanings attached to these patterns. These meanings can take root from political, economic, social, and cultural forces and are based on both quantitative and qualitative data. The crucial questions we are trying to answer with the project are: (1) are there more incidents of graffiti on public or private space? (2) How do the processes of gentrification in a particular neighborhood affect the incidents of graffiti? (3) Which portions of the city are more concerned about covering up graffiti? And (4) how do the patterns change over time? Students from the Geography Department at Portland State University collected the data for the GIS analysis and cartography of the project by spending hours of fieldwork documenting various aspects of graffiti along major corridors in Portland. These aspects documented include the categories of graffiti (i.e. tag, sticker, throw-up), medium used (spray paint, marker), amount, writer’s name, what it’s on (garbage can, bus stop), and whether it is on public or private space. This data was then geocoded into ArcGIS to reveal the physical location of each incident of graffiti where further GIS analysis can take place. The maps are divided by corridor, and more specifically, by block adjacent to each corridor. This study is still in its developmental stages and is laying the groundwork for more research to come.

PORTLAND’S PERI-URBAN RURAL FRINGE: A STUDY OF FARM PRODUCTION AT OUR EASTERN AND SOUTHERN GROWTH BOUNDARY. Melissa Pirie, Geography Department, Portland State University, Portland, OR  97207-0751.

Practicing unsustainable methods of producing, handling, and transporting food will have a negative impact on our future. In the last century we have experienced a shift toward urbanism, raising the cost and amount of energy required to transport our food. In a city there must be enough food produced by the urban population itself or in rural agricultural areas to meet food demands. The cost of food past and present is highly subsidized by the government. National and international subsidies create falsely low prices increasing the likelihood that individuals will purchase instead of grow or raise their own food. Due to this rise, local primary relationships with growing and growers have been supplanted with secondary monetary-based
relationships. Portland’s Urban Growth Boundary (UGB) was established in part to play a role in the local production of food; I discuss preliminary prospects for potential participants in a regional “foodshed” for the greater Portland area. Portland has raised their production of locally grown food while linking urban agriculture to our identity as a city. I examine this identity by looking at the greater geographical context of environmental, social, and economic relationships that exist in Portland, specifically at its UGB. Proposed expansions at our UGB are examined through the lens of farmers at the Eastern and Southern UGB. Data regarding farms and their proprietors, what is being grown at these farms, and where those goods are going, is collected and examined for trends.

THIS DATA IS TOO GOOD – USING LIDAR DATA TO CREATE BOUNDARIES. Corey Plank, U.S. Bureau of Land Management, Portland, OR

Jurisdictional and administrative boundaries often follow physical features such as ridges to separate areas. Traditional methods for depicting the boundaries began with photogrammetric capture of the features on the ground. The highest accuracy in general use for most features was that for the 1:24,000 scale USGS quadrangle series. Today, there is much higher accuracy elevation data available. Surface models with one meter or smaller resolution produces ridges and other features with very fine detail. This presentation provides an overview of the techniques needed to derive features and create linework suitable for typical map scales from high resolution data.

THE EL NIÑO-SOUTHERN OSCILLATION AND WILDFIRES IN THE WESTERN OREGON CASCADES. Sarah Praskievičz, Geography Department, University of Oregon, Eugene, OR 97403.

Wildfires are widely acknowledged as one of the most significant disturbance agents in Pacific Northwest forests. One factor that has been studied in determining wildfire occurrence and intensity is the role of climatic variability. I statistically analyzed the historical association between ENSO phase and wildfire occurrence and extent in the forests of Oregon’s Western Cascades. This study used ANOVA and Pearson’s correlation to assess the relationships between ENSO phase and fire occurrence and size in Oregon’s Western Cascades from 1962 to 2005. The results indicate that current-year ENSO phase is significant in determining the total area burned, with a greater total fire extent in El Niño years. The one-year lagged ENSO phase was also significant in determining number and mean size of fires, with El Niño events generally followed by fewer and larger fires and La Niña events by more and smaller fires. The implication of these findings is that ENSO phase is a significant determinant of the total area burned in a given year in the Western Cascades. The results of this analysis reflect the nature of the
Western Cascades fire regime as weather-driven rather than fuel-limited and the importance of drought in igniting and sustaining fires. In order to understand how fire regimes may respond to future climate change, it is instructive to examine how they have been affected by past climatic variability. Such information can help land managers prepare to adapt to climate-driven changes so that our forests can continue to provide us with their many values.

TIBETAN MIGRATION, CULTURAL REPRODUCTION, IDENTITY AND PLACE IN NORTH AMERICA. Thomas Ptak, Geography Department, University of Oregon, Eugene, OR 97403

This ongoing research undertaken in Portland, Oregon, and New York City investigates current issues surrounding cultural retention, national identity and spatial migration patterns within the exiled Tibetan diaspora of North America. The research examines the importance placed on retention and re-creation of Tibetan culture through a variety of culturally based events and daily cultural practices within two North American Tibetan communities. During prior research a 'strategic essentialization' of Tibetan culture in exile was discovered, current research, therefore, seeks to examine what involved factors have resulted in the conscious or unconscious decision by Tibetans living in the United States to "strategically essentialize" aspects of Tibetan culture and identity. This study adopts a comparative approach to understanding identity construction through an examination of identity markers contrasted between Tibetans born in Tibet and exiles born in South Asia or the United States. Migration impacts and the impacts of pre-migration ethnic and religious sub groups are also a central theme to this research. More specifically this research seeks to examine how spatial patterns and relationships of the ethnic and cultural identities which exist within Tibetan diasporic communities of North America have been affected by strategic directives of the Tibetan Government in Exile, and the Office of Tibet in the United States. This research contributes new data and new theoretical understanding to ever increasing levels of interest focused toward migration studies, and within the broader discipline of Ethnic Geography.

PORTLAND’S AGRICULTURAL LANDSCAPE: LAND-USE, FARMERS, ACROSS THE RURAL-URBAN DIVIDE. Javier Spyker, Geography Department, Portland State University, Portland, OR 97207-0751

In Oregon's Portland Metropolitan Area, Washington County embodies many landscape types. Here landscape transitions rapidly from urban to agricultural resource lands. Urban growth is associated with the rapid expansion of Oregon's information economy in the Silicon Forest. Oregon's land use laws, which created Urban Growth Boundaries (UGB) in 1979 have arrested sprawling growth. Outside the boundary, a century of farming endures and adapts to current
socio-economic conditions. This paper seeks to better understand the ways in which agricultural lands can function as a resource for urban communities and as a sustainable cultural landscape amenity. Nineteen farmers in Washington County were interviewed and surveyed at their properties. These farmers were selected to represent the diverse range of parcel sizes and agricultural production occurring in Washington County (6 small farms of 1-9 acres, 6 medium farms of 10-49 acres and 7 large farms of 50-179+ acres. This exploratory investigation examines empirical evidence of farmland operator attitudes and practices that bridge the urban rural divide as providing resource lands for urban amenity. Survey results indicate a strong linkage between farm operation and local support and emphasize local markets and urban customers. Anecdotal examples demonstrate instances where farmers have made decisions not based on economic function, but on preservation of the regional cultural landscape features. Preliminary investigation garners support for the further investigation into the positive effects of working landscapes (farms) at the edge of large urbanized areas.

USE OF A SAMPLING APPROACH TO REPRESENT SPATIAL DISTRIBUTION OF WILDLIFE IN THE CITY OF PORTLAND. Daniel Uthman, Geography Department, Portland State University, Portland, OR 97201-0751; Oregon Department of Fish & Wildlife, Salem, OR 97303.

As human populations grow and urban development extends into previously undeveloped areas, human and wildlife habitats have increased proximity and contact. At the same time, wildlife has remained in place or migrated into urban areas, whether to seek shelter, food or other resources. This project seeks to answer the question of where the greatest density of certain wildlife can be found in the City of Portland. The study, still in its early stages, mainly focuses on five species – raccoons, opossums, coyotes, skunks and beavers. Unlike a zoo, there is not a system of 24-hour surveillance of wildlife in Portland that can provide the locations of wild animals at any time. In order to affix locations to wildlife presence or habitat in the city, I am using the appropriate reports submitted to the Audubon Society of Portland and Oregon Department of Fish & Wildlife. These reports, which have never been compiled in a geographic information system (GIS), include address data for cases involving private residences or commercial or public buildings. Once collected, the data is entered into ArcMap to do a GIS analysis of the spatial distribution. The goal is to discover patterns or locations of habitat for wildlife species in the urban landscape, with the idea that this could be useful for improving general ecology or developing wildlife corridors or passages in the urban setting.
COMMUNITY LEARNING GARDEN PROGRAMS IN THE PORTLAND AREA: HOW DO LEARNING GARDENS HELP LOW-INCOME FAMILIES ACCESS FRESH LOCALLY-GROWN FOODS? Denissia E. Withers, McNair Scholar, Portland State University, Portland, OR 97209

Community learning garden programs help families grow and prepare their own food. The skills and knowledge gained from these programs can help families access more fresh locally-grown foods. However, locally-grown foods are often perceived to be too expensive for low-income families. Economic barriers such as transportation and access to convenient food sources and the perceived high cost of fresh foods limit the amount of fresh foods available to low-income families and individuals. This study was designed to analyze how participation in community learning garden programs helps increase low-income families access to organic and/or fresh locally-grown foods. The community partner selected for the study was the Oregon Food Bank’s (OFB) Seed to Supper learning garden program. The OFB learning garden programs “address the root causes of hunger through increased nutrition, self-reliance and community food security (Learning Gardens, n.d. para.1).” An analysis of OFB survey results helped assess the effectiveness of the Seed to Supper program and the impact the program has on food security for targeted populations. In addition, participants from the program were interviewed to document qualitative outcomes of the program. The interview and survey process clarified how much fresh produce the participants grew and where and how much produce they purchased. Two Seed to Supper instructors and two key community members were interviewed as well to gain valuable insight from their perspectives about the program. The suggestions and recommendations in this study offer many creative and practical solutions to help alleviate food insecurity.

EVALUATING THE HYDROLOGIC RESPONSE OF STREAMS IN URBAN WATERSHEDS. Matthew Wood. Geography Department, Portland State University, Portland, OR 97207-0751.

Increases in impervious surfaces associated with urban development have been shown to significantly alter the natural hydrologic regime, leading to changes in the amount and timing of streamflow, specifically quicker and higher peak flows, as well as decreases in groundwater storage. To better understand the hydrologic effect of urban development within the Portland Metropolitan Area, this research examines the varying levels urbanization in two urban watersheds and its effect upon streamflow behavior. The Fanno Creek watershed is highly developed, with 84% urban land use, while Johnson Creek watershed is moderately developed with 40% urban land use. To effectively analyze the different response of the two watersheds, wet (November-April) and dry (May-October) seasons
have been isolated to allow seasonal flow comparison for water years 2000-2009. A nested watershed approach is employed to evaluate the effect of scale on streamflow comparisons as well as to explore the impact of upstream areas with less urbanization. Hydrograph separation is used to isolate baseflow from streamflow, and to display any differences in surface runoff contribution that may exist as a result of imperviousness. The results of this investigation will provide insight into the behavior of streamflow and hydrologic responses resulting from urbanization.

GEOLOGY

Section Chairs:

Scott Burns
Portland State University

Jeff Myers
Western Oregon University

GEOLOGY – ORAL PRESENTATIONS:

LANDSLIDES IN PORTLAND, OREGON DURING THE FALL AND WINTER OF 2008-2009: BROKEN WATER PIPES AND HEAVY RAINFALL AS TRIGGERS. Scott Burns, Dept. of Geology, Portland State University, Portland, Oregon 97207

Over 20 major landslides were studied in the area of Portland, Oregon during the fall and winter of 2008-009. The first, and the most spectacular, was a house that came crashing down the hill on Burlingame Place in the West Hills on October 8, 2008 during a time of the year when the soils are dry. It hit three houses at the bottom of the slope after traveling over 80 meters before completely collapsing. The value of the house was over $1.5 million. The fact that insurance did not cover the catastrophe and the owner escaped without injury made the headlines. A broken water pipe was determined to be the cause. Water was noted passing under the house the day before the slide. Water meter readings noted large increases in usage since July 2008. On January 1, 2009 the city had a rainfall of 8.1 cm in 24 hours causing the following slides. In Lake Oswego, a suburb south of Portland, a shallow landslide on a road diverted storm water onto a second slope below the road causing another slide that crashed into a house valued at over $1 million destroying it. No one was injured. In nearby Oregon City, a 500 cubic meter earth flow formed in an ML soil cover of an old landfill; no damages occurred. In Estacada to the east of Portland, reactivation of an ancient landslide that
destroyed a house on the lower slope of the old slide blew up the house’s propane tank causing the house to burn down. The four occupants escaped safely. Four additional earth flows were mapped on the adjacent slope nearby. In nearby Gresham, a large mudflow was formed from the liquefaction of a small earth flow in loess at the top of an ancient volcano. The mudflow traveled over 2 km in length. In the West Hills of Portland, runoff from a small road caused a small earth flow (250 cubic yards) to form.

PRELIMINARY CHARACTERIZATION OF TUFA MOUNDS AND THEIR TEXTURES, LAKE ABERT, OREGON. Anthony Bartruff. Dept. of Geology, Portland State University, Portland, Oregon 97207

Tufa mounds and ridges near the northern shoreline of Lake Abert vary in height from 1 to 3 meters. The mounds were formed most likely during the Late Pleistocene when Lake Abert was part of the larger pluvial Lake Chewaucan. Based on their morphology, location, and texture, the largest grouping of mounds can be split into north and south groups. The southern group consists of several small (<1 m) dome-like mounds, which strike NW-SE. Calcium carbonate textures within the southern group tend to be microcrystalline with occasional colloform and botryoidal calcic forms. The larger, higher relief northern mounds appear to be where north striking faults intersect NW-SE striking faults. Carbonate textures within the northern group range from a biomorphic to microcrystalline substrate with both bladed and botryoidal calcite found within void spaces and conduits within the tufa. The presence of bladed calcite within the mounds suggests boiling to near boiling fluids reached the surface during mound formation.

WINE LABEL LOGOS: ORGANIC, BIODYNAMIC®, AND SUSTAINABLE VITICULTURE IN THE WILLAMETTE VALLEY, OREGON. Kathryn Nora Barnard, Portland State University, Portland, OR, 97202.

Oregon vintners are known for their environmentally conscious practices and many are certified in different manners to relate this to the consumer. As of February 2009, 29% of Oregon vines, totaling more than 5,692 acres (over 3600 acres of which are in the Willamette Valley) were certified in some way. This amount is in large contrast to the rest of the US where only 2% of all the vineyards are certified in some way. A review of the process of certification for different labels is useful for consumers and for background into future research on viticulture in the Willamette Valley. Descriptions of the various certifications were obtained through official websites and visits with the knowledgeable personnel at a selection of wineries located in the Northern Willamette Valley during the fall of 2009. The different ways in which vineyards and wine can be certified include, but are not limited to, Oregon Tilth Certified Organic, Demeter Biodynamic®, Low Input Viticulture and Enology (LIVE)
Certified Sustainable, Salmon - Safe, and Oregon Certified Sustainable Wine. Leadership in Energy and Environmental Design (LEED) US Green Building Certification is a way for the winery or tasting rooms to be certified as well. According to the data, about 2600 acres of vines are certified sustainable by LIVE, Inc, 350 acres are certified by the Oregon Tilth program, and 640 acres are certified by Demeter Biodynamic® in the Willamette Valley. Salmon-Safe has certified 110 Oregon vineyards and many wineries are participating in the Certified Sustainable process as well.

STREAM RESTORATION IN NORTHEASTERN OREGON THROUGH BEAVER REINTRODUCTION. Elizabeth M. Townsend1, Suzanne Fouty2, Nicholas E. Bader1, Robert J. Carson1, 1Department of Geology, Whitman College, Walla Walla, WA, 99362, 2Wallowa-Whitman National Forest, Whitman Ranger District, Baker City, OR 97814.

In the summer of 2009 geomorphic data were collected on Camp Creek, a tributary of the North Fork of the Burnt River in the Wallowa-Whitman National Forest in northeastern Oregon. This region is characterized as semi-arid with mixed ponderosa and lodgepole pine forests. The geology of this site is composed mostly of Quaternary alluvium underlain by clastic rocks and andesitic lava flows." to "Quaternary alluvium overlies clastic rocks and andesitic lava flows. The objective of this project was to collect baseline geomorphic data on Camp Creek as well as to compare the volume of water held in the creek channel during the late summer months to the bank-full volume. The potential storage of Camp Creek is 30 times greater than the current amount in one reach and 50 times greater in a second reach. The reintroduction of beaver into degraded streams such as those in northeastern Oregon could restore these streams to a healthier state, help to repair wetlands and riparian areas, and mitigate the effects of climate change on water storage.

TEPHRA LAYERS IN THE HOLOCENE FILL OF THE LOWER COLUMBIA RIVER VALLEY: PORTLAND TO WARRENTON, OREGON. Shana Kendall, Jenifer Shempert, Curt Peterson, Department of Geology, Portland State University, 1721 SW Broadway, Portland, Oregon 97207.

Several tephra layers have been identified in the upper fill (0-150 ft depth) of the lower Columbia River valley. The tephra layers provide stratigraphic correlation of key geological, archaeological, and geotechnical units throughout the length of the lower Columbia River. The tephra layers are identified by light colored ash and/or by sand-gravel size lapilli (pumice) fragments mixed into the river sediments, as examined from borehole samples. We report on the preserved tephra layers from industry boreholes in the Portland basin, Clatskanie flood plain, and at Warrenton (near the Columbia River mouth). Three distinctive tephra layers occur at ~20’, ~50’, and ~80’ depth in Portland, at ~25’, ~50’, and ~130’ depth in the Clatskanie
flood plain, and at ~65’ and ~120’ depth in Warrenton. The middle tephra layer (50-65’ depths) is dated at 7490-7660 calYr BP in a Portland borehole, and it correlates to the penultimate Mt. Mazama eruption at 7,000 yr BP. The younger tephra layer is correlated to the Mt. St. Helens set Y eruptive phase, reported at 3000-3900 yr BP. The deepest tephra layer’s source is currently unknown; dating and chemical analyses of this layer are in progress. The depths of these tephra layers vary locally between boreholes, possibly due to depositional setting (paleo-channel versus paleo-flood plain). Nevertheless, overall similarities in fill ages, based on the tentative tephra correlations, demonstrate rapid filling of the Columbia River valley due to rising sea levels throughout the Holocene transgression.

AN ASSESSMENT OF NATURALLY OCCURING BACKGROUND LEVELS OF ARSENIC IN SOILS AND GROUNDWATER OF WESTERN OREGON. Tracy Ryan, TJ Schepker, Department of Geology, Portland State University, Portland, Oregon, 97201.

The Oregon Department of Environmental Quality (DEQ) regulated maximum arsenic level for soils in a residential urban area is 1ppm. Prior analysis identified sites in Western Oregon where background arsenic levels exceed 20ppm. These sites were used to identify and map thirteen rock units, covering 35% of Oregon's area, where natural levels of arsenic are likely to exceed DEQ remediation standards. A comparison of contamination levels between the A and B soil horizon data show that greater concentrations of arsenic are occasionally found in the B horizon as expected, however in most locations greater concentrations occur in the A horizon. This suggests the possibility of a particularly complex leaching relationship of arsenic through these soils. Water well data collected by The United States Geological Survey (USGS) were analyzed to explore relationships between contaminated soils and groundwater. Of the wells that registered arsenic levels greater than 1ppb, 20% were within rock units that tested positive for arsenic contamination. Whanger et al. (2007) suggest arsenic contamination of water underneath the Fisher Formation and Quaternary Alluvium, and when the wells within these formations were taken into account, the correlation is significantly more pronounced, with 76% of the contaminated wells being within this area. This study shows that high arsenic levels may naturally occur in soils throughout the state, and that more study is necessary to determine if current standards for remediation need to be reassessed.

PLAGIAULACID PREMOLARS IN KANGAROOS AND MULTITUBERCULATES AS AN ADAPTATION TO A DIET OF TRUFFLES. Gregory J. Retallack, Department of Geological Sciences, University of Oregon, Eugene, Oregon, 97403
Plagiaulacid premolars are distinctively fluted blade-like teeth found in extinct multituberculate mammals, as well as in extinct kangaroos and their living relatives the potoroos and bettongs. Its sharp edge and fluted flanks have been regarded as a cutting tool for carnivores, frugivores or granivores. However, microwear studies of plagiaulacid premolars reveal sharp parallel scratches from a more abrasive diet than typical for carnivores, frugivores or granivores. This can be explained by a diet of truffles (hypogaeal fungi), which are covered with grit that would be shed by steep-sided teeth. Living potoroos and bettongs with plagiaulacid premolars have a high proportion of truffles (hypogaeal fungi) in their diet. Indeed the proportion of fungus ($P$ in %) observed in their diet correlates highly ($R^2=0.77$, standard error±17.6%) with length of the plagiaulacid premolar ($L$ in mm) according to the relationship: $P=18.6L+75.2$. This relationship is based on observations of the following living species and varieties with plagiaulacid premolars: Hypsiprymnodon moschatus (premolar length 3.9 mm, 0% fungi in diet), Potorous tridactylus tridactylus of mainland Australia (6.5 mm, 44%), Potorous tridactylus apicalis of Tasmania (7.6 mm, 79.5%), Potorous longipes (6.7 mm, 76%), Bettongia tropica (8.3 mm, 67 %), Bettongia gaimardi cuniculus of Tasmania (8.1 mm, 64.5%), and Burramys parvus (5.1 mm, 0%).

This relationship should be used with caution because some macropods with plagiaulacid premolars eat no fungus, and others, such as Wallabia bicolor, have been observed to gorge on truffles after fires, yet lack plagiaulacid premolars.

GIANT FELID POSTCRANIA FROM THE HEMPHILLIAN OF OREGON AND NEVADA. John D. Orcutt, Edward Byrd Davis, and Samantha S.B. Hopkins, Department of Geological Sciences and Museum of Natural and Cultural History, University of Oregon, Eugene, OR 97403

The Late Miocene (Clarendonian and Hemphillian Land Mammal Ages, 12-5 Ma) marks the first major radiation of felids in North America. One product of this radiation is the appearance of the continent’s earliest large-bodied felids, the machairodontine Machairodus and the feline Nimravides. Fossils from the collections of the University of Oregon, University of California, and Yale University, as well as recently uncovered remains from the Chalk Butte Formation of eastern Oregon, indicate the presence of a felid in the Hemphillian of Oregon and northern Nevada surpassing in size most specimens of Machairodus and Nimravides. This felid is represented primarily by fragmentary longbones, particularly humeri and ulnae. These bones are morphologically most similar to those of Machairodus, which has previously been reported from the Hemphillian McKay Formation of northeast Oregon. The Oregon felid is also similar to the enigmatic “Felis” maxima of the Great Plains, which may be synonymous with Machairodus. However, the dearth of research on felid postcrania makes such comparisons tenuous and precludes a precise identification of the currently
available material. While the identity of the Oregon felid remains in question, its size is noteworthy, as measurements indicate an animal more massive than all but the very largest specimens of *Machairodus coloradensis* known from Great Plains faunas. Whether or not the Oregon felid represents a new species will be elucidated by a search of existing collections for relevant material, by fieldwork at Hemphillian localities throughout the Northwest, and by a thorough review of felid postcrania.

A NEW SPECIMEN OF *LEPTARCTUS OREGONENSIS* (MAMMALIA: MUSTELIDAE) SHEDS LIGHT ON THE PHYLOGENY OF LEPTARCTINES. Winifred A. Kehl, Jonathan J. Caledo, and Edward B. Davis, Department of Geology and Museum of Natural and Cultural History, Eugene, OR

The Leptarctines are a poorly understood extinct subfamily of mustelids represented by rare fossils found in North America and Eurasia. Most specimens of this subfamily of weasel and badger relatives are cranial and dental material. Leptarctines clearly provide evidence for a Miocene faunal exchange between North America and Eurasia, but the details remain unclear because the phylogeny of the group remains unresolved. A genus-level phylogeny of basal mustelids was recently published including the genera *Leptarctus*, *Schultzogale*, *Kinometaxia*, and *Craterogale*. *Leptarctus* was coded from the species *L. neimenguensis*. We use a previously undescribed specimen of *L. oregonensis*, from the Mascall Formation, with preserved basicranium, auditory bullae and other phylogenetically critical features to further the phylogenetic understanding of leptarctines. By coding the same characters used in the previous analysis, we found that *L. oregonensis* should indeed be included within *Leptarctus*, with *Craterogale* as its sister taxon. However, we also find that there are some discrepancies between the previously coded characters for *Leptarctus* and those we found on *L. oregonensis*. This suggests the need for a species level phylogeny of the genus *Leptarctus* and eventually the Leptarctinae, yet to be undertaken.

DIVERSITY BIASES OF THE PUBLISHED RECORD OF FOSSILS AT THE MIOCENE CHALK SPRINGS, BRADY POCKET, FISH LAKE VALLEY, AND STEWART SPRINGS FAUNAS OF NEVADA. Aili Gusey and Edward Davis, Department of Geological Sciences and Museum of Natural and Cultural History, University of Oregon, Eugene, OR.

Most paleodiversity studies examine the species richness of a geographic area through time. Often this research is based only on the published literature, not accounting for additional, unpublished museum specimens. Unfortunately, publication of specimens is usually not intended to produce a record reflecting the ecological structure of the fauna. This bias is based on publishing only
exceptional fossils, publication constraints, and by not reporting duplicate specimens. This reliance on published specimens introduces a potential problem because the published accounts are often more taxonomically even than the museum collections from the same area. To quantify this bias, we compared ecological parameters calculated using published and museum data from four Miocene Great Basin mammalian faunas: the Stewart Springs fauna (early Barstovian, between 15.9 and 14.9 Ma), the Chalk Springs fauna (Clarendonian, between 12.5 and 9 Ma), the Fish Lake Valley fauna (middle Clarendonian, between 11.7 and 11.0 Ma), and the Brady Pocket fauna (late Clarendonian, between 10 and 9 Ma). We rarified specimen data using the minimum number of individuals to compare published and museum data within these four faunas. As predicted, the museum data from the Brady Pocket, Chalk Springs, and Fish Lake Valley faunas all show a significantly higher taxonomic diversity than the published data, while the Stewart Springs fauna shows the opposite relationship. This anomaly arises because of the publication history of the site and indicates that when using published data for paleodiversity studies, voucher specimens from the collections are necessary for substantiating the data.

COMPOSITION AND ABUNDANCE OF THE MYLAGAULIDAE (MAMMALIA: RODENTIA) FAUNA IN THE NORTHERN GREAT BASIN. Jonathan J. Calede and Samantha S.B. Hopkins, Department of Geological Sciences and Museum of Natural and Cultural History, University of Oregon, Eugene, OR.

The Mylagaulidae is a family of large burrowing rodents that is abundant in the Miocene of North America and is closely related to the modern sewellel (Aplodontia rufa). Species of this family are a common component of fossil faunas from the northern Great Basin (including parts of Oregon and Nevada). Unlike Great Plains mylagaulids, which have been extensively studied, little work has been undertaken on Great Basin specimens. We present a revision of the systematics and phylogeny of Great Basin mylagaulids. In addition to rare large mylagaulids of uncertain taxonomic affinity, we recognize four species of mylagaulids distributed throughout Oregon and Nevada from the late Hemingfordian (16.6 million years ago) through the early late Hemphillian (6 million years ago): Alphagaulus vetus, Hesperogaulus gazini, Hesperogaulus wilsoni, and a new species within the genus Hesperogaulus. This new species occurs from the middle Clarendonian through the late early Hemphillian (12-7 Ma) of Oregon and Nevada. It is intermediate in morphology between the early Barstovian H. gazini and the Hemphillian H. wilsoni from Oregon. All four species are known from large sample sizes that enable the description of wear series of the characteristic fourth premolars of these taxa. These wear series illustrate the key morphological differences that often allow recognition of different species, even when only isolated teeth are preserved. Despite the
wide geographic range of the species, the specimens of *A. vetus* found in the northern Great Basin do not differ very much from the specimens from the Rockies or the Great Plains. The revised phylogenetic and biogeographic analyses indicate a high endemism of closely related species with the exception of the widespread *A. vetus*. There is little spatial overlap between mylagaulid species at any given time with never more than 2 sympatric species of mylagaulids.

**EFFECTS OF TOPOGRAPHIC CHANGE ON PLIOCENE AND PLEISTOCENE BETA DIVERSITY OF THE GREAT BASIN AND GREAT PLAINS PROVINCES OF NORTH AMERICA.** Amy L. Atwater and Edward Byrd Davis, Department of Geological Sciences and Museum of Natural and Cultural History, University of Oregon, Eugene, OR 97403

Beta diversity quantifies the relationship between average local diversity and overall diversity within a region. Previous studies have suggested that beta diversity can be driven by external factors such as changing climate or changing topography. We are investigating the effects of topographic change on beta diversity through time by exploring the Pliocene and Pleistocene of the Great Basin and Great Plains faunal provinces of North America. We expected beta diversity in the Great Basin to have become elevated relative to the Great Plains at the beginning of the Pliocene when the Great Basin reached its current topographic complexity. We analyzed records from the FAUNMAP database for jackknife beta diversity (measuring richness). Preliminary results support the hypothesis of a topographic control of Great Basin beta diversity and reject the hypothesis of climatic control. Additionally, Holocene values from fossil sites are greater than measured values from modern mammalogy collections, suggesting a strong, potentially significant, decrease in beta diversity between fossil sites and the modern landscape. These results are limited to richness-based beta diversity; however, beta diversity can be expressed in terms of either richness or evenness. Richness describes the number of species in a community, while evenness describes the distribution of relative abundances of individuals within those species. We are currently expanding the scope of the study to include evenness; previous work suggests evenness metrics are more sensitive and so may better illuminate the transition from Miocene to Plio-Pleistocene beta diversity in the Great Basin.

**GEOLOGY – POSTER PRESENTATIONS:**

**FLASHINESS IN MOUNTAIN STREAMS, SOUTHERN OREGON: COMPARISONS BETWEEN THE WESTERN AND HIGH CASCADES.** Spike Agosto, Josh Harris, Pat Kennedy, Phil McEwan, Aleece Richter, Nick
Schubert, Charles Lane, Department of Environmental Studies, Southern Oregon University, Ashland, OR 97520.

Grant and colleagues (Grant, per. comm., 2009) have developed a simple index for use in rapidly determining stream flashiness in mountain basins. It is based on a geological framework dependent upon identifying the percentage of Western Cascades and High Cascades bedrock in the basin. The older Western Cascades province (WCP) is characterized by highly-weathered and highly-dissected volcanic rocks (primarily of Miocene age). The WCP is also characterized by a higher stream density than the High Cascades Province (HCP). The HCP reflects more recent constructional volcanic activity and resultant landforms, relatively lower relief, and a substantial lower drainage density. This geologic partitioning is considered a major control on flashy behavior. We apply Grant’s analysis to a number of different low-order basins in the southern Cascades of Oregon. Most of the basins are on small tributaries of the Umqua River in Douglas County; others are in Jackson County and in the Rogue River basin. Using readily-available stream gaging information, we compare a normalized-for-area August mean flow against a mean low monthly flow/mean high monthly flow ratio in the manner proposed by Grant et al. Our results are consistent with those determined from earlier work in the central and northern Cascades of Oregon. Annual flows from both the HCP and WCP are comparable, but the HCP summer lows flows can be orders of magnitude higher. We are interested in broadening our analysis to additional basins in the southern Cascades as stream flashiness is a problem in stream restoration activities in low order streams.

DEVELOPMENT OF A LOCAL METEORIC WATER LINE FOR AREAS NEAR THE TETON CREST IN GRAND TETON NATIONAL PARK, WYOMING. Emily Baker¹, Amanda Kern², Mark Shapley², ¹Department of Geology, Whitman College, Walla Walla, WA 99362, ²Department of Geology, Idaho State University, Pocatello, ID 83209.

Glaciers in Grand Teton National Park, Wyoming, are undergoing rapid retreat. Stable isotopes in water can be useful tracers for determining environmental conditions in areas containing glaciers, and can help predict their long-term health. In late August 2009, samples of snow, streams, and lakes were sampled synoptically in three basins in Cascade Canyon near the Teton crest. From these three watersheds – two glacially-fed, and one snow-fed – a total of 58 water samples were collected from hydrological end members, including snow, meltwater streams, lakes, and outlet streams. Following linear-regression analysis, the samples revealed a Local Meteoric Water Line (LMWL) defined by the equation \( \delta^2 H = 6.252 \delta^{18}O - 19.60 \) \((r^2 = .92)\). Comparison to both the Global Meteoric Water Line (GMWL) and the LMWLs for southeastern Idaho and western Wyoming (Benjamin et al., 2004), and Yellowstone National Park (Kharaka et al., 2002) reveals the high relative importance of
post-depositional fractionation processes in watersheds of the high Tetons. Comparison of deuterium-excess and the slope of the meteoric water line gives important insight into climatic conditions near the park’s glaciers. Analysis by basin shows local importance of post-depositional modification of the stable isotope signal by snow melt, evaporation from lakes, erosive wind loss of snow, and the moderating presence of small alpine glaciers. Development and analysis of a LMWL specific to the high Teton alpine glaciers will be helpful for future studies, which seek to determine the health of the glaciers, and the proportion of glacial melt in late summer runoff.

OLIGOCENE OBLIQUE FAULTING IN THE COLESTIN BASIN, SOUTHWESTERN OREGON. Jad D’Allura, Patrick Kennedy, Timothy Armitage, and Kacy Carlson, CPME Department, Southern Oregon University, Ashland, OR 97520.

The Oligocene (33.1-28 Ma) Colestin Basin is filled with dominantly andesitic and rhyolitic to dacitic volcanogenic rocks that are tilted ~20-25° eastward. The basin is bounded to the north by the N.60°E-trending Siskiyou Summit Fault (SSF) and to the south by the newly-named N.60-75°E-trending State Line Fault (SLF). Undated andesitic dikes intrude both faults. Colestin rocks older than 28 Ma thin dramatically to the south and north of the bounding faults. Oblique faulting on the SSF, occurring before deposition of a 28 Ma tuff, produced steep normal right-lateral movement with a net slip of 4.5 km. In the south, the ~N.45°E-trending Bear Gulch Fault with a steep slip direction is truncated by the normal-slip left-lateral SLF. Slickensides with an average rake of 60° SE within the SLF yields a net slip of 0.77 km. Both northern and southern fault systems show evidence of reactivation: early primarily lateral motion with later dominant dip slip motion. These NE-trending faults commonly are offset by later steep NW-trending normal faults possibly related to Basin-and-Range faults further to the east reported earlier by D’Allura. The ancient Colestin Basin, which deepened to the NE has been faulted into its present position along oblique-slip faults. Those faults were reactivated during uplift of the Klamath Mountains as well as being influenced by later NW-trending faults.

GEOMORPHIC EFFECTS OF DEBRIS FLOWS IN GLACIALLY FED DRAINAGES ON MOUNT RAINIER, WASHINGTON. 1Ian Delaney, 1Robert J. Carson, 1Nicholas Bader, 2Paul Kennard, 3Gordon Grant. 1Department of Geology, Whitman College, Walla Walla, WA 99362. 2Mount Rainier National Park, Ashford, WA 98304. 3USDA Forest Service, Corvallis, OR 97331

Debris flows on Mount Rainier appear to be increasing in frequency in recent years, possibly due to retreating glaciers. These debris flows result from precipitation events or glacial outburst floods. As glaciers recede they leave behind steep unstable slopes of unconsolidated
glacially deposited sediment, susceptible to mass-wasting events. Little is known about the downstream effects of these events over time. We collected evidence of debris flow activity using field observations and sequential aerial photographs of the White River, Carbon River, and Tahoma Creek, drainages. In stream reaches with evidence of debris flows, the average channel width was wider than in reaches not directly affected by debris flows. Furthermore, trends in each stream’s width relate to the condition of the glacier feeding the stream. The rock-covered, relatively stable Emmons Glacier feeds White River, which shows relatively little change in channel width. The stable Carbon Glacier, with little drift at the terminus, feeds the Carbon River, which has a gentle gradient and whose width remains relatively consistent over the observed time. Conversely, the rapidly retreating Tahoma and South Tahoma Glaciers have lots of stagnant ice and feed the steep Tahoma Creek. Tahoma Creek’s width greatly increased, especially in the zone affected by debris flow activity.

BEDROCK MAPPING AND ROCK FALL HAZARD EVALUATION OF SILVER FALLS STATE PARK, OREGON. Erin Dunbar, Carley Francis, Keith Olson, Matt Poole, Jon Weatherford, Department of Geology, Portland State University, Portland, OR 97239.

Within the Silver Falls State Park boundary the primary bedrock geologic hazard susceptibility is observed to be rock fall in the area of the Trail of Ten Falls. Fluvial erosion has exposed the unconsolidated interbeds of buried soils within the basalt flows. For example, under North Falls a thick outcrop of the widespread Vantage Horizon exists. Within the canyon these interbeds act as a failure plane for continued rock fall and landslides on the steep slopes. Outside the canyon, the valleys and hills have a no bedrock hazard susceptibility as geomorphic processes have formed gentle slopes from the soft, easily eroded tuffs. Existing geologic maps of Silver Falls State Park demonstrate edge effects and were not prepared with the technology available today. Well log data, transformed into a spatial database and presented as a fence diagram, provides field verification of the area’s geologic strata. These data, along with field visits and manipulations of LiDAR DEM, provide more accurate and updated geologic and hazard susceptibility maps for Silver Falls State Park.

DISTRIBUTION, VOLUME, AND NATURE OF SEDIMENTS IMPOUNDED BEHIND GOLD RAY DAM, ROGUE RIVER, JACKSON COUNTY, OREGON. Charles Lane¹, William S. Elliott², Jr., Eric Dittmer¹, Patrick Kennedy¹, Steve Mason³, ¹Department of Environmental Studies, Southern Oregon University, Ashland, OR 97520; ²Department of Geology and Physics, University of Southern Indiana, Evansville, IN 47712; ³HDR Engineering, Medford, OR 97504.
An analysis has been completed on sediment impounded behind Gold Ray Dam (GRD) as part of a feasibility study on potential removal of the dam. GRD is a main-stem dam on the Rogue River in Jackson County, Oregon. Originally built as a log crib dam in 1903 for the purposes of electrical generation, the present concrete structure was erected in 1941 and abandoned by its owner in 1972. The dam currently is the property of Jackson County. The dam is a significant barrier to salmonid migration and a liability to the county, which seeks the dam’s removal. We have determined the volume, aerial extent, and textural nature of the sediments impounded behind GRD. Approximately 400,000 cubic yards of sediment are currently deposited in a slackwater area immediately upstream of GRD, with an additional 1,800,000 cubic yards deposited in a wetland area. Twelve vibracores were collected from the Gold Ray Reservoir to assess grain size and distribution of sediments in the main channel and inundated backwater environments (sloughs). The sediment located in the main channel of the Rogue River is composed primarily of sand and gravel; sediment located in the sloughs is composed primarily of silt and clay. The overall volume of sediment calculated for GRD is surprisingly small given annual sediment loads of approximately 100,000 cubic yards/year for downstream reaches of the river near Savage Rapids Dam. The results of this study will be used to construct transport models that will assess sediment mobility if GRD is removed.

IMPROVING FOREST ROAD MANAGEMENT: AN ANALYSIS OF FACTORS INFLUENCING ROAD TO STREAM CONNECTIVITY. Sara McCune¹, Tom Black², Nathan Nelson², Caty Clifton³, Nick Bader¹

¹Department of Geology, Whitman College, Walla Walla, WA, ²USFS Rocky Mountain Research Station, Boise, ID, ³Umatilla National Forest, Pendleton, OR.

Road networks are an integral part of the hydrologic system of many forested watersheds. The U.S. Forest Service (USFS) alone has over 616,379 kilometers of roads on its land—more than the total mileage of all interstate highways. Numerous studies have shown that roads contribute vast amounts of sediment to streams, negatively impacting the stream ecosystems. Because the USFS has limited resources, it is important that it target for improvement roads that have strong negative effects on their watersheds. To do this, forest managers must understand the factors that create “high-risk” roads. In this study, we used the Geomorphic Road Analysis and Inventory Project data collection method to inventory road features that may relate to sediment and water delivery in the Wall Creek Watershed, located in Oregon’s Umatilla National Forest. Inventories included data on flow path length, drain point type, flow obstructions, elevation and vegetation. We used these data in a model to determine which road features most strongly predicted stream connectivity probabilities. Results suggest that stream connectivity is best predicted by a model
that includes distance from stream, drain point type, and elevation. These findings can be used to adjust road management plans to diminish sediment input into streams, and to improve the overall health of the watershed.

THE PORTLAND BASIN GRAVEL QUARRY PITS AS A RESOURCE FOR STRATIGRAPHIC MAPPING OF THESE GRAVELS. Steven Wright, Department of Geology, Portland State University, Portland, Oregon, 97201.

Throughout the Portland Basin are thick gravel beds deposited during the Pleistocene and early Holocene periods. The uppermost layers of these gravels are attributed to the Missoula Floods (Evarts, O’Conner, et al, 2009). Quarry pits by their nature provide vertical or near vertical walls facing in multiple directions thus exposing the lithographic and stratigraphic record of the quarry material. Photographing and analyzing these exposures can provide a stratigraphic record of the depositional characteristics within the quarry area. As there are multiple quarries in the Portland Basin, by studying their walls, the stratigraphic sequences can be linked with fence diagrams to provide a more comprehensive understanding of gravel deposits in the basin. Photographs of the walls of the quarry pits visited so far by the author will be displayed on the poster and keyed to a Google Earth clip of the Portland Basin with their locations marked on it.

The above photograph was taken facing North at the edge of the Knife River Quarry pit located near SE 190\textsuperscript{th} Division in Portland. You can clearly see the depth of the quarry ~100m or 300ft and the near verticality of the walls. The lower reaches are laminar framework bedding of large clasts intermixed with coarse gravels and sand with occasional sand lenses. Also easily seen are erosional features delineated by horizontal channel fills. The upper reaches display large west trending foresets composed in intermixed large unsorted cobbles, coarse gravels and sands, perhaps traces of the reworking of the existing deposits by the Missoula Floods or fresh deposits left by the floods.
HEALTH SCIENCE – ORAL PRESENTATIONS:

EFFECT OF MATERNAL LOW PROTEIN DIET ON FUNCTIONAL ACTIVITY OF RENAL CYTOCHROME P4501A1 IN RAT OFFSPRING. Barent N. DuBois, Oregon State University, Ganesh Cherala, Ph.D, OHSU College of Pharmacy

To determine the effect of maternal low protein diet (LPD) administered during pregnancy on the status of renal cytochrome-P450 (CYP) enzymes in the offspring, pregnant rats were fed either a purified control diet (C76) or a low protein diet (L76) throughout pregnancy and lactation and offspring were weaned onto lab chow on postnatal day28. The control diet contained 18% protein while the LPD contained 8% protein. One male and one female offspring were sacrificed and kidneys were collected and frozen from 28-day, 65-day, and 150-day old rats. Renal microsomes were prepared using differential centrifugation technique. For the current study, we examined CYP1A1 which is an important drug metabolizing enzyme involved in the generation of carcinogenic metabolites. Its main role is the oxidation of aromatic amines, polarizing such compounds so they may be readily metabolized and excreted from the body. CYP1A2 activity was measured via its ability to oxidize the substrate ethoxy-resorufin into the fluorescent product resorufin; activity was measured at 530/590 nm upon incubation of renal microsomes for 30 min. Preliminary analysis of day 28, 65, and 150 male and female rats suggests no alterations in CYP1A2 activity normalized to microsomal protein amount. However, upon normalization to total kidney mass, we found significant changes. In summary, renal CYP1A1 activity is permanently altered by early life nutritional insult.

LIMB REGENERATION FOLLOWING ACUTE COMPARTMENT SYNDROME INJURY. Kimberly Hamlin; Ping-Cheng Wu; Bo Zheng, MD; Jeff Teach, RN; Lian Wang; Rose Merten; Kenton Gregory, MD. Oregon Medical Laser Center, Portland, OR 97225.

Incomplete or delayed fasciotomies following acute compartment syndrome injury can result in permanent damage to tissues of the compartment, as local ischemia results in muscle infarction and nerve damage. Stem cell implantation has been shown to improve angiogenesis and osteogenesis after compartment syndrome injuries.
The objectives of this study were: (1) to account for the induced compartment syndrome injury, (2) to evaluate injured tissues after treatment, and (3) to track potentially viable stem cells after their injected into the muscle. A unilateral compartment syndrome injury was induced in six domestic swine by autologous plasma infusion. A week later, autologous CM-DiI labeled bone marrow derived mononuclear cells were delivered into the injured tissue. Two animals were sacrificed for histological evaluation at one, three, and six-week time points after treatment. Functionality was determined by motor nerve conduction data and histopathological analysis. After injury, there were significant differences (*p<0.05, ANOVA) found in the activated muscle potential between the pre-injury and post-injury time points. Significant differences (**p<0.01, ANOVA) were also found with activated muscle potential between the six weeks post-treatment and all other post-injury time points (Figure 1). Six weeks after treatment, the swine on average recovered approximately 73% of their muscle activity, which is significantly higher than the other post-treatment time points but still significantly lower than pre-injury. CM-DiI labeled cells were found in the histological sections from the six week time point (Figure 2).

Figure 1. Box plot of activated muscle potential amplitudes. Significant differences (*p<0.05, ANOVA) were found between the pre-injury and all post-injury time points. Significant differences (**p<0.01, ANOVA) were found between the six weeks post-treatment and all other post-injury time points.

Figure 2 (Proceeding page). Confocal microscopy of fluorescent immunohistochemical staining of DiI-labeled cells in injured skeletal muscle at 6 weeks after cell injection. Images show a cluster of CM-DiI labeled bone marrow mononuclear cells (red) in proximity to dystrophin myofibers (A. dystrophin green, 100x) and near the capillary of skeletal muscle (B. vWF green arrows, CM-DiI cell red arrows, 600x). Nuclei were stained blue with DAPI.
This study evaluated the natural anti-bacterial effect of nano-structured, sol-gel processed bioactive glasses that may be used as implants, coatings, and as adjuncts during root canal therapy. Bioactive glasses contain oxides of calcium, sodium, phosphorus, and silicon in a proportion that provides the material with surface activity and concomitantly with the property of forming a strong bond with bone. Bioactive glasses with nano-structured porosity were produced by sol-gel technique, and ground to a powder (<38µm). This was done by incubating each microbe in a suspension, in the presence of bioactive glass in powder form. Streptococcus mutans [ATCC strain #25175] or Enterococcus faecalis were grown in Bovine Heart Infusion Broth for 24 to 48 hours at 37° C. Subsequently; 500µl of culture was added to 0.025g of BAG and co-incubated for 4 hours or 24 hours. At each time point, control and samples were serially diluted to 10⁻⁵, 10⁻⁶, and 10⁻⁷ concentrations and 100µl were plated on BHI agar plates for Enterococcus faecalis or Trypticase Soy agar with 5% sheep blood for Streptococcus mutans. Colonies were allowed to grow for up to 72 hours at 37° C before being counted. At 4 and 24 hours, all bioactive glasses produced significant reduction in Enterococcus faecalis bacteria. At 4 hours of incubation, all bioactive glasses resulted in significant reduction in Streptococcus mutans. Increasing incubation time with different bioactive glasses had a significant effect on bacteria reduction. These sol-gel glasses have been shown to be effective at reducing the number of Streptococcus mutans and Enterococcus faecalis bacteria in culture and show evidence of natural bactericidal activity. Consequently, it could be useful as an ingredient in tooth-care products that may have
beneficial effects on oral health both from a cariologic and a periodontal point of view.

HISTORY, PHILOSOPHY, AND SOCIAL STUDY OF SCIENCE

Section Chair:

Dave Boersema  
Pacific University

HPSSS – ORAL PRESENTATIONS

THE OTHER THEORY OF INTELLIGENT DESIGN: FROM PLATO TO DEWEY. Terry Bristol. President, Institute for Science, Engineering and Public Policy, Portland, OR 97214

There are two paths to intelligent design, one through Athens based on reason, the other through Jerusalem based on revelation. This talk is concerned with the former (almost) exclusively. How did the universe come to be the way it is? Has it always been this way? Or have both the universe and life developed? If development is real, then how did it happen? Within the reason-tradition there are two competing research programs - the scientific and the engineering. – Stephen Jay Gould, in his book, Wonderful Life, argued that a re-running the tape of biological evolution could result in an enormous range of possible outcomes - implying that current theory has no way of explaining the actual outcome. John Barrow, in his book, Constants of Nature, raises Gould's question at the cosmological level, with the same conclusion, that physics has no way to predict a unique outcome and so has no explanation of the actual outcome. Brian Greene, in his book, The Fabric of the Cosmos, reiterates Barrow's point that physicists are in 'the worst possible situation' as regards accounting for the actual observed universe. -- One common ‘scientific’ conclusion at this point is that the outcome is a matter of chance - our actual universe being one of an enormous number of possible universes. – 'The Turn' from the scientific to the engineering hypothesis, characterized as the Socratic Turn and the Pragmatic Turn, is represented by John Dewey as a shift from a Spectator to a Participant approach. To provide a more formal argument for 'The Turn' I introduce the Criterion of Self-Referential Consistency. Plato’s dialogue Timaeus is the earliest formulation of the coming to be of the cosmos from an engineering perspective.
SPREVAK, EXTENDED COGNITION, AND FUNCTIONALISM. J. M. Fritzman and Kristin Thornburg, Lewis & Clark College, Portland, OR 97219. Mark Sprevak recognizes that functionalism entails the hypothesis of extended cognition. However, he is mistaken to charge that this hypothesis is overly permissive in its attribution of mental states and so wrong to conclude that functionalism must be rejected.


In his *Supersizing the Mind: Embodiment, Action and Cognitive Extension* Andy Clark argues that the human mind super-sizes itself by *embodying* itself in a body, *embedding* itself in an epistemic environment and uniting itself with both in *extended* cognition. Call this the 3Eness thesis. In this paper, I support 3Eness but critique Clark’s 3E position, rejecting a presupposition of Clark’s dialectic that the phenomenon of 3Eness needs demonstration. Findings from developmental and social psychology provide ample evidence of 3Eness. Moreover, I maintain that what is needed and lacking in Clark’s account, is an explanatory understanding of 3Eness. Thus I offer a schema for understanding and explaining the structure of 3Eness and the forms of instrumental cognition that are distinguished from it. In addition I suggest an evolutionary model for understanding how cognitive unities might be formed based on how individuals in a group merge to become parts of a larger whole. Finally, I turn to Clark’s tentative efforts to understand 3Eness examining his well-known case of Otto and his notebook. I argue that far from illustrating Otto’s powers of supersizing, what Clark attempts to understand is a diminished from of embodied and extended cognition that lacks 3Eness. I conclude that Clark’s super-sized mind is a cheat. It does not give us the genuine item or the recipe for it. I start with the genuine item and provide a recipe for it, thus offering a real bargain.

THE LITTORAL TRUTH: EDWARD F. RICKETTS, JOEL W. HEDGEPETH AND THE SEA. A HISTORY OF COASTAL MARINE BIOLOGY, CONSERVATION AND INVASIVE SPECIES ALONG OREGON SHORES, HEADLANDS, WETLANDS AND ESTUARIES. Randall W. Smith. Environmental Sciences and Resources Program, Department of Physics, Portland State University, Portland, Oregon 97207

The book, *Between Pacific Tides* (Stanford University Press, 1939 onward) originally authored by Edward F. Ricketts and subsequently edited and revised for the third and fourth editions by Joel W. Hedgpeth is a unique piece of scientific literature. This is one of the first ecologically oriented books for coastal, littoral or intertidal environments. In particular, this writing and editing represents one of the early attempts to integrate developing ecological or
environmental philosophy to the practical aspects of scientific endeavors in the intertidal zones of Oregon, Washington and California of the United States, British Columbia, Canada and portions of Baja, Mexico and the Sea of Cortez. It is more than a seashore guide. It is a history of skillful interaction of four young scholars with an interest in the sea and intertidal environments: Edward F. Ricketts, John Steinbeck, Joseph Campbell and Joel W. Hedgpeth. The presentation of taxonomy by ecological zones was a unique approach at the time, (first edition, 1939), which was subsequently enhanced following the death of Ed Ricketts by his colleague, Joel W. Hedgpeth, noted marine biologist, oceanographer and taxonomic expert on the Pycnogonida (sea spiders). In this intersection, we see a literary approach to Pacific shores that opened new windows into the scientific and systematic evaluation of ecological study. It has been a primary influence on our examination of coastal biodiversity and destructive presence by invasive species of all kinds. The current work on invasive species owes much to the pioneering efforts of these two biologists and the legacy of this enduring book. It was clearly the literary and scholarly skills of Joel W. Hedgpeth, the first director of the Marine Science Center, Newport, Oregon (1965-1973) and his friendship with Governor Tom Lawson McCall that gave an important focus to coastal conservation in Oregon.

MATHEMATICS AND COMPUTER SCIENCE

Section Chair:

Timothy Thompson
Oregon Institute of Technology

MATHEMATICS – ORAL PRESENTATIONS:

A MATHEMATICAL MODEL FOR PREDICTING A HIGH-ALTITUDE BALLOON FLIGHT PATH. Jim Fischer, Department of Mathematics, Oregon Institute of Technology, Klamath Falls, OR, 97601.

This work was completed in coordination with a current Junior Project within the Software Engineering Technology Program at Oregon Institute of Technology. A four-member team of students will build a prediction system that uses the following mathematical model as a template. A helium-filled balloon is launched with a payload that contains a GPS radio transmitter, other scientific equipment and a parachute. The balloon expands as it ascends and eventually reaches a burst altitude of approximately 80,000 feet.
After the balloon bursts, the parachute opens and the payload returns to Earth. The lack of knowledge of a wind velocity field is the most significant challenge to predicting the flight path. We make several simplifying assumptions concerning the wind. First, we assume that the balloon and payload travel with the same velocity as the wind. Second, we assume that the wind velocity field is the same for both the ascent and descent paths. The wind velocity field will be created by integrating static, preflight information with dynamic information that is provided by the GPS system. The static data is typically several hours old at the time of launch. After the balloon is launched, the live GPS data is used to continuously update the wind velocity field. Modeling the altitude of the balloon is accomplished with a direct application of Newton’s 2nd law. The altitude predictions are computed by numerically solving a nonlinear 2nd order, ordinary differential equation. We predict the path of the balloon by using the lateral wind velocity field together with altitude predictions. The GPS data is also used to estimate the error in the prediction algorithms and provides a way to make improvements in the prediction process.

GOOGLE HACKING AND EFFECTIVE DEFENSES. Remy Neymarc, Jens Mache, Department of Mathematical Sciences, Lewis & Clark College, Portland, OR 97219.

Google hacking is the art of locating sensitive data and security holes using the Google search engine. This presentation will provide an overview of Google hacking, how it is used, and how to defend against it. We will begin by introducing the use of advanced operators to narrow down searches. Then, we will demonstrate how these advanced operators can be used to locate private or classified information such as usernames and passwords. Finally, we will provide important security tips on how to protect privacy.

TOWARDS CONTOUR TRACKING WITH WIRELESS SENSOR NETWORKS. Samuel Bock, Jens Mache, Department of Mathematical Sciences, Lewis & Clark College, Portland, OR 97219.

An emerging class of small computers, outfitted with sensors and linked by radio transceivers, can form perceptive sensor networks that will more intimately connect the virtual world to the physical one. MIT Technology Review lists sensor networks as one of “Ten Emerging Technologies That Will Change the World”. Our work focused on making these new technologies accessible to undergraduates through the use of activity based labs. Our lab assignments introduce students both to the usage of the SunSPOT devices and to many of the key areas of sensor network programming, such as communication, localization, power management, security, data aggregation and contour tracking. We
chose contour tracking since it is a canonical task common to many different kinds of distributed sensing applications. For instance, atmospheric scientists may be interested in tracking the plume fronts of air pollution, while first responders may be interested in tracking the boundary of a chemical spill or a forest fire. The implementation is simple, completely distributed, and relies solely on local (one-hop neighbor) information. All labs are supported by a wiki that we have created and populated with plain language information related to the topics and to common pitfalls of sensor network programming. Over the course of the class this wiki can be extended by the students to reflect the knowledge they have gained. (This work is supported by NSF grant CNS 0720914.)

PHYSICS

Section Chair:

Scott Prahl
St. Vincent Medical Center

PHYSICS - ORAL PRESENTATIONS:

DEVELOPMENT OF AN ELECTROCHEMICAL MICROSCOPE. Fredrick DeArmond, Derek Nowak, A.J. Lawrence, Erik Sanchez, Department of Physics, Portland State University, Portland OR.

A scanning electrochemical microscope (SECM) is being developed for use in the detection of gentamicin to assist in the determination of the source and mode of transfer of gentamicin through a confluent layer of barrier cells. Gentamicin is an aminoglycoside antibiotic used to treat many types of bacterial infections. About 10% of patients receiving aminoglycosides experience acute nephrotoxicity and/or permanent ototoxicity as a side effect. A redox reaction is known to occur in drug-resistant varieties of bacteria between gentamicin and N-acetyltransferase involving the exchange of an acetyl group from acetyl coenzyme for a proton on a gentamicin amino group. Measurement of this reaction through the use of a functionalized biosensor provides a means of detecting gentamicin efflux in solution in close proximity to cellular barriers. The redox current detected by the biosensor will be amplified and measured using a Keithley 6430 Sub-Femtoamp Remote SourceMeter® capable of measuring currents with 400 aA sensitivity. The probe will be attached to the tuning fork of a non-contact based atomic force microscope (AFM) to provide the necessary topographical information to determine the the location of reactions as related to the
position of the cells. The project has yielded promising results in the form of sub-40 nm resolution topographical AFM imaging using tungsten probes with end diameters on the order of 10 nm. Chemical probes, non-functionalized, can be made as small as 100nm in end diameter.

LOOKUP TABLE BASED FABRICATION OF OPTICAL NANO PROBES FOR TIP ENHANCED NEAR FIELD OPTICAL MICROSCOPY. Jeff Doughty, Derek Nowak, Erik Sánchez, Department of Physics, Portland State University, Portland OR.

Tip Enhanced Near-field Optical Microscopy (TENOM) is a method for optically imaging at resolutions far below the diffraction limit. This technique requires optical nano-probes with very specialized geometries, in order to obtain large, localized enhancements of the electromagnetic field, which is the driver behind this imaging method. Traditional methods for the fabrication of these nano-probes involve electrochemical etching and subsequent FIB milling. However, this milling process is non-trivial, requiring multiple cuts on each probe. This requires multiple rotations of the probe within the FIB system, which may not be possible in all systems, meaning the sample must be removed from vacuum, rotated by hand and placed back under vacuum. This is time consuming and costly and presents a problem with reproducibility. The method presented here is to replace multiple cuts from a side profile with a small number of cuts from a top down profile. This method uses the inherent imaging characteristics of the FIB, by assigning beam dwell times to specific locations on the sample, through the use of bitmap images. These bitmaps are placed over the sample while imaging and provide a lookup table for the beam while milling. These images are grayscale with the color of each pixel representing the dwell time at that pixel. This technique, combined with grayscale gradients, has provided probes in a very reproducible manner. Depending on the complexity of the bitmap used, specialized geometries are also achievable with a low number of cuts/rotations.

MAGNETO-OPTIC KERR MICROSCOPY BEYOND THE DIFFRACTION LIMIT. A.J. Lawrence, Derek B. Nowak, Erik J. Sánchez, Department of Physics, Portland State University, Portland, OR.

A TENOM (tip-enhanced near-field optical microscopy) system will be built such that it has magnetic imaging capabilities. The principle of TENOM is to use excitation light in the proper polarization to induce a strong localized enhanced field at the end of a metal tip or fiber. The enhanced field consists mainly of non-propagating (evanescent) components and is thus strongly confined to the end of the probe. These fields locally interact with the sample surface and generate a spectroscopic response that can be detected in the far-field at a wavelength different than that of the incident field. TENOM
forms the basis of our system, and Kerr microscopy adds magnetic imaging capabilities. Kerr microscopy is a technique which exploits the magneto-optic Kerr effect (MOKE), a phenomenon in which the light incident on a magnetic surface undergoes a polarization shift upon reflection. This is the same process by which magneto-optic drives are capable of detecting magnetic data. The initial polarization of the excitation laser is modulated using a photoelastic modulator, so with knowledge of how the polarization is affected by sample interaction, the final polarization returns information about the magnetic state of the sample. Writing is possible due to the temperature increase generated by the enhanced field, which allows the sample to be heated beyond the Curie temperature. By merging the techniques of TENOM and Kerr microscopy, we will have developed an instrument capable of reading and writing magnetic domains in the near-field at resolutions below 30 nanometers.

APPLICATION OF CRYSTALLOGRAPHIC IMAGE PROCESSING (CIP) FOR SCANNING PROBE MICROSCOPY (SPM) IMAGES. Bill Moon, Peter Moeck, Department of Physics, Portland State University, Portland OR.
Crystallographic image processing (CIP) is an established technique in the electron microscopy community where it is used for the analysis and enhancement of high-resolution transmission electron microscopy (HRTEM) images of crystals. The technique has successfully elucidated complex crystal structures such as Ca$_4$Fe$_2$Ti$_2$O$_{11}$ and B$_{105}$Al$_{2.6}$Cu$_{1.8}$. We briefly discuss the CIP technique as it relates to HRTEM, and then discuss its use on 2D periodic images from scanning probe microscopes (SPM) [1]. This is done in order to accomplish two tasks: to enhance the SPM image quality over and above the enhancement available through translational averaging of unit cells; and to use a periodic, highly symmetric reference sample such as highly oriented pyrolytic graphite (HOPG), to calculate the point spread function (PSF) of the microscope including the unavoidable effects of non-ideal SPM tip. The information in that PSF describes how the microscope maps the object to the image under a particular set of experimental conditions. That PSF can then be used to correct SPM images taken of other samples with the same scanning probe tip under essentially the same experimental conditions. While the discussion is illustrated with SPM images of HOPG, the technique is applicable to any 2D periodic image. [1] P. Moeck, M. Toader, M. Abdel-Hafiez, M. Hietschold, Quantifying and enforcing two-dimensional symmetries in scanning probe microscopy images, In: Frontiers of Characterization and Metrology for Nanoelectronics: 2009, Eds. D.G. Seiler at al., AIP Conference Proceedings 1173, pp. 294-298, (ISBN: 978-0-7354-0712-1).
Crystallographic image processing (CIP) is a set of techniques that correct images of 2D periodic objects for the “less than perfect” recording process of the microscope that has been used in order to obtain the images in the first place. Following standard procedures of structural electron crystallography [1], scanning probe microscopy (SPM) images of 2D periodic objects can be processed crystallographically too [2]. We present our dedicated PC software for the crystallographic processing of any 2D periodic image and place a special emphasis on the processing of SPM images. Our Microsoft Windows™ based stand-alone program performs all necessary steps of CIP; from the Fourier transform of the initial image up to the creation of plane symmetry enforced versions of this images for the correct crystallographic origin choice for either user-selected plane groups or the group that possesses the lowest residual of the Fourier coefficient phase angles. We emphasize the importance of the so called “phase origin map”, which besides containing information on the unit cell’s origin shows for simulated images with minimal distortions also the arrangement of symmetry elements within the unit cell. We utilize a cross-correlation method in order to test if the symmetry enforcement procedures in Fourier space may have introduced artifacts into the corrected images in direct space. The height of the central peak of the “cross-correlation map” is used as a qualitative measure of the similarity between the initial image and its symmetry enforced versions. [1] X. Zou and S. Hovmöller, “Structure Determination from HREM by Crystallographic Image Processing,” in Electron Crystallography, T. E. Weirich, J. L. Lábár, and X. Zou, Eds.: Springer, 2006, pp. 275–300. [2] P. Moeck, B. Moon Jr., M. Abdel-Hafiez, M. Hietschold, “Quantifying and enforcing the two-dimensional symmetry of scanning probe microscopy images of periodic objects”, Proc. NSTI 2009, Houston, May 3-7, 2009, Vol. I (2009) 314-317, (ISBN: 978-1-4398-1782-7).

Automated Crystal Orientation and Phase Mapping in TEM, Sergei Rouvimov1, Peter Moeck1, Edgar F. Rauch2, and Stavros Nicolopoulos3, 1Department of Physics, Portland State University, Portland OR, 2SIMAP/GPM2 laboratory, CNRS- Grenoble INP, BP 46 101 rue de la Physique, 38402 Saint Martin d’Hères, France, 3NanoMEGAS SPRL, Boulevard Edmond Machterns No 79, Saint Jean Molenbeek, Brussels, B-1080, Belgium

An automated technique for the crystal phase and orientation mapping of polycrystalline materials in a transmission electron microscope has been developed [1]. This technique is based on template matching of experimental electron diffraction spot patterns to their pre-calculated theoretical counterparts. Precession of the

PHOTOEMISSION ELECTRON MICROSCOPY (PEM; PEEM) REVEALS ENVIRONMENTAL STRUCTURE AND ORGANISMS FOR FLOATING MIXED-VALENT IRON OXIDE FILMS FROM SURFACE WETLAND ENVIRONMENTS. Randall W. Smith, Robert C. Word, Rolf Könenkamp, Erik J. Sánchez, Department of Physics, Portland State University, Portland OR.

Floating mixed-valent iron oxide films are an enigmatic feature of surface waters, and are found in both freshwater and estuarine wetlands as well as contaminated sites of several kinds. These silvery, often iridescent surface films have unique structural features. Photoemission electron microscopy (PEM or PEEM) was used to reveal both structural elements and the imaging of bacteria and cyanobacteria. PEM uses the photoelectric effect first described by Albert Einstein for the photoemission of electrons from metals irradiated by photons. Biological materials are suitable for this method as photons are sometimes less destructive to biological membranes and other structures or features than the electron beam found by TEM and SEM examination. In PEM examination emitted electrons are focused by electrostatic lenses and the images analyzed by deconvolution. Imaging reveals the presence of both bacteria and cyanobacteria in our test samples and suggests further organic materials not found by SEM imaging. Comparison to images obtained by scanning electron microscopy (SEM) with analysis by energy dispersive spectroscopy (EDS) suggests that several different microscopical methods are necessary to gain a more comprehensive structural concept of these films. A single microscopical method, such as SEM, would otherwise give a biased picture of both structure and organisms. Surface film organisms from temperate environments offer an important comparison to thermophiles from extreme environments. This study suggests that photoemission electron microscopy is an important comparative tool for the examination and comparison of floating iron oxide films and their colonization. Bacterial components of this habitat and the development of a habitat concept for this iron-rich environment were documented by PEM examination. New instrument design is discussed.
A BRIEF INTRODUCTION TO PLANE SYMMETRY AND CRYSTALLOGRAPHIC IMAGE PROCESSING. Taylor Bilyeu, Peter Moeck, Department of Physics, Portland State University, Portland OR.

Crystallographic image processing (CIP) is becoming an increasingly useful tool for use in conjunction with scanning probe microscopy (SPM). When used accordingly, CIP enhances the signal to noise ratio in SPM images and enables quantitative calibration of a given tip (especially when using a highly symmetric calibration standard). Here we present a simple case study that clearly illustrates how CIP deals with such periodic images under a variety of circumstances. A simulated image that approximates one created by a blunt scanning tunneling microscope (STM) tip comprised of two similarly shaped mini-tips without interference is examined. A number of different symmetries are enforced in the image using CIP. Qualitative examination of these symmetry enforced images introduces several symmetry operations and reveals how CIP handles them. Other simulated images with p4mm point symmetry are used to show the effects of Wyckoff positions while also providing stronger visual clarification of concepts that arise when dealing with the original simulation. We show how CIP reduces noise, why highly symmetric samples work best and which problems to be aware of when applying CIP to SPM data.

CLARIFYING MULTIPLE-TIP EFFECTS ON SCANNING TUNNELING MICROSCOPY IMAGING AND CRYSTALLOGRAPHIC FILTERING IN THE SPATIAL FREQUENCY DOMAIN. Jack C. Straton, Bill Moon Jr., Peter Moeck, Department of Physics, Portland State University, Portland OR.

Crystallographic image processing (CIP) techniques may be utilized in scanning probe microscopy (SPM) to glean information that has been obscured by signals from multiple probe tips. The image-forming current for multiple tips is derived in a more straightforward manner than prior approaches. The Fourier spectrum of the current for tetragonal Bloch surface wave functions and a pair of delta function tips reveals the tip-separation dependence of various types of image obscurations, from basket-weave patterns to banding for this model. A surface wave function that models the essential character of pyrolytic graphite (technically known as HOPG) is introduced and used for a similar tip-separation analysis.
PSYCHOLOGY

Section Chairs:

David A. Foster
Western Oregon University

Heide D. Island
Pacific University of Oregon

PSYCHOLOGY- ORAL PRESENTATIONS:

BENEFITS AND CHALLENGES OF MENTORING MIDDLE SCHOOL STUDENTS. Chehalis M. Strapp, Kendra L. Kunze, Caleb T. Hughes, Anne E. Spalding, Andrew W. Gilles, Psychology Division, Western Oregon University, Monmouth, OR 97361.

Although mentoring programs are increasing in popularity (Portwood & Ayers, 2005), there is limited evaluative research demonstrating the efficacy of such programs (Portwood, Ayers, Kinnison, Waris, & Wise, 2005). Additionally, little is known about how mentors benefit from participation (Terrion & Leonard, 2007) or how specific mentor characteristics (i.e., expectations, self-efficacy) predict successful mentoring relationships (Karcher, Nakkula, & Harris, 2005). Given that as many as fifty percent of mentoring relationships terminate within the first two months (Grossman & Rhodes, 2002), understanding mentoring from the perspective of the mentor is necessary to develop sustainable and effective mentoring programs. To that end, the current study describes a longitudinal assessment of undergraduates serving as mentors for at-risk middle school “mentees” in a school-based mentoring program. Undergraduate psychology students (Mage = 21.64, SD = 2.80) mentored middle school students four hours per week, across six months. The mentoring relationship focused on developing skills for academic success, emotional and social growth. Mentors were assessed prior to and after three and six months of mentoring on measures of expectations, efficacy, resilience, and empathy. At the conclusion of the program, mentors evaluated the mentoring relationship, reported negative mentoring experiences, and rated perceived benefits of mentoring. As expected, mentors experienced significant changes in mentee-perceptions and self-efficacy across time. Mentor expectations about the mentoring relationship, as well as mentor characteristics predicted relationship satisfaction. Finally reported benefits of mentoring included increased understanding of personal strengths and weaknesses, increased desire to help others, and hands on experience.
THE EFFECTS OF GROUP CREATIVITY ON GROUP DECISION QUALITY. Keiko Ushijima-Mwesigwa, Dr. David Foster, Dr. Victor Savicki, Department of Psychology, Western Oregon University Monmouth, OR 97361.

The limited studies done on group creativity have primarily focused on brainstorming. Recent research has shown that, in contrast to conventional brainstorming, groups given permission to debate and critique generated significantly more ideas. Such findings are important since the introduction of evaluation allows for selection of the best quality ideas. Consequently, we analyzed the effects of evaluation within group creativity of real groups. Based on previous research, we hypothesized that idea generation would be positively associated with idea evaluation and both would be positively associated with the quality of group decision-making. Data from 79 three-person groups were used. Participants, both individually and as a group, rank ordered a list of items according to importance for survival in two hypothetical wilderness scenarios. Idea generation was measured by counting the number of times conventional, novel, or combinations of multiple uses of an item were suggested. Evaluation and group decision quality were assessed by identifying potential negative and positive consequences to proposed ideas and the group added value (GAV) respectively. As predicted, idea generation was significantly related to evaluation (r = .51, p < .01) and evaluation was positively associated with GAV (F (1, 72) = 3.08, p < .10) accounting for an additional 2.4% of explained variance. Idea generation, however, was not significantly related to GAV. Finally, there was a significant interaction effect between idea generation and evaluation on GAV (F (1, 70) = 2.96, p < .10) accounting for 2.2% additional explained variance.

IN THE KNOW OF THE MAJORITY CULTURE: SHARING COMMONALITIES. Kathryn L. Thompson, Jennifer Mill, Irina M. Granov, Janelle de Kanter, Psychology Division, Western Oregon University, Monmouth, OR 97361.

Bicultural identity with an ethnic group and the majority culture is a positive resolution (Santrock, 2010). Niemann, Romero, Arredondo and Rodriguez (1999) suggested that sharing commonalities leads to perceptions of group membership. Commonalities, such as knowledge or cultural awareness (Keefe & Padilla, 1987) and behaviors or cultural adherence (Cabassa, 2003), are components of the acculturation process. Cabassa (2003) suggested going beyond proxy measures and assessing these components as indicators of acculturation. This study’s hypotheses were that valid, reliable scales could be developed to measure commonalities of U.S. culture and that proxy measures would predict scores on these scales. Scales of awareness and adherence to U.S. culture were given to 40 Spanish speakers from Mexico and 53 U.S.-born English speakers. Cronbach’s alphas were strong, indicating good reliability. Validity of a Knowledge scale was established by U.S.-born participants’
uniformly high performance. Further validity of the scales was established by a one-way independent MANOVA, indicating a significant effect of cultural group on scores, Wilk’s lambda = .36, F(3, 87) = 50.78, p < .0005, partial eta squared = .64, with U.S.-born English speakers scoring significantly higher than the Mexican-born Spanish speakers on all scales. Multiple regression indicated that age of immigration and English fluency explained a significant proportion of the variance in the Mexican participants’ scores on the combined scales, R-squared = .30, F(2, 35) = 7.42, p = .002. Future studies should assess the importance of commonalities or “being in the know” of the majority culture to successful bicultural identity resolution.

FANTASY PRONENESS CORRELATIONS WITH MULTIDIMENSIONAL JEALOUSY. Stella Tran, Department of Psychology, Pacific University of Oregon, Forest Grove, OR 97116

The Creative Experiences Questionnaire (CEQ) is a 25-item measure used to identify fantasy proneness, characterized by a rich fantasy life and vivid mental imagery (Merckelbach, Horselenberg & Muris, 2000). This instrument is often applied concurrent with dissociative experience, traumatic experience, and psychopathological scales, suggesting a relationship between the fantasy prone personality and various disorders. A pilot study was designed to assess the potential of the CEQ in other nonclinical contexts, specifically pathological jealousy. It was predicted that individuals who scored high on measures of jealousy (Multidimensional Jealousy Scale) may also report higher scores on fantasy proneness. Given fantasy is a reflection of imagined or unrestrained mental imagery, typically as it pertains to a positive narrative or daydream, so too might this inclination work in reverse; to establish an imagined or unreal negative attribution for the behavior or mental processes of others. However the results of this study revealed a trend between cognitive jealousy and fantasy proneness as it related to the CEQ. Further investigation with a larger sample size may be fruitful to find a significant relationship.

FOOTLOOSE AND FANCYFREE? COUPLES CHOOSING TO BE CHILDFREE. Matthew Blankenship, and Heide D. Island, Ph.D. Pacific University of Oregon, Forest Grove, OR 97116

To date, the bulk of the literature of reproductive refusal among committed couples focuses almost entirely on the explanations, rationalizations, stigma management, identity protection, and social justification of these couples for their lifestyle choice (e.g., Gillespie, 2000; 2003; Morrell, 2000; Park, 2002; Wagner, 2000). Additionally, within the heterosexual literature of voluntarily childless, dual-income couples, these studies take a decidedly femme-centric perspective, in most cases completely ignoring the male
partner’s contribution to the decision and his experience in the social fallout. The purpose of this study is to provide a more holistic investigation of couples (both heterosexual and same-sex couples) that have elected to forgo parenting. The goal is to collect information on life satisfaction, marital (or commitment) satisfaction, goal achievement, financial and professional happiness, and the breadth of the social network that comprises this demographic of the population. Additionally, we will compare the scores on the New Environmental Paradigm Scale among voluntarily childfree couples and parenting couples, given some literature points to the concern of overpopulation as a contributor in the lifestyle decision (Campbell, 2000). A number of studies have already revealed a positive significant relationship between couples who postpone parenthood and perceived marital happiness (Freeman, 2008; Gilbert, 2008), the current study extends this investigation to those who forgo parenting altogether.

A PERSON-CENTERED APPROACH TO MOTIVATION AND ACADEMIC PERFORMANCE IN A HIGH SCHOOL SETTING. Stephanie Wormington, Jennifer Corpus, Department of Psychology, Reed College. Portland, OR 97202.

Recent research on motivation has adopted a person-centered rather than variable-centered approach because it is important to understand how types of motivation interact at the individual level. The current study utilized such an approach to identify naturally occurring combinations of intrinsic and extrinsic motivations among high school students, and the academic performance associated with each of these profiles. 1080 high school students completed measures of academic motivation and reported their grade point averages. Cluster analysis revealed three naturally occurring motivational profiles among this sample of high school students. All three profiles could be characterized by high levels of extrinsic motivation coupled with either high, moderate, or low levels of intrinsic and introjected forms of motivation. Academic performance varied according to levels of intrinsic motivation, with the highest grades among students who reported the most intrinsic motivation. These findings suggest that high levels of both intrinsic and extrinsic motivations may produce the greatest achievement. It is notable, however, that a profile of high intrinsic coupled with low extrinsic motivation was not common enough to be identified as a unique profile.

A CROSS-CULTURAL LOOK AT CO-RUMINATION IN U.S. AND ECUADORIAN COLLEGE STUDENTS. Nadia Abraibesh, Ashlee Hockett, Dr. Tanya Tompkins, Department of Psychology, Linfield College, McMinnville, OR, 97128.

Co-rumination, or extensive problem-focused talk, is an understudied construct (Rose, 2002). It uniquely combines self-disclosure and
Co-rumination is a relatively new construct, similar to rumination, but social in nature and has been associated with depression. Girls report higher levels of co-rumination, compared to boys, which predicts increased depression over time (Rose, 2002; Rose et al. 2007). Rose suggests that for girls, co-rumination activates certain cognitive vulnerabilities that are associated with internalizing problems. Seeking to understand whether negative inferential style (NIS) partially explains the association between co-rumination and depression, we hypothesized: 1) gender differences in co-rumination would emerge and account for the relationship between depression and co-rumination, 2) post-observation NIS would be concurrently associated with co-rumination and depression, and 3) post-observation NIS would mediate the relationship between co-rumination and depression, with gender moderating the relationship. The role of NIS as a moderator was also explored. Participants (46...
males, 56 females) were recruited through introductory classes and instructed to bring a same-sex close friend to complete measures of co-rumination and depression. Immediately after problem-focused discussion, participants completed a measure of negative inferences regarding the problem. Unexpectedly, no gender differences in co-rumination emerged. Negative inferences were not associated with co-rumination, so mediational analyses were not performed. NIS moderated the relationship between co-rumination and depression. Inspection of simple slopes revealed that co-rumination was significantly associated at moderate (M) levels and more strongly associated in high levels of NIS (1 SD). At low-levels of negative inferential style (-1 SD), co-rumination was not significantly associated with depression. Although failing to explain gender differences in co-rumination, NIS may exacerbate risk for young adults.

THE SCIENCE OF PSYCHOLOGY IN A PSYCHOLOGICAL TRAINING CLINIC. Scott Waltman, Katherine Rex, Colleen Dolan, and Alyson Williams, School of Professional Psychology, Pacific University, Forest Grove, Oregon 97116.

This study examines the treatment outcomes in a psychological training clinic. Diverse methods exist for studying and defining treatment outcomes. Studying treatment outcomes in a psychological training clinic is especially important as treatment outcomes affect the training of future psychologists. Traditional methods, for example, have relied on either arbitrary cutoff points or therapist judgment to determine whether treatment has been successful. It has been suggested that researchers utilize a more objective and reliable method of determining when treatment is successful. Jacobson and Truax (1991) described a method for defining successful treatment outcomes: changes in scores on an outcome questionnaire are examined to determine if the change is large enough to be considered reliable and clinically significant. As part of a previous study, information about client treatment outcomes was collected from a psychological training clinic in the Pacific Northwest. This data includes information about client demographics, therapist description of the outcome of therapy, and client scores on the Outcome Questionnaire 45.2 (OQ; a common outcome tracking measure). This study will examine client changes in OQ scores to determine whether reliable and meaningful change has occurred. This study will also examine the relationship between changes in OQ scores and therapist description of treatment outcomes. Suggestions for future assessment of treatment outcomes will be addressed.
THE ALLURING ALTRUIST: HELPING BEHAVIOR AS A COSTLY SIGNAL. Gene Estrada, Eric Brown, Gabriela Martorell, Charles Mire, Rachael Miller, Department of Psychology, Portland State University, Portland, OR 97207.

Evolutionary psychology attempts to explain human psychological phenomena in terms of adaptation, with traits that would most likely have conferred a fitness advantage to humans in the ancestral environment being the most common today. Altruism is a well-studied topic within the field, and many theories within evolutionary psychology deal with various manifestations of altruism. Costly signaling theory explains the costs incurred by altruistic acts in terms of the benefits to reputation that are accrued by such acts. In the context of sexual selection, displays of altruistic acts may make an individual more appealing to members of the opposite sex. These two theories could account for public displays of altruism, particularly among males. The current study examines the effects of sex and costliness on altruistic behavior. This is ascertained by varying the sex of the confederate, who will interact with targets of both sexes, and the cost of helping by eliciting both low and high levels of altruistic behavior from targets. We find mixed support for both costly signaling and sexual selection theories.

A PILOT STUDY TO PROVIDE COGNITIVE STIMULATION TO HOMEBOUND OLDER ADULTS. William J.W. Feldmann, Sarah Pratt, Cassandra Dinius, Jacquelyn DeGraw, Robert G. Winningham, Psychology Division, Western Oregon University, Monmouth, Oregon 97361.

Cognitive stimulation has been shown to be beneficial to maintaining cognitive function in older adulthood. Previous research has shown that the number of cognitively stimulating activities a person engages in is negatively correlated with their likelihood of developing dementia. Moreover, numerous intervention studies have found that increasing the number of cognitively stimulating activities usually leads to improvements in various aspects of cognition. However, many homebound older adults are not getting enough mental exercise due to health or mobility limitations. In the present study, homebound older adults who were recipients of the Meals on Wheels program were provided packets of cognitively stimulating activities each week for 10 weeks. The activities were designed to exercise numerous cognitive abilities (e.g., word generation, attention, encoding, spatial manipulations). We surveyed participants at the end of the 10-week program and found that 80% of participants perceived an improvement in their cognition. We also found that the average participant reported spending over 45 minutes per week on the activities. We also received feedback about the intervention and ways it can be improved and made available to older adults on a broader scale. We conclude that this is a feasible model to increase the cognitive activity of homebound older adults.
EXAMINING CLIENT DEMOGRAPHICS IN A PSYCHOLOGICAL TRAINING CLINIC. Katherine Rex, Scott Waltman, Colleen Dolan, and Alyson Williams, School of Professional Psychology, Pacific University of Oregon, Forest Grove, Oregon 97116.

A paucity of research on doctoral-level psychological training clinics exists. As emphasized by Callahan, Aubuchon-Endsley, Borja, and Swift (2009), there is a particular need to evaluate whether research findings from outpatient settings are applicable to training clinics. An ongoing study involving the collection of data from a training clinic located in the Pacific Northwest will be described. This study represents an opportunity to compare data collected from a local training clinic to published data collected from outpatient settings. We will focus on a variety of client demographic variables, which are important as they may impact the process and outcome of psychotherapy (Clarkin & Levy, 2004). We will present descriptive statistics for these data and discuss potential implications for training clinics.

ASSESSING AND IMPROVING WORKPLACE SAFETY FOR IN-HOME CARE WORKERS. Lindsay Nakaishi1, W. Kent Anger1, Helen Moss2, Marc Weinstein3, Nancy Glass4, 1Center for Research on Occupational and Environmental Toxicology, Oregon Health and Science University, Portland, OR 97239, 2Labor Education and Research Center, University of Oregon, Portland, OR 97209, 3Department of Leadership and Professional Studies, College of Education, Florida International University, Miami, FL 33199, 4School of Nursing, Johns Hopkins University, Baltimore, MD 21205.

Oregon’s consumer-driven, in-home care program is an alternative to institutionalized care for seniors and people with disabilities, which facilitates patient autonomy, employer power for patients, improved care, increased workforce and reduced costs. However, the system’s unique nuances—workplace setting within the patient’s home, employer/employee relationship between the patient and consumer-focused policies—may render the Oregon HCW vulnerable. This study aims to investigate and address workplace violence and sexual harassment perpetrated by consumers (i.e., patients) (and others in the homes) against HCWs. Focus groups and surveys with HCWs (n = 83) revealed that during their career, the majority of HCWs have experienced workplace violence and sexual harassment perpetrated by their consumers (or others in the home): physical violence (e.g., strangulation, hitting, and stabbing) (44%), emotional abuse (e.g., financial abuse, threats, and stalking) (65%), sexual violence (e.g., inappropriate touching and rape) (14%), and sexual harassment (e.g., unwanted sexual attention) (41%). These results were supported by data from case manager (n = 99) focus groups and surveys. Most case managers received reports of HCWs experiencing workplace violence and sexual harassment perpetrated by the consumer (or others in the home), including reports of physical violence (66%), emotional abuse (85%), sexual violence (27%) and sexual harassment
This preliminary data will be supported by further investigations, including interviews with consumers and a more extensive survey of HCWs. Ultimately, the data will guide the development of evidence-based interventions such as trainings and policy modifications to improve HCWs’ workplace safety and consumers’ quality of care.

THE ROLE OF AGENCY AND POSITIVE AFFECT IN RESILIENCE TO LOSS, Kayla Wilhite, Marissa Cuperus, Tiffany Hendrix, Dionne Verba & Charles Taylor, Western Oregon University, Monmouth, OR, 97361.

Many individuals demonstrate resilience by weathering a loss without long-term negative outcomes. In this study, personal growth and positive affect were examined as contributors to resilience. College students (N= 181) rated their feelings about a recent loss on a 9-item emotional rating scale representing Negative Feelings (e.g., discouraged) and Resolution (e.g., resolved). The Positive Reappraisal subscale of the Reactions to Loss scale assessed personal growth and positive reappraisal of one’s life following the loss. The Personal Growth Initiative Scale (PGIS) assessed the individual’s sense of agency in guiding their personal development. The two types of emotional reactions to the loss and the Positive Reappraisal scale were the dependent variables in hierarchical regressions. The time since the loss and the significance of the loss were controlled. Results indicated that the negative feelings about a loss were predicted by the regression (R-squared = .35, p<.001) with significance of the event and Positive Affect having significant beta weights in the final equation. For feelings of resolution about the loss (R-squared = .12, p <.001), only Positive Affect added significantly to the final equation. For the Positive Reappraisal scale (R-squared = .37, p<.001), the significance of the event, Positive Affect, and the PGIS all added to the final equation. Individuals who reported feeling more positive than negative emotions reported a greater feeling of resolution about the loss. These positive emotions along with the PGIS were predictors of the use of growth oriented and reappraisal strategies in dealing with a loss.

PERCEPTION OF PESTICIDE RISK AMONG RESIDENTS OF AN AGRICULTURAL REGION IN OREGON. Elliot Hohn, Tara Moomey, Diane Rohlman, Center for Research on Occupational and Environmental Toxicology, Oregon Health and Science University, Portland, OR 97239

Pesticides are widely used in agricultural operations, and have the potential to impact the economy, human health, and environmental health of surrounding communities. Due to their close proximity to these operations, the residents of agricultural communities offer a unique perspective on the risks posed by the use of agricultural pesticides. This study utilized a bilingual, cross-sectional survey, which was administered to attendees of a county fair (n=477) in a
major agricultural region in Oregon. The majority of respondents (55%) had agricultural work experience, and 27% were Latino, with ages ranging from 17 to 93 (mean=39.8). Surveys were administered in both computer-based (n=295), and paper-based formats (n=182), and were available in English and Spanish. The aim of this study was to determine the degree of risk that community members believe pesticide use poses to various aspects of their community. Results show that participants believe pesticide use poses a very high to extremely high risk to: pesticide applicators’ health (64%), farm family health (57%), health of other people outside the farm (28%), farm animal health (49%), wildlife health (52%), water safety (59%), food safety (48%), air quality (55%), and the health of beneficial insects (61%). Overall, respondents with agricultural work experience showed lower levels of perceived risk than those without. These results highlight a potential concern for farm operators, and point to the need for further investigation into the community impacts of pesticide use, and the factors that contribute to high levels of perceived risk among those living in these communities.

ASTHMA AND PESTICIDE EXPOSURE IN CHILDREN. Andrew Kirk1, Diane Rohlman1, Elliot Hohn1, Tara Moomey1, Martha Fuchs1, 1Center for Research on Occupational and Environmental Toxicology, Oregon Health and Science University, Portland, OR 97239

Children exposed to environmental toxins at an early age have a greater risk of childhood asthma. There is a growing public health concern that children of agricultural workers may be especially susceptible to developing childhood asthma due to increased exposure to pesticides. As part of an ongoing pesticide study both agricultural and non-agricultural families (n=70) took part in interviews and surveys on orchard pesticides, asthma, and asthma-like symptoms. Among the agricultural families, data was gathered on the number of family members working in the orchard, type of work, and the proximity of the home environment to agricultural pesticide spraying. In addition, data was gathered on non-agricultural families living in close proximity to an orchard and thus potentially susceptible to pesticide drift. Fifty two percent of the children in agricultural families surveyed (n=33) reported asthma related symptoms, such as wheezing or whistling, as compared to 21% of children from non-agricultural families (n=37). In addition, 15% of children from agricultural families reported physician diagnosed asthma, compared to 5% of children from non-agricultural families. Incidence of asthma increased slightly among families both working and living in close proximity to an orchard (n=23), with 57% of this children reporting asthma like symptoms and 17% reporting physician diagnosed asthma. There was no discernable increase in incidence among those non-agricultural families living in close proximity to an orchard (n=14) at this sample size. These preliminary data highlight the importance of continuing to investigate
a potential correlation between incidence of childhood asthma and families in agricultural labor.

NEUROBEHAVIORAL PERFORMANCE AND HOME ENVIRONMENT.
Tara Moomey, Elliot Hohn, Martha Fuchs, Silvia Huszar, Diane S. Rohlman.
Center for Research on Occupational and Environmental Toxicology. Oregon Health and Science University, Portland, OR 97239

Neurobehavioral (NB) tests are used to evaluate the central nervous system functions of cognition and motor performance. In a larger pesticide study, these tests are utilized to evaluate the effects of low-pesticide concentrations on neurobehavioral performance of children of agriculture workers that may have an increased risk of pesticide exposure due to contaminants brought into the home on the parents’ shoes and clothing. In order for the NB tests to accurately detect adverse effects of very low pesticide concentrations, it is important to identify and statistically control confounders that might influence performance on the NB tests. One confounding factor is the child’s home environment, thus we conducted an investigation of the children’s home environment, including emotional climate, encouragement of maturity, learning opportunities, enrichment, family companionship, family integration and physical environment. This investigation utilized the standard Middle Childhood Home Survey in order to evaluate the home circumstances of 65 children between the ages of 5-12 years who were participating in the pesticide exposure study. The survey produced scores from 22-59 (score range was 0-59, 0=less favorable, 59=more favorable). In addition, a series of NB tests were administered to each child. We hypothesize that NB tests involving dexterity and coordination will show the smallest correlation with home environment, as opposed to tests with large cognitive, memory and attention components. The results will be used to interpret our current data by eliminating home environment as a confounding factor and therefore, more accurately measuring the effects of low-pesticide exposure on NB performance.

IMPACT OF OREGON’S PROTECTIVE LEAVE LAW ON LEAVE USAGE PATTERNS.
Naima Laharnar1, Nancy Perrin2, Nancy Glass3, W. Kent Anger1. 1Center for Research on Occupational and Environmental Toxicology, Oregon Health and Science University, Portland, OR, 97239, 2Kaiser Permanente Center for Research, Portland, OR, 97227, 3School of Nursing, Johns Hopkins University, Baltimore, MD, 21205.

Twelve US states provide unpaid, but job-protected leave to victims of domestic violence (e.g. in order to obtain a restraining order, seek medical care). Oregon is one of the states with its “Oregon Victims of Certain Crime Leave Act”, passed in 2007. One in ten women in Oregon suffer from domestic violence (DV), also known as Intimate Partner Violence (IPV), that not only effects the health of the victim (e.g., higher blood cholesterol), but also productivity at the workplace
We are conducting a study to determine the degree to which this leave law is being used in Oregon and to evaluate the effectiveness of training designed to increase the awareness of the law for affecting the use of leave due to this law. We have collected state-level data on usage of the law from each county recruited into the study. No county reported use of the DV protective leave law in the past 4 months, though other leave categories (family medical leave, sick, vacation) are reported. Workplace visits to county buildings uncovered that employers’ knowledge about the DV law is limited and some counties count leave for DV issues towards family medical leave. The design of the training effectiveness study will be described to depict how interventions might affect usage of a little-known law and thus affect public policy.

**HOW TO MAKE A CLIENT SURVIVAL KIT: WHY THERAPIST DRIFT HURTS OUR CLIENTS AND WHY FOCUSING ON THE WORKING COMPONENTS OF THERAPY HAS LONG-TERM BENEFITS FOR RELAPSE PREVENTION.** Kimberly Carroll1, Aspen Sartoris1, Staci Wade1, Danny Zamir1, Amanda McCabe1, Jacqueline Randall1, Dr. Johan Rosqvist1, 1 Pacific University of Oregon, School of Professional Psychology 511 SW 10th Ave., Portland, OR 97205-2732.

Therapist drift occurs for many reasons: safety behaviors of the therapist, attempting to modify current empirically supported treatments or interventions to meet special needs, the use of pseudosciences that are unsupported, or doing what ‘feels’ right. Efficacious treatments are deemed empirically supported after standing many trials and showing supporting evidence for effectiveness. However, when therapist drift occurs, intervening effects happen within specific interventions and treatment may focus on the ineffective components of therapy or the use of pseudosciences. It is critical for practitioners to understand why protocol for following empirically supported treatments and manual-based treatment is important and how to identify pseudoscience practices. As an important role of clinicians is to provide clients with the tools to help themselves, it is important to use empirically supported interventions, and maintain focus on the essential aspects of these treatments. Putting a focus on the improperly demonstrated components or ineffective components of therapy could hinder long-term effects of treatment and negatively impact clients' well being. This presentation will look at important ‘helping components’ of different therapies, provide clinical recommendations on how to differentiate between scientifically supported therapies and pseudosciences. Discussion how to better prepare clients with the proper skills they need to be able to manage symptom reduction and maintain learned skills after therapy by emphasizing specific clinical components during the stages of treatment in therapy. These emphasized components will help maintain client autonomy by
teaching clients' the skills they need for self-maintenance, a crucial part of relapse prevention.

PERSONALITY AND GROUP DEVELOPMENT AS PREDICTORS OF GROUP DECISION MAKING. Daniel W. Mutschler, Laura E. Fink, Emily Rulla, Keiko Ushijima-Mwesigwa, Jessica A. Rice, David Foster, & Victor Savicki, Department of Psychology, Western Oregon University, Monmouth, OR 97361

This study examined the effects of personality characteristics and group development on group decision-making. One hundred groups of three participants each completed both a desert and winter survival task in which they were stranded in the wilderness with various items. They ranked these items, individually and then as a group, in order of importance for their survival. Before beginning the survival tasks, participants completed several personality measures (e.g., self-monitoring, competitiveness, desirability of control, communication apprehension, and judgmental self-doubt). A 3X3 experimental design involving forming activities and feedback was used to manipulate group development. In the forming conditions, group members became acquainted by answering questions about themselves in either a sequential or random order. In the feedback conditions, feedback was provided based on the first task accuracy or participation level and was issued prior to beginning the second task. After completing both decision making tasks, participants completed self-report measures on group consensus and emergent group leadership based on their experience in the second task. Data analyses for this study emphasized the impact of personality inputs on quality of group decisions as measured by group added value, as well as the relation of self-reported group process dimensions to outcome measures. Results will be discussed.

THREATS OF LAYOFFS AND ABSENTEEISM. Mike Raich, DesignCut, Inc., Olympia, WA 98506.

The present study examined whether an increased threat of layoff was associated with absenteeism. Research has shown an indirect link between threats of layoffs and absenteeism in that such threats lead to increased occupational stress and added worker stress is associated with more absenteeism. The tax revenue for the southeastern state government studied here was approximately 6.5% lower during fiscal year (FY) 2003 than FY 2004. The threat of layoffs was greater throughout FY 2003. The present study looked at the use of earned leave by 204 employees in the state’s community health agency in both FY’s. Results showed that use of earned leave tended to be lower during FY 2003 than FY 2004 (p <.10). Research linking layoff threat to stress and stress to absenteeism suggested leave use might be greater during FY 2003 than FY 2004. One explanation for
the present findings may be related to reports from a sample of supervisors about their employees’ discussions of leave use. The supervisors indicated employees suggested they took less leave in FY 2003 as a way show added commitment to the organization in the tougher economic times of FY 2003 than FY 2004. The increase in organizational commitment was considered something leaders in the agency might consider when determining whom to layoff.

REVIEW OF ASSESSMENT FOR DEPRESSION WITH LATINO. James Maxson, Josh Tabaldo, School of Professional Psychology, Pacific University, Hillsboro, OR 97123

The author conducted a comprehensive critical review of literature related to the assessment of depression within the Latino community. The first section focuses on the properties and appropriateness of the following assessment measures of depression used with the Latino population in English and Spanish: the Beck Depression Inventory (BDI), the BDI-II, and the Center for Epidemiological Studies Depression Scale (CES-D). The second part focuses on reasons why culture should be more emphasized when assessing depression with the Latino population, such as: reliance on Westernized diagnostic criteria, cultural influences, protective factors, and potential misinterpretation of Spanish translated assessment measures. The third section examines the discrepancy in reported prevalence rates of depression with Latino individuals and focuses on three possible contributing factors to this discrepancy, including: a lack of assessment for culturally specific syndromes, Latino individuals’ perceptions and attitudes about depression, and barriers to treatment and potential risk factors for depression. Finally, some future directions for research and suggestions for improving how depression is assessed with Latino individuals are addressed.

SCIENCE EDUCATION

Section Chair:

Karen Bledsoe
Western Oregon University

SCIENCE EDUCATION: ORAL PRESENTATIONS:

THE NATURE OF SCIENCE IN AN UNDERGRADUATE BIOLOGY SURVEY COURSE. Erin Baumgartner, Biology Department, Western Oregon University, Monmouth, OR 97361.
This study examines whether undergraduate students in an introductory survey course can gain knowledge about the nature of science if it is not explicitly taught. Biology 101 is an introductory biology course for non-science majors at Western Oregon University. Although the course includes a laboratory, students do not conduct any experiments or develop any investigations based on their own questions. Laboratory activities focus on the demonstration of course content. Students’ exposure to nature of science primarily includes descriptions of the scientific process within the lecture and lab. Students responded to questions about the nature of science and about their personal attitudes toward science before and after participating in the course. Pre- and post- Likert scores were compared using paired t-tests. These comparisons showed that while students made some gains in their knowledge of the nature of science, they mainly showed no change to knowledge and in some cases increased their misconceptions. Moreover, they showed no gains in positive attitudes about their relationship with or ability to do science. These preliminary results indicate that students can gain some understanding about the nature of science if not fully immersed in the full scientific process. However, these gains are minimal and do nothing to improve students’ attitudes about and confidence in using scientific information and thinking skills, which are essential components of scientific literacy.

USING A RESEARCH LABORATORY APPROACH TO TEACHING MOLECULAR BIOLOGY CONCEPTS. Charles J. Kunert, Department of Math and Science, Concordia University, Portland, OR.

A unique approach to teaching scientific concepts will be discussed that focuses on the development of research teams among the students in class and develops both collaborative and competitive modes of motivation to spur student learning. This approach has been successfully refined over the course of the past two decades and has been demonstrated to be a very effective method of encouraging students into careers in research. The method involves student identification of a research question, development of a strategic plan for answering the question, determining protocols and methodologies necessary to obtain the goal, and research meetings to discuss results and explore next steps. Students learn content largely as a byproduct of their interest in attempting to meet to goal of solving the problem. This very realistic experience in science has the additional benefit of forcing students to struggle with the inescapable issue of failure in the scientific process.

WILLAMETTE VALLEY BIOLOGICAL EDUCATION NETWORK (WVBEN): USING REGIONAL PEDAGOGICAL COMMUNITIES TO IMPROVE UNDERGRADUATE LEARNING ENVIRONMENTS IN BIOLOGY. Marlene Moore1, Gary Reiness2, Stephen Scheck3, Walter Shriner4.
The Willamette Valley Biological Education Network (WVBEN) entails the planning and initial development of a sustainable regional pedagogical community to engage faculty members in professional development activities that improve undergraduate biology education and provide a model for development of other regional networks. The pedagogical community will include public, private, 2-year, and 4-year institutions with faculty members from biology, chemistry, education and mathematics. This faculty development project emerges from the belief that individual faculty members acting alone generally do not have the knowledge, will, time, support or resources to mount and sustain pedagogical reform. The goal is to lower these barriers to reform by establishing a regional pedagogical community that is sustained over time, collaborative, and focused on evidence about student learning. WVBEN will contribute to the growing base of data on the value of networks by documenting its progress and disseminating the lessons learned. It will develop and implement “pedagogical audit” and “needs assessment” surveys and assess the impact of activities on participants. This project will enhance the infrastructure for education in biological sciences by establishing a regional pedagogical network. By assessing, documenting and disseminating its work it will enhance understanding of how we change institutional cultures and faculty activities through creating communities of practice. The network will serve as a model for other regions, contribute to data about the value of communities of practice, and serve as the foundation for the larger regional Northwest Biological Education Network. Funded by NSF RCN-UBE #0957254

A GLIDER NAMED PHOEBE: A RESOURCE FOR EDUCATION AND RESEARCH. Katie Rathmell, Antonio Baptista, Center for Coastal Margin Observation and Prediction, Oregon Health and Science University, 20000 NW Walker Rd., Beaverton, OR. 97006.

The Center for Coastal Margin Observation and Prediction (CMOP) have been collecting data off the coast of Washington using a Slocum 200m glider. The autonomous underwater glider accomplishes dives by moving ballast and can reach a maximum depth of 180m. It is equipped with a Seabird CTD to measure conductivity, temperature, and depth, Aanderaa optode to measure dissolved oxygen, and a Wetlabs ECO triplet for measuring backscatter, fluorescence, and turbidity. The glider follows a mission plan that is written and uploaded to the onboard computer. Communications are achieved by an Argos satellite link, a 900 MHz spread spectrum radio, and GPS transmitter. At every surfacing the glider transmits data via the satellite link which is made available immediately to the web. Four
missions were run in 2009 in cooperation with the Quinault Indian Nation (QIN) in order to characterize tribal fishing grounds and identify hypoxic zones. The glider has also been used as a teaching resource to provide unique learning experiences. For example, middle school children participating in a CMOP program called Ocean Observatory Camp learned how to ballast the glider, write missions, and operate the glider control software. This presentation will provide an introduction to Phoebe and an overview of CMOP glider operations. A more detailed look at glider data, its potential use in undergraduate courses, and pathways to science technology careers, will be provided in the special science education session “What can Phoebe tell us about the Columbia estuary and coastal waters of the Pacific Northwest?”

SCIENCE EDUCATION – POSTER PRESENTATION:

THE CENTER FOR OCEAN SCIENCE EDUCATION EXCELLENCE (COSEE) - PACIFIC PARTNERSHIPS: PROVIDING OPPORTUNITIES FOR COMMUNITY COLLEGE FACULTY AND STUDENTS TO INCREASE THEIR UNDERSTANDING OF THE OCEAN. Jan Hodder1, Shawn Rowe2, George Boehlert2, Coral Gehrke1, Itchung Cheung2, 1Oregon Institute of Marine Biology, University of Oregon, Charleston OR 97420, 2Hatfield Marine Science Center, Oregon State University, Newport, OR 97366.

The mission of the Centers for Ocean Science Education Excellence (COSEE) network is to engage scientists and educators to transform ocean sciences education (www.cosee.net). COSEE - Pacific Partnerships (COSEE - PP) is a regional Center in the COSEE Network based at marine laboratories in Oregon, Washington, California, & Hawai’i. COSEE-PP is developing programs that aim to increase opportunities for community college faculty and students to connect with marine scientists. The goal of these programs is to increase the inclusion of marine science instruction in community colleges, and to provide faculty and students with marine research and career exposure experiences. Currently COSEE – PP provides several professional development opportunities for community college faculty, including summer workshops on current ocean science topics. It also sponsors summer marine research internships based at marine laboratories for community college students.

SCIENCE EDUCATION – SPECIAL PRESENTATIONS:

PRESERVICE TEACHERS’ RESEARCH: COGNITIVE PROCESSES INVESTIGATION OF MATHEMATICS AND SCIENCE CONCEPTS. Ronald Narode, Panel Moderator, Portland State University, Department of Curriculum & Instruction, Portland, Oregon, 97207-0751

Students in the Portland State University, Graduate Teacher Education Program conduct research into the cognitive processes of students in middle and high school science as part of their teacher
preparation. Topics range across much of the curriculum advocated in national and state standards and include, weather and climate, the function of the cell, molecular theory, kinematics, Newtonian dynamics, earth processes such as continental drift, seismic activity, erosion, etc.. Carefully constructed interviews were recorded and analyzed to reveal preconceptions and alternative conceptions from students, many of whom have had instruction on the topics. Results have alerted prospective teachers to their students’ prior knowledge, imaginative thinking, and language usage (with emphasis on student literacy). Interviews provide insight into what students believe and also help teachers look critically at how they pose questions. A series of brief presentations will describe the most salient aspects of the research as well as indicate the instructional relevance of the findings. Audience questions and suggestions are welcome.


In this special session sponsored by the Center for Ocean Sciences Education Excellence – Pacific Partnerships, Katie Rathmell, a scientist with the Center for Coastal Margin Observation and Prediction (CMOP), will discuss Phoebe, an autonomous underwater glider used to study the Columbia River Estuary and coastal waters of the Pacific Northwest. The session will look at what data is collected by Phoebe and how this data can be used in education, particularly in undergraduate courses. The session will also provide information on career paths that students interested in this type of science might follow. An introduction to Phoebe and CMOP’s glider program will be provided in the session “A Glider Named Phoebe: A Resource for Education and Research.” The special session is particularly suited to community college faculty but is open to all who are interested.

LEARNING OUTCOMES OF BIOLOGY PROGRAMS IN OREGON. Marlene Moore1, Gary Reiness2, Stephen Scheck3, Walter Shriner4, 1Department of Biology, University of Portland, Portland, OR, 97203, 2Department of Biology, Lewis and Clark College, Portland OR, 3Dean, College of Arts and Sciences, Western Oregon University, Monmouth, OR, 4Mt. Hood Community College, Gresham, OR.

This workshop will be facilitated by the Willamette Valley Biological Education Network (WVBEN). It is designed to clarify learning outcomes for general biology majors by exploring how different institutions have defined them. Each institution in our region has learning outcomes for its academic majors that have been developed by the faculty on that campus. In this session, we will compare and contrast the learning outcomes from biology programs of seven
Oregon institutions with those developed for all undergraduates by the American Association for Colleges and Universities (AAC&U) and for all science students by Project Kaleidoscope (PKAL). AAC&U developed learning outcomes for all undergraduates as part of its LEAP program (Liberal Education and America’s Promise). PKAL compiled a list of learning outcomes from science programs and synthesized the lists into common categories. Participants are encouraged to bring copies of the learning outcomes from their programs to share with the group. This workshop will be of interest to faculty members from biology, chemistry, education, and mathematics departments. Funded by NSF RCN-UBE #0957254

SOCIOMETRY, POLITICAL SCIENCE, AND ANTHROPOLOGY

Section Chairs:

Cheleen Mahar
Pacific University of Oregon

Aaron Greer
Pacific University of Oregon

SPSA – ORAL PRESENTATIONS:

SHAPING THE NATION: BRITISH COLONIALITY IN THE CARIBBEAN.
Aaron Greer, Department of Anthropology, Pacific University of Oregon, Forest Grove, OR 97116

This paper will use recent post-colonial theories to examine the ways in which colonial subjects were constructed under British imperialism in the Caribbean. Focusing specifically on Trinidad, this paper will explore some the technologies and rationalities of control and subject formation used by British planters and colonial administrators to create docile subjects. Trinidad has a unique labor history given that its subjects endured both slavery and, after 1845, indentured servitude. Many scholars have convincingly argued that the indenture project, which saw the exploitation in Trinidad of 144,000 East Indians, was a modern form of slavery. Though there is little evidence that indentured servants suffered the physical abuse that African slaves did, history still records that the system was inhumane, exploitative and cruel. Yet the Indian laborers only found common cause with Afro-Trinidadian laborers for a brief period in the early 20th century. This paper, then, will explore the techniques of
population control and subject formation that led to ethnic antagonism, keeping the ire of Trinidad’s laborers directed toward each other rather than the colonial regime responsible for their exploitation.

WHERE ARE WE HEADED AFTER COLLEGE?: FACTORS INFLUENCING COLLEGE STUDENT ASPIRATIONS. Jennifer L. Johnson, Department of Sociology, Wayne State College, Wayne, NE 68787.

A few studies have looked at college students’ class aspirations most notably, Brimeyer, Miller, and Perrucci (2006). The future aspirations of college students have changed over time. The changing educational requirements for occupations combined with increasing pressures from family members has led to a growing number of students attending public colleges and universities. Interestingly, students along with their parents expect a greater return for their educational investments. In this study college students are surveyed to investigate the potential effects of their social class socialization, college socialization and awareness of current affairs on their future class expectations. This study finds that their social class socialization significantly affects their own aspirations and as expected college socialization matters as well. It also finds that having an awareness of current affairs through newspaper reading significantly affects their future class expectations.


Afghanistan has been referred to as the accidental country, jihadistan, land of Islamofascism, the epicenter of terrorism, the future pipelinistan, graveyard of empires, the wild east, and narcostate etc. Whatever the merits of such attributes, Afghanistan, has, throughout its tortured history, attracted and repulsed, the Greeks, Mongols, Arabs, Brits, Russians, and now the Americans. Ranked as the second poorest and least developed country in the world, the fractured society endures nevertheless. It is where BushOma encounters Mullah Omar. The US launched Operation Enduring Freedom in October 2001, in response to 9/11, even though Afghans had little to do with the attack. We have learned since that OEF was essentially the start of a grand design by the fundamentalist neocon cabal and America’s shadow and permanent government to ‘remake’ the entire Middle East and establish neocolonial hegemony over the energy-rich countries in the area. The US-NATO occupation of Afghanistan has been catastrophic for the wretched country. Thus far it has also cost the US about a thousand lives and $250 billion dollars. The enormous human, material, political, and moral costs of the “war on terror” notwithstanding, America’s shadow government prevailed over the Nobel peace prize winning multicolored virtual president, to escalate the warjustifying it as the ‘necessary’, ‘just’,
and ‘right’ war. But every occupation engenders resistance, so evident in the Afghan theatre. The January 28, 2010 international conference on Afghanistan in London is a desperate attempt by the postmodern crusaders to extricate themselves ‘honorably’ from their misadventure in the ‘graveyard of empires.’ This presentation is based on the presenter’s annual visits to Afghanistan since 2002.

GETTING IT OFF YOUR CHEST: CONFESSIONS OF MALE BODY HAIR REMOVAL AND THE IMPLICATIONS FOR GENDER. Jennifer Nicole Hites Thomas, Department of Sociology, Pacific University, Forest Grove, OR 97116.

Previous sociological studies have concluded that the hairlessness ideal has influenced American women to engage in body hair removal practices that further differentiate women from men. However, male body hair removal has recently become in vogue, challenging the notion that depilatory practices serve to reinforce the gender/sex binary. Current research has yet to address the question of the significance of male body hair removal and its implications for gender. I conducted qualitative interviews with men who engage in body hair removal in order to understand their motivations and reasons for removing their body hair, how their body depilation relates to the gender identity they most ascribe to, and how their body depilation and gender identity fit (or do not fit) with the gender/sex binary. The purpose of this study is to understand how male body hair removal relates to the inscription of structuring structures, such as binary gender ideologies, onto the male body.

SURFING AND SPIRITUALITY. Leslie Kerby, Department of Anthropology, Pacific University of Oregon, 2043 College Way, Forest Grove, OR 97116.

A common conception in our society is that the sacred and profane realms are oppositional. This study seeks to demonstrate the fallacy of this belief through the observation and analysis of the spiritual capacity of surfing. The research conducted for this project will contribute to the scholarship on the binary of secular versus sacred and on the relationship between surfing and spirituality. The intention is to illustrate how people make spiritual meaning out of surfing, a seemingly secular activity. Spirituality here refers to any process which aspires towards enlightenment, towards purpose in life. The focus of the study is the connection between surfing as a secular sport and spirituality and asks the question: how is it that surfers find spiritual meaning through their sport and what does this mean in regards to common perceptions of the secular and sacred? The goal of this research is to draw attention to the deeply embedded societal assumptions concerning the opposition of secular versus sacred and to question their validity through the exposition of surfing as both a secular and sacred activity.
INVESTIGATING THE PERSONAL HISTORIES OF PRISONERS AFFECTED BY DRUG-RELATED RECIDIVISM. Heidi Cupp, Department of Anthropology, Pacific University, 2043 College Way, Forest Grove, OR 97116.

Often times, prisoners are looked at as a number, or a group rather than the individual. More often than not, more than half of all prisoners will return to prison within three years of being released. With drug related crimes, the reconviction rate has been steadily growing. This project seeks to investigate the personal history of prisoners who are affected by drug related recidivism; specifically, I have worked with three prison counselors whose job it is to help prisoners with their drug addictions in order that they not return to prison. This study also investigates the structure of prison culture and state requirements of care for drug and alcohol addicted prisoners.

RE-FINDING PLACE: THE AMERICAN JAPANESE GARDEN. Angelica Rockquemore, Department of Anthropology, Pacific University, 2043 College Way, Forest Grove, OR 97116.

Japanese style gardens embody a distinct appeal and value as prominent and esteemed aspects of Japanese culture; yet, the precise qualities that allow for these gardens, as a whole, to maintain and perpetuate this renowned cultural status remains unknown. By investigating the symbolic meaning and consumption patterns associated with the overall Japanese garden space in both Japan and in the United States, specifically at the internationally renowned Portland Japanese Garden, this thesis will explore the larger question of how Japanese gardens holistically function not only as a traditional art form and practice, but furthermore, as an approach and methodology exemplary of cultural restoration. Given the data from my work in Japan and at the Portland Japanese Garden, I hope to contribute to the larger anthropological discussions of space versus place consumption along with the importance of engaging in cultural restoration.

SPSA – POSTER PRESENTATION:

IS THE GLASS CEILING SHATTERED? Jeff Shelton, Cecilia Roldan-Shaw, Elaine Tennyson, Tara Hubbard, Deborah Fread. Undergraduate Research Group, Portland State University, Portland, OR, 97207.

The study to be conducted investigates the current popular attitude of the relationship between gender and leadership. Respondents will be asked to complete a 43 questions survey composed of both open and close ended questions. It will be conducted anonymously on a
computer in order to avoid ethical complications. The questions will focus on their opinions about leaders in a variety of positions (professors, managers, military, and community) as well as their opinions on the opposite gender's beliefs. A primary focus of the study is to determine if pluralistic ignorance about the opposite gender exists. For example, in trial runs, male respondents misjudged how women felt about being under the guidance of a same-sex manager. Because the group of respondents is composed solely of PSU students, the goal of the research is to establish how our future generation responds to leadership. How might this alter societal patterns? Is the glass ceiling shattered? This is a primarily study that will lead to future research opportunities.