

SHOWCASE | WSU

2016

ACADEMIC SHOWCASE

AND

GPSA RESEARCH EXPO

RESEARCH, SCHOLARSHIP,
AND CREATIVE WORK

FROM THE WSU COMMUNITY

ACADEMIC SHOWCASE ABSTRACTS

SHOWCASE | WSU

Board Placement: 1

Abstract Title: Medical Humanities: Brazil, Carnival, and Viral Infections

College/Campus: Arts and Sciences, Pullman

Authors:

Aaron Oforlea

Abstract:

Goal, Hypothesis, or Description: I propose to study the relationship between tourism and the increase of infectious diseases cases during Carnival between 2012 and 2015. For this study, I collected information on HIV virus, dengue fever, and hepatitis from the three largest cities in Brazil: Salvador, Sao Paulo, and Rio de Janeiro. During carnival celebrations, hundreds of people line the streets or watch processions from stadium bleacher seats; tourists and residents stand in close proximity of each other or/and randomly hug and dance while following the campos or bands. This contact exposes them to contracting a virus.

Methods: I retrieved data from the Brazilian "Information System of Notification of Diseases" (SINAN), the official government statistical databank of rates or increases of infectious disease cases. The SINAN gives three options for collecting data: city of residence, city of notification, and city of infection.

Results: According to the SINAN, rates of infection peak during Carnival season (from February through March).

Significance: My study enters into the ongoing debate about the impact of global tourism on communities. One can argue that Carnival celebrations present a paradox for the Brazilian Ministry of Tourism: Carnival tourism generates significant money for Brazil's economy, and it increases the risk of exposure to infectious diseases.

Conclusions: This study explores the reasons for the rise in disease incidence, considers approaches for educating the public and tourists who travel to Brazil, and examines current public health practice and research in Brazil.

Board Placement: 3

Abstract Title: Exploring associations among parent-student relationship profiles and substance use across the transition to college

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Eleanor Dizon

Matthew Bumpus

Brittany Rhoades Cooper

Benjamin Bayly

Erin Carroll

Abstract:

Introduction

Incoming college students are at increased risk for health-related consequences due to increased alcohol consumption. A growing literature suggests that parents still matter during this period and are valuable agents for substance use prevention efforts.

Specific parenting behaviors (i.e. monitoring; communication) can impact college student alcohol/substance use. However, few studies examine how the impact of parenting behaviors varies as a function of parent-student relationship characteristics (e.g., warmth, closeness, conflict, control). Given that parent-based interventions (PBIs) have been identified as promising avenues for college substance use prevention efforts, it is critical to understand the conditions under which interventions are most effective.

The goals of this study are to 1) use Latent Class Analysis (LCA) to identify profiles of parent-student relationships across the transition to college and 2) determine how profiles relate to students' substance use.

Method

Data were drawn from the pretest measures of an evaluation of a parent-based handbook intervention at a large university in the Northwest. Students completed baseline (n=121) surveys online the summer before college enrollment.

Results

Latent Class Analyses revealed four distinct and theoretically-meaningful parent-student relationship profiles (i.e., controlling, warm and supportive, high intensity, and disengaged). Results indicate differences between groups' understanding of parents' expectations for communication.

Implications

Person-centered approaches provide important information for understanding the complexities of parent-student relationships. Identification of profiles expands current parent-child relationship literature and can be used to tailor and adapt PBIs across a range of health-related outcomes.

Board Placement: 4

Abstract Title: The recombinase paralogs, Ral1 and Ral2, function together to modulate RadA strand invasion in the archaeon *Sulfolobus solfataricus*

College/Campus: Veterinary Medicine, Pullman

Authors:

Corey Knadler

Cynthia Haseltine

Antonia Vallejo

Abstract:

The DNA of organisms is constantly being damaged by many sources, and a number of repair systems are needed to repair these lesions. Homologous recombination (HR) plays a key role in almost all organisms in repairing double-strand breaks. The recombinase protein Rad51 and its paralogs are vital to HR because they serve the function of finding homologous template DNA to repair double-strand breaks. Rad51 paralogs have been found in archaea. . Archaea are a third domain of life that resemble bacteria but are as closely related to eukaryotes as they are to bacteria. Studying the proteins of archaea can lead to new insights into the mechanisms of related eukaryotic proteins, such as those found in human DNA repair. To better understand the function of recombinase paralogs in these repair pathways, the three paralog proteins of the hyperthermoacidophilic archaeon *Sulfolobus solfataricus* are excellent models because their stability and solubility makes them particularly amenable to biochemical study. The recombinase paralogs Ral1 and Ral3 associate with RadA on DNA and enhance its strand invasion activity. Ral2, the smallest of the paralogs, functions through a mechanism distinct from that of Ral1 and Ral3. Biochemical data indicate that Ral2 lacks robust DNA binding and the DNA dependent ATPase activity of the other paralogs. It directly interacts with Ral1, and this interaction modulates Ral1-ssDNA binding and appears to function through an ATP-dependent mechanism. Taken together, these data suggest that Ral2 serves to modulate HR by affecting the activities of other recombination proteins such as Ral1.

Board Placement: 5

Abstract Title: Evaluating a norms-based, abuse-prevention campaign targeted to members of fraternities and sororities

College/Campus: Communication, Pullman

Authors:

Jason Wheeler
Bruce Pinkleton
Erica Austin
Whitney Stefani

Abstract:

Abusive drinking behaviors among college students are a significant health problem affecting nearly all college students. Researchers conducted a posttest, delayed-posttest quantitative experiment to explore the potential effectiveness of and replicate a previously fielded online experiment using an "e-zine" newsletter containing norms-based, abuse-prevention articles as stimuli. The articles, written by Greek-affiliated college students and market tested in focus groups of other Greek-affiliated students, contained varied, normative pro-health messages. One condition contained descriptive health messages describing what peers do, the other condition contained injunctive health messages describing what peers approve or disapprove of. Personal drinking behaviors, as well as perceptions of peers' behaviors were measured and their associations to each other, and the experimental stimuli were analyzed. The results indicated that an in-group referent group is an important consideration for norms-based campaigns, as all personal behaviors were correlated to estimations of their peers' behaviors. Main effects of gender were also associated with outcomes, as were the type of message in the intervention.

Board Placement: 6

Abstract Title: Probing the specialized cell types in *Piper solmsianum* involved in accumulation/formation of (-)-grandisin, an anti-chagasic compound effective against the trypomastigote form of *Trypanozoma cruzi*

College/Campus: Arts and Sciences, Pullman

Authors:

Herana Seneviratne

Laurence Davin

Norman Lewis

Abstract:

Vascular plant species in the Piperaceae produce different classes of important bioactive compounds, including lignans and neolignans, alkaloids, amides, prenylated benzoic acids and chromenes, dihydrochalcones, flavonoids, and various phenylpropanoids. For example, *Piper solmsianum* accumulates (-)-grandisin whose anti-chagasic properties are documented as a most potent natural product against the trypomastigote form of *Trypanozoma cruzi*. The biosynthetic pathway to (-)-grandisin is, however, still incomplete, including where it is formed and accumulates (i.e. the specialized cell types involved). Matrix-assisted laser desorption/ionization (MALDI) mass spectrometry imaging, together with a collision-induced dissociation fragmentation and ion mobility separation strategy were developed to investigate sites of accumulation of (-)-grandisin in situ, as well as biochemically related isoelemicin, myristicin and apiol. (-)-Grandisin and the other phenylpropanoids of interest were co-localized in the epidermis, collenchyma and vascular bundles in *P. solmsianum* petiole tissue. These data now permit the study of their biosynthesis at the cellular/tissue level.

Board Placement: 8

Abstract Title: Effects of collector's opening diameter on measuring application efficiency and uniformity of linear-move irrigation system

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Mohammad Zaman Amini

R. Troy Peters

Abstract:

Pressurized irrigation systems have recently become very popular in many parts of the world. Center pivots and linear-move sprinkler laterals are two types of these systems which irrigate about half of the irrigated lands in the United States. A typical center pivot or linear-move irrigation system with mid-elevation spray drops can achieve an irrigation application efficiency of 80-85% which means that about 15-20% of applied water is lost on wind drift and evaporation before it can be caught and stored on the soil surface. Application efficiency (AE) and uniformity coefficient (CU) of these sprinkler systems are most commonly measured using collectors (catch cans). However, very limited reports exist on whether the size of collector's opening diameter makes any difference in measuring these two parameters.

In this study, a linear-move irrigation system was operated twice a day for a period of one month. Collectors with opening diameters of 27.1, 16.1, 10.9, and 8.3 cm, arranged in randomized complete block design, were used to measure the AE and CU of this system. The objective of this experiment was to study the effects of collector's opening diameter on the measurement of these two variables.

The results of this study indicated that collectors with smaller diameters measured the AE and CU more precisely and with less errors compared to those with larger diameters. Thus, it is recommended for the grower to use collectors with smaller diameters for measuring the application efficiency and uniformity of their center pivot and linear-move irrigation systems.

Board Placement: 9

Abstract Title: Effects of Age and Previous Exposure on Calf Resistance to Reinfection with *Cryptosporidium parvum*

College/Campus: Veterinary Medicine, Pullman

Authors:

Lance Kidder

Geneva Graef

Tracy Sy

Natalie Hurst

Jennifer Zambriski

Abstract:

Cryptosporidium spp. is a major contributor to morbidity and mortality in humans and livestock worldwide. It is the second most common cause of diarrhea in children <5 years in resource-poor settings and an important cause of calf diarrhea. Despite this fact, no consistently effective chemotherapeutic treatments or vaccines exist to treat or prevent cryptosporidiosis. The neonatal calf model of cryptosporidiosis closely approximates human disease except that calves do not experience reinfection as do humans. If reinfection could be induced, this model would serve as a close approximation of human disease. The objective of this study was to determine whether *C. parvum* reinfection could be achieved in neonatal calves. Seventeen Holstein bull calves were enrolled, including one positive and one negative control. All calves were aseptically delivered to mitigate risk of exposure to pathogens. Calves received 4L of commercial colostrum replacer within 3 hours of birth and were experimentally challenged with 5×10^7 *C. parvum* oocysts within 24 hours of birth. Calves were individually housed in a BSL2 facility. All calves developed clinical cryptosporidiosis, shed fecal oocysts, eliminated infection, and completely resolved clinical signs. Upon cessation of fecal oocyst shedding, a washout period of 10 days was observed and calves were then re-infected with either a single dose ($n=8$) of 5×10^7 *C. parvum* oocysts or with 3 doses of 5×10^7 oocysts over 3 consecutive 24 hour periods ($n=3$). Fecal oocyst shedding and clinical illness was evaluated for 7 days post re-infection. None ($n=0$) of the re-infected calves developed clinical cryptosporidiosis.

Board Placement: 10

Abstract Title: Mapping Vineyard Potential

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Colnaz Badr

Gerrit Hoogenboom

Abstract:

Developing a sustainable agricultural production system that uses the full potential of land resources requires knowledge of the climate, soil, and topography of the area of interest. There is a great potential for grapes (*Vitis vinefera* L.) production in the Pacific Northwest region of the United States. However, there are few studies that have focused on the development of a comprehensive spatial suitability system. The main objective of this study was to develop a spatial site selection system that can help with the identification suitable areas for grapevine cultivation.

Several bio-climatic indices were calculated from the weather data obtained from the Uofl GSM dataset. The soil data were obtained from the gSSURGO dataset. The topographical data were obtained from the National Elevation dataset. Following reclassification using fuzzy logic, the soil, weather, and topographic suitability maps were developed. The final vineyard potential scores were obtained by combining the suitability scores for soil, weather, and topography. The vineyard potential score for the vineyards that have been established in the state of Washington were obtained from the land cover maps and was used as a measure for evaluation of the calculated scores.

The evaluation results indicated that 84% of the vineyards that are already established in the study area have a vineyard potential score ranging from 0.91 to 1. Another 15 % had a potential score ranging from 0.8 to 0.9. The results of this study can help decision makers, growers, and others with conducting a precise land-use assessment for grapevine potential production.

Board Placement: 11

Abstract Title: Heterogeneity in the Level of Experienced Legal Problems among Low-and

College/Campus: Office of Research, Pullman

Authors:

Danna Moore

Arina Gertseva

Abstract:

Drawing on empirical data from the 2014 Legal Needs Study Update, a state-wide representative probability survey of low- and very low-income households in Washington, this study employs Latent Class Analysis (LCA) to determine whether there is heterogeneity among low- and very low-income residents of Washington State with respect to the levels and types of experienced legal problems and if so, to identify an optimal number of latent groups or classes of low-income residents with qualitatively distinct levels and types of legal problems. The study also examines the social demographic characteristics that heighten one's vulnerability to a range of legal problems. Our analyses uncovered three distinct sub-groups or latent classes of low-income residents with qualitatively different levels of legal problems: 1) majority of respondents (78%) belonged to a class with a relatively low level of legal problems; 2) a sizable proportion of respondents (19%), on average, experienced more than 3 legal problems in the previous year, and 3) a small portion (2%) experienced, on average, more than 8 legal problems.

The study also identifies which segments of low-income individuals have a higher chance of confronting a larger number of various legal issues. These groups of individuals include victims of domestic violent and sexual assault, persons with a disability, minorities, and seniors. If we want to safeguard equal access to justice for everyone, efforts to ensure legal assistance to these vulnerable groups of low-income individuals should be one of the key issues facing public policy makers.

Board Placement: 12

Abstract Title: Grape Berry Colonization and Biological Control of *Botrytis cinerea* by Indigenous Vineyard Yeasts

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Xuefei Wang
Elizabeth Kramer
Dean Glawe
Patricia Okubara

Abstract:

Botrytis bunch rot, caused by *Botrytis cinerea*, is an important disease of grape berries in wet, cool growing regions throughout the world, and is a postharvest disease of table grapes. This study was aimed at testing the hypothesis that indigenous yeasts in vineyards would effectively control disease of *Botrytis* bunch rot. Our objectives were to evaluate indigenous yeast for colonization and antagonistic activity against *B. cinerea* on Thompson Seedless berries. In a previous study, fifty indigenous yeasts strains representing 16 genera, isolated from Washington vineyards, were tested for suppressive activity. In this study, eleven of these strains were re-tested using new inhibition assays. Wild yeast species, including *Candida saitoana*, *Curvibasidium pallidicorallinum*, *Metschnikowia chrysoperlae*, *Mt. pulcherrima*, *Meyerozyma guilliermondii*, *Saccharomyces cerevisiae* and *Wickerhamomyces anomalus*, inhibited one to three of nine pathogen isolates on agar plates. The known biocontrol yeast *Aureobasidium pullulans* var. *pullulans* P01A006 showed inhibitory effects against all nine *B. cinerea* isolates. *A. pullulans* P01A006, *Mt. chrysoperlae* P34A004, *Mt. chrysoperlae* P40A002, *Mt. pulcherrima* P01C004, *S. cerevisiae* HNN11516, and *W. anomalus* P42B001 significantly reduced disease symptoms and sporulation of *B. cinerea* on berries in vivo. Yeast cell suspensions (200-20,000 cells/wound) applied to artificial wounds consistently reached populations of log 5.91-6.78 cells in berry tissue. However *S. cerevisiae* HNN11516 barely maintained log 5. By themselves, yeast strains caused mild to moderate discoloration of berry tissue at the wound site, but none caused necrosis characteristic of pathogens. Our findings indicate that antagonistic yeasts with biocontrol activity against *B. cinerea* can be found among the indigenous microflora, and certain yeasts could provide antagonistic activity in planta.

Board Placement: 14

Abstract Title: Rural Interdisciplinary Service-Learning Projects: Frameworks For Engagement Within Regional Rural Development Centers

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Kathleen Ryan

Robert Krikac

Ole Sleipness

Abstract:

In recent decades, design programs have engaged communities' tangible needs through service-learning, civic engagement, and participatory action research. These approaches offer experiential learning opportunities for students and provide services to underserved communities (Lee, 2008). Recognizing these benefits, academic programs employ these models of engagement in their pedagogical approaches at the project, course, or program levels. In the current era of urbanization, rural communities and their landscapes represent an array of large-scale design challenges. While landscape architecture maintains a body of work in the planning, design, and management of large-scale and rural landscapes, allied design disciplines have been reticent to engage in rural projects within the university studio setting to a comparable degree. This paper showcases an alternative focus to the dominant urbanist paradigm by engaging university design programs in rural projects. Using a content analysis of publicly available publications, we identify potential strategic opportunities for the design disciplines located at land-grant institutions within the region of the Western Rural Development Center and recommend ways in which design programs based in all four USDA-funded Regional Rural Community Development Centers can enhance their engagement in rural issues while fulfilling the land-grant missions of their respective institutions.

Lee, Y. (2008). Design participation tactics: the challenges and new roles for designers in the co-design process. *Co-Design*, 4(1), 31-50.

Board Placement: 15

Abstract Title: Diffusion Ordered Nuclear Magnetic Resonance Spectroscopy Characterization of Brust-Schiffrin Synthesis Intermediates

College/Campus: Engineering and Architecture, Pullman

Authors:

Trent Graham

Steven Saunders

Abstract:

Syntheses that produce tunable, monodisperse populations of nanoparticles circumvent the high cost of size fractionations. Nanoparticles are often synthesized in water-in-oil, reverse micelles to control the size of the produced nanoparticles. Currently, there is a debate over whether the two phase Brust-Schiffrin Synthesis consist of reverse micelles or small ion-ion aggregates without an aqueous core. The Brust-Schiffrin Synthesis produces gold nanoparticles under 10nm in diameter. Supramolecular assemblies composed of tetraoctylammonium bromide (TOA-Br) and tetraoctylammonium chloroaurate (TOA-AuCl₄) are postulated to stabilize the gold salt prior to nucleation and growth of the nanoparticles. Whether the Brust-Schiffrin Synthesis aggregates of TOA-Br and TOA-AuCl₄ consist of reverse micelles or ion-ion aggregates remains unclear. In this study, we use quantitative ¹H Nuclear Magnetic Resonance Spectroscopy (NMR) and Diffusion Ordered NMR to investigate the supramolecular structure of the phase transfer catalyst used in the Brust-Schiffrin synthesis of organometallic nanoparticles. We present results that are consistent with the formation of ion-ion aggregates and not reverse micelles. We demonstrate that the size of nanoparticles can be modified by changing the extent of ion-ion aggregation. Techniques to control the size of the particles mitigate the laborious fractionations and will expedite research into the size-dependent properties of nanoparticles.

Board Placement: 17

Abstract Title: Democratizing design through participatory action in a rural town

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Uris Giron

Kathleen Ryan

Abstract:

Topic

This qualitative research study developed a process to incorporate community engagement in the design process. This process was applied in a small rural community (pop. 2845) using an abandoned hospital built in 1894, and closed in 1968 as the site.

Understanding a collective response from a vocal community is integral to validating the place as locals interpret it. The essential question here is what strategies can be used to help community members articulate their design vision to designers? The goal of this research project was to identify a design process that is community focused and enables designers to gain a clearer understanding of a diverse community's ideas through co-design.

Methodology

Using the method of participatory action research multiple tactics were implemented: a community workshop using design games; an online survey linked through the town's Facebook page; and kiosks were implemented at central locations in the community. Visual displays of design ideas for the site were displayed on the kiosk, and surveys were available to collect community feedback.

Results

The goal of this project was to create a design process that is community focused and thus enables designers to gain a clearer understanding of a community's perspective on a project. The data collected found significant agreement in the community. The results also identified additional areas of agreement that could be considered in the design process. This work will add information to the larger body of knowledge of design processes related to how community members consider the built environment.

Board Placement: 18

Abstract Title: Exploring Effectiveness and Moderators of Language Learning Strategy Instruction on Second Language and Self-Regulation Outcomes

College/Campus: Education, Pullman

Authors:

Zhe Wang

Yuliya Ardasheva

Olusola Adesope

Abstract:

This meta-analysis synthesized most recent (2008-2014) research on strategy instruction (SI) effectiveness in order to estimate SI effects and their moderators for two domains: language and self-regulation. A total of 37 studies (47 independent samples) for language domain and 16 studies (17 independent samples) for self-regulation domain contributed effect sizes for this meta-analysis. Findings indicate that the overall effects of SI were large: $d = 0.78$ and $d = 0.87$, for language and self-regulation, respectively. A number of context (e.g., ESL/EFL/FL setting), treatment (e.g., SI delivery agent), and methodology (e.g., pretest) characteristics were found to moderate SI effectiveness. Notably, the moderating effects varied by language learning versus self-regulation domains.

From a practical point of view, this study offers several insights. In particular, this study: (a) corroborates “empirical justification for integrating learner training programs into L2 curricula” (Plonsky, 2011, p. 1013); (b) provides guidelines for more effective SI designs by identifying student populations that are more prone to benefit from SI and treatment features that are associated with greater gains;¹ and (c) suggests a need for a greater emphasis on self-regulation as an underlying mechanism of SI effectiveness in teacher preparation and professional development programs as well as in SI curricular materials.

Board Placement: 19**Abstract Title:** Structural Invariance of Political Participation and Social/Political Involvement**College/Campus:** Communication, Pullman**Authors:**

Yiran (Meredith) Wang

Abstract:

The purpose of this study is to examine the measurement (configural, metric, scalar and residual) and structural (factor variance, factor covariance, and factor means) invariance of self-ratings of the political participation measurement and social/political involvement measurement in ANES datasets across gender, race and age groups. Political participation and social/political involvement measurements have been used frequently in political communication and political science research. The invariance of items used in political participation measurement must be established before researchers' being able to interpret group (i.e. gender, race, age) differences. Multiple group confirmatory factor analysis, which can determine if ratings of these items demonstrate invariance across groups, were conducted with ANES 2000, 2004, 2008 and 2012 datasets. In addition, each item of involvement measurement can have either binary options (i.e. yes or no) or interval options (i.e. not at all likely to extremely likely). In order to understand which kind of options provide better evaluation of involvement behavior across groups, multiple group confirmatory analyses were conducted with ANES 2008 dataset. Results show that for political participation measurement, in 2008, there is differential item functioning when measure different race groups. In other years (i.e. 2000, 2004, 2012), differential item functioning doesn't exist. Results also show that for social/political involvement measurement with interval answer options in 2008 dataset, there is differential item functioning when measure different age groups (millennial vs. baby boomer). Differential item functioning doesn't exist for any group when use binary answer options in the same year.

Board Placement: 20

Abstract Title: Political Facebook use in Presidential campaigns: Incivility and Political participation

College/Campus: Communication, Pullman

Authors:

Porismita Borah

Yiran Wang

Abstract:

As Americans have started using social networking sites for political information politicians and political groups have started using these sites to reach out to their audience. With the help of two online experiments we examine the influence of Facebook posts on the pages of Barack Obama and Mitt Romney in 2012; and Jeb Bush and Hillary Clinton in 2015 primaries on political participation. We examine two kinds of posts: promote vs. attack. We also investigate the interactions of uncivil vs. civil comments on these Facebook posts. A three-way interaction demonstrates that posts promoting the candidate increase willingness to participate in the politically congruent and uncivil comments conditions. This is true in case of both the experiments. Implications are discussed.

Board Placement: 21

Abstract Title: Understanding hidden disabilities: An analysis of the perceptions of individuals with ADD/ADHD toward stimulant medication

College/Campus: Communication, Pullman

Authors:

C. Kit Kaiser

Abstract:

Attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD) are two of the most common childhood brain disorders, which can continue throughout adulthood. More than 11% of US school children have received a diagnosis by 2011, an increase of 42% since 2003. More than 4% of adults have received a diagnosis, with estimates of 1 in 5 left undiagnosed. In the United States, stimulant medication abuse is on the rise with 14% of high school students and 17% college students reporting abuse. The purpose of this study was to gain a greater understanding of how individuals perceive the role of ADD/ADHD in their lives as they navigate a competitive academic atmosphere and transition to adulthood. The data includes interviews with nine participants, and through constant comparative analysis and coding, this study developed a grounded theory of the meaning for those with attention disorders concerning ADD/ADHD and stimulant medication use, which encompasses their meaning of health and wellness, their role in their own social groups, the stigma attached to having ADD/ADHD, and their perceptions of stimulant medication use.

Board Placement: 22

Abstract Title: Preparing Interprofessional Student Teams for International Healthcare Immersion

College/Campus: Nursing, Spokane

Authors:

Sandy Carollo
Debbie Brinker
Catrina Schwartz

Abstract:

The process of preparing interprofessional students for global healthcare involves team cohesion with emphasis placed on leadership, communication, mutual support and situation monitoring. The purpose of this study was to demonstrate the impact of pre-departure preparation on team engagement.

Review of prior preparatory interventions identified lack of team cohesion resulting from multi-campus students and varied program schedules. Additionally, a passive or non-contextual approach was utilized in prior pre-departure orientation. These barriers supported limited understanding of roles and responsibilities within the team, and contributed to a lack of confidence in providing a team approach to healthcare abroad.

Teambuilding was facilitated by requiring students to develop a short presentation prior to a one day retreat. Students presented group topics emphasizing health literacy, global citizenship, social justice, and cultural awareness. Following presentations, students developed teaching projects to be introduced while in country. The final retreat event included a simulation which allowed students to actively engage in a role-played clinical scenario. The simulation was followed by debriefing to understand clinic logistics, team roles, and to revisit the group topics.

Outcomes included enhanced student leadership skills and confidence. The team demonstrated understanding of individual and team roles and responsibilities, and leadership skills supported understanding of seamless logistics and promoted focus on the common goals of providing quality care.

The one day retreat provided a valuable venue to foster team cohesion and collaboration, and serves as an example of how early involvement can positively impact student preparation to work in teams and toward a common goal.

Board Placement: 23

Abstract Title: Identifying Counseling Needs and Services of Middle School English Language Learners in Washington Public Schools

College/Campus: Education, Pullman

Authors:

Tom Salsbury

Susan Jensen

Abstract:

This poster summarizes findings in the first year of a three year project investigating the counseling needs and services of English language learners (ELLs) in eastern Washington middle schools. The impact of the growing numbers of ELLs in Washington public schools suggest that there is also a growing need to identify the counseling needs and services of these students. In the first year of this project, the authors have developed a needs assessment rubric based on structured interviews at schools with school counselors, ELL coordinators, general educators, parents/guardians of English language learners, and middle-school ELL students. The rubric was developed from the themes that emerged from the data. These were grouped into 17 general families of themes: (1) Assessment and student data; (2) Behavior and classroom management, academics & SpEd; (3) Caseload, workload, responsibilities and time; (4) Communicating between/across programs & schools, a web of relationships; (5) Connecting to families & communities and out-of-school activities; (6) Connecting to kids; (7) Counseling needs/services for ESL students; (8) Cultural awareness; (9) Dealing with change; (10) Getting resources; (11) Language/literacy awareness; (12) Mentorship; (13) Leadership, social justice and efficacy among administration, faculty & students; (14) Migration process; (15) SES; (16) Social/emotional development; (17) Training, bios, experience, degrees, background. The researchers will pilot their rubric at participating schools in eastern Washington to assess its usefulness as a tool for program improvement. Plans to develop and implement a survey instrument in the second and third year of this project are also summarized in the poster.

Board Placement: 24

Abstract Title: A Versatile Modular Scanning Spectroscopic Microscope

College/Campus: Arts and Sciences, Pullman

Authors:

Xianjun Ye

Matthew D. McCluskey

Abstract:

The optical microscope has become an essential part of many modern day laboratories. The scientific curiosity of researchers to look into all aspects of the microscopic world has pushed the development of a vast variety of optical microscopes. On the other hand, the increasing complexity with bundled redundant functionality, and the high price tag, often imposes a burden on budget-limited research labs.

Here we present an inexpensive and versatile modular scanning microscope design with optional spectroscopy functionality. The backbone is built upon a scanning confocal optical profile microscope which replaces the set of pinhole and photomultiplier tube (PMT) of a conventional confocal microscope with a digital (CCD) camera. The approach enables the use of versatile image analysis tactics to provide different aspects of information based on single set of image data. In addition to the backbone, one can add a single mode fiber connected photodiode module or a small area photodiode which makes the system a conventional scanning confocal microscope. The photodiode can also be replaced with a spectrometer, which makes the setup a scanning spectroscopic microscope. Our microscope design can be easily customized to house more user function modules based upon the research needs. Proof of concept experiments were carried out on etched silicon wafer and gold plated chip carrier. Different image analysis methods were used to reconstruct the 3D geometry and surface features of the aforementioned samples.

Board Placement: 25

Abstract Title: Shedding Light on Stocking Regimes by Evaluating the Concept of Carrying Capacity in Owhi Lake, WA

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Timothy Taylor
Barry Moore
Benjamin Cross

Abstract:

Fisheries managers are often tasked with balancing stocking rates with population dynamics—determining local fish population size relative to habitat and resource availability. Similar to other systems, Owhi Lake has experienced inconsistent stocking regimes without evaluating their effectiveness. In order to evaluate stocking effectiveness, we estimated a seasonal baseline carrying capacity for Brook Trout (*Salvelinus fontinalis*) in Owhi Lake, WA. Owhi Lake provides an excellent test case for carrying capacity as Brook Trout is the only harbored fish species. Previous studies have quantified their prey consumption, including crayfish, macroinvertebrates, and zooplankton. We used the program Fish Bioenergetics 3.0 to identify trout energy requirements and monitored dissolved oxygen and temperature variations using water profiles to quantify available habitat. To quantify prey availability, crayfish were collected using minnow traps and SCUBA surveys. Zooplankton densities were quantified using profile collections; littoral invertebrates were quantified using D-frame kick nets. We estimated total available energy using prey densities and caloric values to estimate short-term carrying capacity of the lake, and we coupled this method with fish condition indices to support this method. Our results for both measures indicate that Owhi Lake's carrying capacity is exceeded, suggesting that an alternative stocking regime is needed to support a self-sustaining ecosystem.

Board Placement: 26

Abstract Title: Osmostress and pH sensitivity in production of antimicrobial peptide MccPDI in *Escherichia coli*

College/Campus: Veterinary Medicine, Pullman

Authors:

Shao Lu

Zhe Zhao

Lisa Orfe

Thomas Besser

Douglas Call

Abstract:

Microcin MccPDI is an antimicrobial peptide (≈ 10 kDa) produced by *Escherichia coli* in strain 25 and 264. It is known to inhibit the growth of a broad diversity of *E. coli* including EHEC strains O157:H7 and O26. It has been observed that inhibition differs when the bacteria are co-cultured in a defined media (M9; greater inhibition; lower NaCl molarity) compared with a complex media (Luria-Bertani, LB; less inhibition; higher NaCl molarity). Furthermore, under acidic conditions (pH 5 – 6) the inhibition activity is significantly reduced compared with physiological pH (pH 7 – 7.5). This suggests the production of MccPDI may be linked to osmolality for which EnvZ is a key response regulator, and a separate CadC regulator may be linked to the regulation of microcin under acidic pH. The goal of this project was to attempt to elucidate the underlying mechanism of MccPDI regulation. We hypothesize osmostress and acidic pH sensitivity affects MccPDI regulation. Chromosomal gene deletion of *envZ* and *cadC* in the producer strain was achieved using splice by overlap extension method. Co-culture experiments were assessed using colony forming unit (CFU) counts based on serial dilution onto agar plates. Electroporetic mobility shift assay (EMSA) was used to assess the binding of OmpR to *mcpM* promoter. RT-qPCR was used to assess the transcription of *mcpM*. CFU and RT-qPCR results were statistically determined using student t-test. Results showed that production of MccPDI appears to be osmoregulated (EnvZ-OmpR) and CadC appears to be a parallel pathway which influences production of microcin through EnvZ-OmpR.

Board Placement: 27

Abstract Title: Environment and Perception: Exhibition Design Theory in Florence, Italy

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Carrie Vielle

Robert Krikac

Abstract:

Contemporary museum design is becoming less about object display and more about viewer engagement and experience. This work documents how research on how environmental conditions and display strategies can affect a viewer's perception and viewing experience was applied in student design projects.

Participants in this three-day workshop were WSU Interior Design Students in a faculty led study abroad in the Fall Semester of 2015 in Florence, Italy. Students completed readings and participated in presentations focused on museum design theories, nomenclature, display principles and strategies, and goals of contemporary exhibition designers. Case studies were presented to demonstrate environmental factors "controlled" by designers and how these factors influence viewing experience.

With this foundational knowledge, students engaged in their own research by completing an analytical comparison of two versions of Michelangelo's David statue: the public copy which resides in the Piazza della Signoria, and the original statue housed in the Galleria dell'Accademia. Students documented physical attributes of each environment, compared them to observed viewing behaviors of visitors as well as personal impressions, and drew conclusions as they relate to success of viewer experience.

These conclusions helped inform their final assignment: a redesign of a display environment for a work of art displayed in the Uffizi Museum. Students incorporated exhibition design theories from literature, case study analyses, and on-site encounters to create dynamic, engaging environments in which art/artifact is more meaningfully experienced.

Board Placement: 28

Abstract Title: Data Mining the Cougcard for Student Fitness

College/Campus: Engineering and Architecture, Pullman

Authors:

Yunshu Du

Matt Taylor

Bei Peng

Chris Cain

Viresh Duvvuri

Abstract:

WSU's Recreation Center (the Rec) is among the most frequently visited campus facilities. However, students may prefer to avoid the Rec when it is most crowded. Our work aims to solve this problem by predicting how crowd the Rec will be at different times. Cougcard, the WSU official identification card, is used by all students when entering the Rec. This work used anonymized CougCard data from the Rec and applied data-driven techniques to analyze student exercise trends. A predictive decision tree model was successfully built to predict the peak hours at the Rec. A web-based application for the model is currently under construction with the goal of suggesting when the Rec will be more or less busy. Our long term goal is to make students more (quantitatively) satisfied with their experience at the Rec and/or (quantitatively) increase the number of times they visit the Rec to exercise. Additionally, our system can assist Rec managers with shift scheduling and fitness event planning. Future work includes building personal fitness recommendations into the application and increasing the number of areas the application monitors and predicts crowdedness (e.g., the CUB's food court).

Board Placement: 31

Abstract Title: Effect of water on ethanol conversion over zinc oxide

College/Campus: Engineering and Architecture, Pullman

Authors:

Muhammad Rahman

Junming Sun

Yong Wang

Abstract:**Principal Topic**

In ethanol steam reforming (ESR) for producing hydrogen, water activation plays several roles. It helps to maintain catalyst performance by gasifying the carbonaceous species on the surface, it affects the metal/metal oxide equilibrium and it also plays a role in directing the reaction pathway. This work focuses on understanding the role of water on ethanol conversion over zinc oxide (ZnO).

Method/Hypotheses

As one of the amphoteric metal oxides, ZnO can play several roles by serving either as catalyst support or dopant in the reactions associated with water activation. Water has a high sticking coefficient on ZnO surfaces. It is hypothesized that, due to higher probability of water adsorption on the surface, ZnO can influence the reaction pathway from ethanol to hydrogen. Different reactions have been held over ZnO catalyst with aqueous and non-aqueous ethanol. Reaction products were analyzed by gas chromatography and correlated with the physical and chemical properties of the catalyst.

Results/Implications

It was found that a competitive adsorption between ethanol and water occurs on ZnO, which leads to the blockage of the strong Lewis acid site by water on ZnO. As the result, both dehydration and dehydrogenation reactions are inhibited. However, the extent of inhibition for dehydration is orders of magnitude higher than that for dehydrogenation, leading to the shift of reaction pathway from ethanol dehydration to dehydrogenation. In the secondary reactions for acetaldehyde conversion, water inhibits the acetaldehyde aldol-condensation to crotonaldehyde, favoring the oxidation of acetaldehyde to acetic acid, and then to acetone via ketonization at high temperature (i.e., 400 °C).

Board Placement: 33

Abstract Title: Agency Normalization in Life Cycle Assessment: Methodological Developments and Case Study

College/Campus: Engineering and Architecture, Pullman

Authors:

Quinn Langfitt

Liv Haselbach

Abstract:

Agencies are increasingly using environmental assessments, like life cycle assessment (LCA), as inputs to decision making processes. Communicating the complex and detailed results of an LCA to these decision-makers can present challenges, and interpretation aids are commonly provided to increase understanding. One such method is normalizing results as a means of providing context for interpreting magnitudes of environmental impacts. Currently, normalization is mostly carried out by relating the environmental impacts of a product (or process) under study to those of another product or a geographic reference area (e.g. the United States). This research hypothesizes that agency decision-makers might benefit from normalization that considers comparisons to their agency's total impacts. Two novel hybrid normalization schemes have been developed which include aspects of normalization to the United States and to an agency, which have been named agency overlaid and agency accentuated normalization. The schemes allow for performance-based planning and emphasize environmental impact types which are most relevant to an agency's operational profile. To demonstrate these normalization schemes, a hypothetical case study is presented which uses actual environmental data for a US transportation agency as the basis for agency normalization factors. Results of this case study under the new normalization schemes demonstrate how they might be useful to agencies and increase the relevance of environmental assessment information in holistic decision-making processes.

Board Placement: 34

Abstract Title: A successful youth beef exhibitor program: Reviewing history, industry milestones, education, and 35 years of carcass excellence.

College/Campus: Extension, Pullman

Authors:

Donald Llewellyn

Rebecca Sero

Ely Walker

Shannon Neibergs

John Driver

Jean Smith

Abstract:

The Benton Franklin Fair in Kennewick, WA has held a youth Steer of Merit (SOM) contest annually since 1979. The focus of the SOM program has been to evaluate the economically important carcass traits in a methodical and scientific manner, to provide educational programming to encourage youth exhibitors in meeting the industry standards, and to recognize their success and accomplishments. Our objective was to review the long-running Benton Franklin Fair SOM program and its impact on educating youth beef exhibitors. From 1979 until 2014, a total of 1,830 youth-exhibited market steers were evaluated. The criteria have followed the Washington Steer of Merit Program developed by Washington State University Extension. Carcasses were evaluated on the economically important traits of hot carcass weight (HCW), ribeye area (REA), USDA Yield Grade (YG), and USDA Quality Grade (QG). The objective of our evaluation was to determine if there was a significant difference between carcass traits recorded at fair during 1979-1991 (baseline data) and subsequent year groupings, 1992-1995, 1996-2000, 2001-2005, and 2006-2014. These data were compared with industry data available for the respective time periods (historical data). In doing so, we could determine if our educational programming was effective in giving youth producers the knowledge to produce superior beef. Results indicate that HCW, USDA YG, and USDA QG followed industry standards. In some comparisons, REA decreased slightly. In conclusion, the Benton Franklin Fair SOM program has been an effective program in educating youth beef producers in production of superior beef animals.

Board Placement: 37

Abstract Title: A comparison of hydrostatic and plastic yield criteria for a toughened adhesive for shear and tensile loading

College/Campus: Engineering and Architecture, Pullman

Authors:

Preetam Mohapatra
Harrison Scarborough
Lloyd Smith

Abstract:

Structural adhesives, used in aerospace industry, are designed to perform according to specific mechanical loading requirements. Tough adhesives are capable of sustaining large strain in both tension and shear. However, failure stress, failure strain and modes of failure are different for various shear configurations, i.e. scarf joint, wide area lap shear (WALS) joint, thick adherend lap shear joint and V notched bulk adhesive shear (Iosipescu) specimens. The focus of this work was to study and compare failure mechanisms of these configurations under static loading. A tough film adhesive was chosen for this work. Finite element analysis was used as a numerical method to predict failure of the specimens. A simple elastic-plastic yield criterion, i.e. Vonmises yielding and a hydrostatic pressure sensitive yield criterion, i.e. Drucker Prager yielding were taken into consideration. Effects of both normal and shear stress on performances of bulk adhesives as well as thin adhesive joints were evaluated. The Drucker Prager criterion was observed to have a better correlation with the experimental results. Bulk adhesive in tension and shear and shear joints were compared to study the effect of geometrical configuration on adhesive performance.

Board Placement: 38

Abstract Title: Efforts Toward Automation of Red Raspberry Bundling and Pruning

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Aadit Shrestha

Manoj Karkee

Qin Zhang

Abstract:

Washington State is the biggest producer of red raspberries in the United States. Mechanization has already been achieved in harvesting the crop, but other agricultural practices such as pruning and bundling of canes remain highly labor intensive. Red raspberry is grown in a cycle with two-year old canes (floricanes) pruned out every year and new one-year old canes (primocanes) bundled and tied together for next season's fruiting. In this work, an automated bundling mechanism for primocanes has been designed and a gripping arm has been fabricated and evaluated in the field. A prototype for tying the canes together with adhesive tape is currently being developed. A mechanism for pruning however requires prior identification of floricanes and primocanes. A hyperspectral sensing system (450-950 nm range) was used for scanning the raspberry canes. Some level of difference was observed in their spectral profiles, however no significant differences were found for standard spectral indices such as Water Index (WI), NDVI, and Simple Ratio Index (SRI). Therefore, image classification techniques were investigated for differentiation. Principal Components Analysis (PCA) was used to reduce the dataset to a few manageable bands with the retention of around 95% variability in information. Then, two classification methods, K-means clustering and a combination of different morphological operations, were applied, which achieved a classification accuracy of 85.8% and 93.1% respectively. The classification methods, however, were able to extract only parts of the canes on a pixel-level basis. Further work is needed to extract complete canes using techniques such as region growing.

Board Placement: 39**Abstract Title:** Contributors to Science Reading Comprehension: Study 1 and Study 2**College/Campus:** Education, Pullman**Authors:**

Anna Karin Roo
Yuliya Ardasheva
Wang Zhe (Joey)
Olusola Adesope
Newcome Sarah
Firestone Jonah
Lamb Richard

Abstract:

Study 1: This random assignment, experimental study explored the impact of representation + glossary label visuals on science outcomes in a sample of 174 regular education, Grade 7 English Learners (ELs). Results of ANCOVAs indicated that, regardless of English proficiency levels, ELs in both treatment and control conditions performed statistically similar, both on the reading comprehension ($p = .26$) and triggered interest ($p = .65$) measures, with a trend in means favoring the no-visual group. These findings suggest that, although recommended by the literature, representation + glossary label visuals for ELs may be associated with the deleterious (seductive detail) rather than with beneficial (dual coding) effect. Additional research is needed to explore higher level visuals' (organization, interpretation, transformation) impacts to better understand the types of visual accommodations needed to support ELs' science learning.

Study 2: This study explored contributions of general and specialized skills needed for science reading comprehension among Grade 7 students of varied English proficiency. Sample included 204 regular education students (35 non-ELs, 86 current ELs, 83 former ELs). Results of hierarchical regression models indicated that, regardless of EL status, general vocabulary accounted for little to no additional variance in reading above and beyond science vocabulary. Results from the former EL model showed a marginally significant benefit of memory strategies above and beyond language-specific skills ($\Delta R^2 = .09$, $p \leq .01$). These findings warrant an instructional focus on technical vocabulary and suggest that learners of different proficiency may draw on different skill sets to support their reading comprehension.

Board Placement: 40

Abstract Title: Assessment of antimicrobial activity of chlorine against most prevalent poultry Salmonella serotypes in a chicken-meat-based model

College/Campus: Veterinary Medicine, Pullman

Authors:

Devendra Shah

Tarah Sullivan

Abstract:

Despite frequent use of various FDA approved sanitizers in poultry processing, significant proportion of marketed poultry meat in the US remains contaminated with some of the Most Prevalent Poultry-associated Salmonella seroTypes (MPPSTs): S. Typhimurium, Enteritidis, Kentucky, Heidelberg, Montevideo, Mbandaka, Senftenberg, Infantis, Hadar, Schwarzengrund, Typhimurium 4,[5],12:i: and Thompson. The objectives of this study were to (i) develop a food-based model that simulates carcass chilling; a major step in commercial carcass processing, and (ii) determine the susceptibility differences among MPPSTs against chlorine; a widely used carcass sanitizer. Our experimental model included a filter sterilized chicken meat extract (CME) obtained from frozen chicken carcasses mixed with ice-cold chlorinated water (40/50ppm) in different concentrations. This model was challenged with different MPPST strains (10⁵ CFU) and their survivability was tested at 5, 30, 60 and 90 min post-inoculation. At 1% [total organic carbon (TOC)-145.56±19.31 mg/L and total nitrogen (TN)-50.39±6.97 mg/L] and 2% CME (TOC-297.64± 30.03 mg/L and TN-112.18±12.75mg/L), all MPPSTs died within 30 min. At 3% CME (TOC- 500.45±58.60 mg/L and TN- 193.26±21.72 mg/L), all MPPSTs survived until 90 min except S. Mbandaka, Kentucky and Heidelberg. At 4% CME (TOC- 660.92±66.76 mg/L and TN- 258.72±24.33 mg/L), S. Mbandaka and Heidelberg survived until 90 min but not Kentucky. At 5% CME (TOC- 790.25±79.14 mg/L and TN- 309.84±28.64 mg/L), S. Kentucky survived until 90 min. The MPPSTs differ in their susceptibility to chlorine; however the level of CME contamination during immersion chilling is an important contributing factor for survival of Salmonella against chlorine treatment.

Board Placement: 41

Abstract Title: Will chronically ill older adults use the Meaningful Use Clinical Summary?

College/Campus: Nursing, Spokane

Authors:

Karen Colorafi

Abstract:

The Electronic Health Record (EHR) Incentive Program introduced in 2009 was designed to use technology to improve the engagement of patients and the coordination of healthcare. The rule mandates the provision of a clinical summary at the conclusion of the healthcare encounter through an online patient portal. For millions of older adults with chronic disease the plan of care (POC) contained in the clinical summary provides a foundation for self-management and engagement in health promoting behaviors (instructions about medication, monitoring, testing, follow-up). However, two decades of research into health literacy confirms that patients in general and older adults in particular often do not understand material given to them in written or oral formats, nor are they actively involved in the development of the POC. These factors create a "perfect storm" whereby older adults with multi-morbidities may be ill equipped to participate in a new, technologically enhanced healthcare delivery system, leaving an already vulnerable population exposed to the risks of reduced healthcare access and worsening health outcomes.

Through a qualitative descriptive approach, this research sought to describe the ways in which older adults with multi-morbidities engaged with the POC. Adults (>65) with multiple cardiac diagnoses participated in this research (n=40), consisting of observations, interviews, and collection of standardized measures (SILS, Mini-Cog, PAM).

Patients reported that the clinical summary helped them to engage with the POC for multiple reasons. The majority of patients would not go online to access the clinical summary and felt that the clinical summary could be improved upon.

Board Placement: 42

Abstract Title: Baseline Urinalysis as a Mediator Between Education Level and Treatment Outcomes in Two Contingency Management Clinical Trials

College/Campus: Nursing, Spokane

Authors:

Crystal Lederhos
Joahua Smith
John Roll
Sterling McPherson

Abstract:

Principal Topic

Higher educational attainment (Ed) has been linked to decreased likelihood of illicit substance use and increased likelihood of treatment completion, and so has baseline urinalysis (UA; i.e. indicating substance use at the first treatment visit). We examine whether baseline UA is a mediator between education and total -UAs submitted.

Method/Hypotheses

Data are from two multi-site randomized clinical trials (RCTs) of contingency management that targeted stimulant use (n=836). Variables included education, race, sex, age and Addiction Severity Index (ASI) composite measures. Education was coded as less than high school (LHS), high school (HS), and greater than a high school (GHS).

H₁: Ed will be positively associated with the number of -UAs provided. H₂: Ed will be associated with a decrease in the likelihood of providing a positive baseline UA. H₃: Ed will have an indirect effect on total -UAs, through the effect that education has on the likelihood of providing a +UA.

Results/Implications

H₁ was not supported, however H₂ and H₃ were. There was a significant effect of education on baseline +UA (GHS=Reference; LHS OR=1.67, HS OR=1.56, p<0.05), and a relationship between +UA at baseline and total -UAs (OR=-6.72, p<0.05). Baseline urinalysis partially mediated the relationship between several demographic characteristics, including Ed and total -UAs during treatment.

This investigation provides preliminary data suggesting that baseline UA status could be an effective treatment target, given its mediational role. Ed and other demographics are important considerations when designing and optimizing interventions that target stimulant use.

Board Placement: 43

Abstract Title: The Big Beat in Louisville

College/Campus: Arts and Sciences, Pullman

Authors:

Gregory Yasinitsky

Abstract:

In October of 2015, Gregory Yasinitsky, Regents Professor, Eminent Faculty Award Winner and Director of the WSU School of Music, created The Big Beat, a new, commissioned big band composition for the acclaimed DownBeat magazine award winning youth ensemble "The Little Big Band" directed by renowned educator and producer Caleb Chapman for a premiere performance January 2016, in Louisville, KY, at the international conference of the Jazz Education Network, arguably the most important academic organization for jazz. The piece was informed by the great 'jungle swing" tunes of the big band area such as "Sing, Sing, Sing," and was written in way as to showcase special musicians in the Little Big Band including the trombone section and drummer. For the premiere, the Little Big Band was joined by guest artists Wycliffe Gordon, trombonist with the Lincoln Center Jazz Band, and Jeff Coffin, Grammy Award winning saxophonist with the Dave Matthews Band.

Board Placement: 44

Abstract Title: A Methodology for Understanding Relative Reinforcement in Co-Addiction Treatment: An Example with Alcohol and Tobacco Use

College/Campus: Nursing, Spokane

Authors:

Michael Orr
Crystal Lederhos
Samantha Martin
John Roll
Sterling McPherson

Abstract:

Principal Topic

Understanding the relative reinforcement of two or more drugs in a randomized clinical analog trial (RCaT) could inform future co-addiction treatments by demonstrating how the reinforcement of one drug impacts the reinforcement of another drug when being treated concurrently. Given the frequency of alcohol and tobacco co-addiction, and paired with the dearth of effective treatments, we utilized this co-addiction in our RCaT to better understand each drug's relative reinforcement.

Method/Hypotheses

Our primary hypothesis is that targeting both substances will yield the highest abstinence rates compared to CM for either drug individually, in part, because of both the behavioral and neurobiological link between use of these two substances.

We used a 2x2 factorial design, with alcohol and nicotine as the co-primary outcomes. After baseline, individuals are randomized into 1 of 4 groups wherein they receive contingency management (CM; or equivalent, non-contingent reinforcement) for: neither drug, alcohol use, tobacco use, or both drugs. All groups have equivalent reinforcement densities. Abstinence will be measured using urine analyses, breathalyzers, and self-reports.

Results/Implications

With this design, we will be able to assess the CM's relative effects as participants respond to one or neither of the reinforcement manipulations when compared against each other. This methodology will allow us to examine the comparative reinforcement between two related, but distinct, behaviors that are linked and are in need of better understanding regarding their relative reinforcement to better optimize treatments.

Board Placement: 45

Abstract Title: WSU Extension's Mudslide Team, Year 2: Evolution and Innovation

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Christina Sanders
Monica Babine
Curt Moulton
Martha Aitken
Brad Gaolach
Susan Kerr
Jana Ferris
Judy Pendergrass
Michael Gaffney
Rob McDaniel

Abstract:

On March 22, 2014, a catastrophic landslide devastated several communities in northwestern Washington. When an entire hillside gave way, it buried a neighborhood, took 43 lives, and temporarily closed State Highway 530--the region's physical and economic lifeline. In the wake of the disaster, WSU assembled a multi-disciplinary team to help affected communities recover. This team's evolving work illustrates Extension's profound and unique impact on the region in several key areas.

Natural Resources: Even before the slide, these communities had struggled to reinvigorate their former timber-based economy. In partnership with a groundbreaking timber collaborative, WSU is exploring an innovative, sustainable forest product industry. The team was also instrumental in creating Glacier Peak Institute, a unique STEM education program rooted in the area's rich natural resources, and implemented a high school summer forest management program.

Economic Development: After completing work on a region-wide federal EDA Economic Redevelopment Plan, WSU used it to create a community-based revitalization plan encompassing place-making, industry and workforce development, and broadband infrastructure.

Disaster Mitigation: WSU is working with the Sauk-Suiattle Tribe, whose land is vulnerable to flooding, to expand their reservation to a new, safer location. Additionally, this team's work helped inform a new WSU Wildfire Recovery effort in areas stricken by last summer's extensive wildfires.

Community Development: WSU's team also included students from two campuses. For two years, twelve summer interns have been integrated into local government and community-based organizations; and a student week of service was supported by resolutions from local governments.

Board Placement: 46

Abstract Title: Determining the Cause of Ulcerative Shell Disease in the Western Pond Turtle

College/Campus: Veterinary Medicine, Pullman

Authors:

Marley Iredale

Gretchen Kaufman

Tom Wilkinson

Abstract:

The western pond turtle (*Emys marmorata*) is an endangered aquatic chelonian native to the Pacific coast of North America suffering mortality from an ulcerative shell disease (USD) of unknown etiology. Every year, some hatchlings are collected and raised for several months in captivity, where husbandry conditions induce them to grow more rapidly normal, "wild" turtles in an attempt to increase survival. Previous work has shown that nearly all turtles that develop USD have been "head-started". This observation led to the hypothesis that the abnormally high rate of growth of head-started turtles may cause an underlying pathology of bone which increases susceptibility to USD. This study examined the relationship between "head-starting" and bone quality when compared with "wild" turtles through bone densitometry (DEXA), radiographs and computed tomography (CT). The trend demonstrated by statistical analysis was a significant difference in bone mineral density between wild and head-started animals when they are young and small (1-3 years, $\leq 149\text{g}$), with head-started animals having higher bone mineral density. However, when animals are older and larger (4-7 years, ≥ 150), wild animals have higher bone mineral density than head-started animals, but they are not statistically significantly different. There were a higher percentage of head-started animals with shell abnormalities than wild animals. The earliest abnormalities were detectable on CT in animals two years of age. The next progression of this study would be to biopsy early abnormalities identified through imaging two year old animals to examine for microscopic differences in bone structure and/or evidence of early infection.

Board Placement: 48

Abstract Title: School Shootings, Reconstruction, and Aesthetic Response

College/Campus: Education, Pullman

Authors:

Patricia Maarhuis

A.G. Rud

Abstract:

School shootings are an ongoing and highly disruptive problem in the U.S. Since the tragic shootings at Sandy Hook Elementary in 2012 there have been at least 159 school shootings (Everytown, n.d.). The aim of this qualitative educational research project is three-fold: (1) to better understand the educational and relational significance of individual and communal aesthetic responses to school shootings, as interpreted through a Deweyan lens; (2) to analyze transactional aesthetic responses of reclamation, restoration, and re-presentation within three communities – Columbine High School, Red Lion Junior High, and Sandy Hook Elementary School; and (3) to identify the process of artful conduct and creative behavior observed in aesthetic responses. Results: (1) ten themes of evolving expression and relational identity were found in aesthetic responses across art forms, media, building design and construction; and (2) researchers identified a 7 step process of artful conduct and creative behavior in response to shooting events. Findings suggest engagement in responsive aesthetic projects may ameliorate the disruption and trauma of school shootings. Within aesthetic response, there is potential to return community and school to practices of stable associated living through rebuilding social bonds. And, there is potential for beneficial reclamation, restoration, and re-presentation of the traumatic experience through the doubled reconstruction of communal spaces/places and of relational identity after shooting incidents. Pragmatic applications include the use of aesthetic response and associated living practices by educators and civic leaders as a means to return to teaching and learning post-shooting event and as activism against gun violence.

Board Placement: 49

Abstract Title: Characterization of novel regulator of cell division in plants

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Rafal Kacprzyk

Andrei Smertenko

Deirdre Fahy

Abstract:

Plant cells divide by partitioning the cytoplasm and cellular organelles of mother cells in a process known as cytokinesis. Microtubules are an important component in cytokinesis; they form a dynamic scaffold called the phragmoplasts, which facilitates delivery of building blocks required for construction of cell plate, a partition between daughter cells. The cell plate consists of lipid membrane and oligosaccharide cell wall material. The phragmoplast first constructs the cell plate in the center of mother cells. Then it expands to reach mother cell wall and disappears once cell plate synthesis is finished. During expansion the phragmoplast consist of three zones: the leading edge, transition zone and the lagging edge. The leading edge is dominated by growing microtubules forming ahead of the cell plate and facilitate phragmoplast expansion toward the mother cell wall. The transition zone contains stabilized microtubules, which govern delivery of vesicle cargo carrying cell plate material. Microtubules in the lagging zone undergo depolymerization and then repolymerize at the leading edge. How depolymerization of microtubules is coordinated with the cell plate synthesis remain unknown. Here we characterize a novel cell plate protein kinase (CPK), that controls the microtubule stability in the phragmoplast. Advanced cell imaging was used to demonstrate localization of CPK to the growing cell plate. Measuring dynamics on intracellular localization of CPK revealed stronger association with the edge of expanding cell plate, than with regions where cell plate synthesis has been accomplished. Understanding IMK2 impact on cytokinesis can further our knowledge on dynamics mechanisms in plant morphogenesis.

Board Placement: 51

Abstract Title: Effects of preharvest temperature on external CO₂ injury and molecular changes in 'Golden Delicious' apple fruit peel

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Franklin Johnson
Gerrit Hoogenboom
Kate Evans

Abstract:

Preharvest air temperature has been found to be associated with the occurrence of many postharvest storage apple fruit physiological disorders. An economically-important controlled-atmosphere storage-related fruit disorder is external CO₂ injury. The goal of this study was to develop a preharvest weather model for external CO₂ injury in fruit of 'Golden Delicious.' The growing seasons for 2011 through 2013 were defined as the period between the full bloom and commercial harvest dates for apples grown in an identical orchard in Quincy, WA. In 2011, external CO₂ injury was 25% by 12 weeks storage, and in 2012 and 2013 injury remained near 0.5% over the same period. Historical weather data obtained from the Washington State University AgWeatherNet weather station located approximately one kilometer from the orchard were used to characterize the growing seasons. Accumulated heat hours at high temperatures correlated with low levels of external CO₂ injury. Furthermore, an injury incidence-correlated gene set was evaluated in 2011 and 2013 peel tissues collected from two postharvest storage types of regular atmosphere and 5%CO₂ and 1%O₂ controlled-atmosphere. The gene set expression levels in 2011 were more dynamic than 2013. Anthocyanin biosynthesis, carbohydrate metabolism, non-mevalonate-directed isoprenoid and phenylpropanoid biosynthesis were found to be the metabolic pathways involved with injury incidence. In addition, genes representing abiotic stress responses and protein degradation also correlated with injury incidence. Preliminary results of the gene set expression analysis need to be confirmed for additional years. Overall, preharvest air temperature appeared to affect postharvest fruit storability and susceptibility to external CO₂ injury.

Board Placement: 55

Abstract Title: A mechanistic study of the effects of nitrous oxide (N₂O) on spatial working memory in mice

College/Campus: Arts and Sciences, Pullman

Authors:

Raymond Quock

Abigail Brewer

Evan Klein

Dimitris Emmanouil

Yangmiao Zhang

Donald Shirachi

Abstract:

Nitrous oxide (N₂O) potentiated amnesia in patients during dental procedures [Yokoe et al., *J Oral Maxillofac Surg* 73:P402-409, 2015]. Other studies have indicated that prolonged exposure to high concentrations of N₂O (70%) in oxygen affected spatial learning memory in rodents [Culley et al., *Anesth Analg* 105:83-88, 2007]. Therefore, the aim of the study was to explore potential mechanisms of N₂O in reducing spatial working memory in mice. Studies have shown that flumazenil reversed N₂O-induced anxiolysis in mice [Emmanouil et al., *Psychopharmacol* 115:167-172, 1994]. Furthermore, there has been evidence indicating that hyperbaric oxygen (HBO₂) improved cognitive functions in both humans and mice that have suffered brain injury [Liu et al., *Neural Regen Res* 8:3334-3343, 2013]. Therefore, flumazenil and hyperbaric oxygen (HBO₂) were used to study potential mechanisms of N₂O-induced spatial working memory dysfunction. The T-Maze spontaneous alternation mice exposed to 70% N₂O (in O₂) exhibited severely reduced alternation behavior in the T-SAT. Mice in this environment alternated their route only 33.04% of the time, in comparison to the control (room air) rate of alternation at 62.81%. Three groups of mice received i.p. injections of flumazenil (0.1, 1.0 or 10 mg/kg) and demonstrated a dose-dependent restoration of spatial working memory under 70% N₂O in the T-SAT. Lastly, mice pretreated for 60 min with HBO₂ at 3.5 atmospheres absolute demonstrated 47.32% alternation under 70% N₂O in the T-SAT. This study verified that 70% N₂O reduced spatial working memory in mice, which can be improved independently by flumazenil and HBO₂.

Board Placement: 56

Abstract Title: Hyperbaric oxygen (HBO2) suppresses paclitaxel-induced neuropathic pain through the rostral ventromedial medulla (RVM)

College/Campus: Arts and Sciences, Pullman

Authors:

Raymond Quock

Donald Shirachi

Abstract:

Hyperbaric oxygen (HBO2) treatment produces antinociception in rats with various neuropathic pain conditions [Thompson et al., *Neurosci Res* 66:279-283, 2010; Gibbons et al., *Brain Res* 1537:111-116, 2013]. Recently we reported that HBO2 suppressed paclitaxel-induced neuropathic pain via a supraspinal mechanism in rats [Zhang et al., 4th Int Cong Neuropathic Pain, 2013]. The rostral ventromedial medulla (RVM) is the known output of the pain-modulating system in the brain, and sends descending signals to the dorsal horn to modulate nociception. The aim of this study is to examine whether the RVM is involved in the pathway by which HBO2 suppresses neuropathic pain. Male Sprague Dawley rats developed neuropathic pain following four repeated injections of 1.0 mg/kg paclitaxel, which was assessed by mechanical and cold allodynia. After the last injection of paclitaxel, the rats received a single or four daily 60-min treatments with HBO2 at 3.5 atmospheres absolute. To test involvement of the RVM, 2% w/v lidocaine in 0.5 uL saline was delivered into the RVM by microinjection immediately before HBO2 treatment [Saadé et al., *Pain* 149:89-99, 2010]. The assessment of allodynic response was carried out every other day and lasted for 32 days after the first paclitaxel injection. Results showed that a single HBO2 treatment suppressed paclitaxel-induced mechanical allodynia, but not cold allodynia. Four repeated HBO2 treatments reduced the cold allodynia. However, the antinociceptive effect of HBO2 on mechanical allodynia was blocked by the microinjection of lidocaine into the RVM. This demonstrated that HBO2 suppressed paclitaxel-induced neuropathic pain via the RVM.

Board Placement: 58

Abstract Title: SMALL TOWN REDEFINES ECONOMIC SUSTAINABILITY

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Robert Krikac

Kathleen Ryan

Abstract:

After a devastating fire in the summer of 2014 destroyed 30% of the housing stock in the city of Pateros, Washington, the city began the long process of rebuilding. This process revealed the need for redevelopment of the downtown area in order to make the city more economically sustainable. The Rural Communities Design Initiative (RCDI) was contacted to collaborate with the stakeholders of the city on the development of a new downtown plan.

Working with a group of community stakeholders; city administration, elected officials, small business owners and residents, the RCDI used participatory action research to determine the major issues impacting the development of the downtown. From these discussions, graphic documentation was created to provide a broad view of opportunities envisioned by the participants, including: alteration of traffic flow to encourage access to downtown, repurposing existing structures, improving links to recreation, and future development of under-utilized lots. The participatory action research results were compiled into a graphic document that the stakeholders can review. This document identified tangible topics for laypeople and business owners to discuss, such as traffic flow, repurposing buildings, etc., and not a specific focus on "design" or aesthetics at this stage. The document is currently being used by city administration to further the discussion with the stakeholders and obtain more poignant feedback on opportunities discovered in the process. Next steps will be the revision of the graphic documentation and larger public co-design sessions to refine the conceptual plans for the downtown of Pateros.

Board Placement: 59

Abstract Title: Dangerous Spaces: Explaining Variation in the Location of Political Violence

College/Campus: Arts and Sciences, Pullman

Authors:

Ashly Townsen

Bryce Reeder

Abstract:

Why does political violence occur at some locations but not others? The occurrence of civil violence is heterogeneous across all locations within a country, yet most scholarship examines this phenomena at the state level. In this article, we develop a new and detailed theory for understanding why we observe episodes of political violence in specific locations. We also develop an argument detailing the advantages of studying conflict at the local level. Actors of political contested countries exist in a small and defined strategic environment and we believe that researchers must begin to theorize about their actions at a sub-state level in order to sharpen our predictions and prescriptions. Utilizing geo-coded spatial data we develop several unique and original measures of political expression, political violence, and government repression. These new measures allow us to increase the precision of previous local level research and to better predict the location of political violence. To accomplish this we create kernel density estimates of variables we believe are important for the location of political violence events and the interaction of government repression and political violence. Our analysis confirms our expectations in that there are certain key variables that significantly predict the location of violence and increase our understanding on the interaction between violence and repression.

Board Placement: 61

Abstract Title: Synthesis of high-density jet fuel from plastics via catalytically integral processes

College/Campus: Agricultural, Human and Natural Resource Sciences, Tri-Cities

Authors:

Xuesong Zhang

Hanwu Lei

Lei Zhu

Moriko Qian

J.C. Chan

Xiaolu Zhu

Abstract:

The present study was aimed at synthesizing JP-5 navy fuel from plastics through a novel pathway. The consecutive processes for manufacturing JP-5 navy fuel principally included the catalytic microwave-induced degradation of low-density polyethylene (a model compound of waste plastics) and the hydrotreatment of obtained liquid organics. The catalytic microwave degradation was conducted at the catalytic temperature of 375 °C and catalyst to feed ratio of 0.1. The carbon yield of the liquid organics from the catalytic microwave degradation was 66.18%, mainly consisting of a mixture of aromatic hydrocarbons and aliphatic olefins. Several variables, such as initial pressure and catalyst to reactant ratio, were employed to determine the optimal condition for the production of alternative jet fuels in the hydrotreating process. We observed that the aromatic hydrocarbons and aliphatic olefins as the precursors of jet fuels could be converted into jet fuel range aliphatic alkanes and cycloalkanes. The hydrotreated organics from the experiment conducted at the reaction temperature of 250 °C for 2 h, including 31.23% selectivity towards aliphatic alkanes, 53.06% selectivity towards cycloalkanes, and 15% selectivity towards remaining aromatic hydrocarbons, which were consistent with the specifications of JP-5 navy fuel. In this regard, the catalytic microwave degradation of plastics and the hydrotreatment of obtained liquid organics can be regarded as a clear breakthrough to produce alternative jet fuels. From a commercial point of view, the catalytically integrated processes could be the most feasible for synthesizing advanced jet fuels (e.g. JP-5 navy fuel).

Board Placement: 62

Abstract Title: Crossing the Border: Documenting Immigrant Student Experiences to Enhance Classroom Instruction

College/Campus: Education, Tri-Cities

Authors:

Eric Johnson

Abstract:

Latino immigrant students disproportionately experience extreme challenges in the U.S. school system and currently have the highest dropout rate of any major demographic group (Migrant Policy Institute, 2014). This statistic warrants a better understanding of how to improve the academic conditions face, as well as how to better support the teachers who strive to provide them with the highest quality education possible. This project is unique because it explicitly focuses on how the experience of crossing the border impacts students' personal and academic "funds of identity" (Esteban-Guitart & Moll, 2014). This work also explores ways to heighten educators' overall understanding of how the immigration process shapes their students' identities. Stemming from this platform, my proposal has two fundamental components: 1) to explore the range of immigrant student experiences crossing the border and determine how/if that process has shaped their experiences in school; and 2) to examine pre-service teachers' understanding of what immigrant students go through during the immigration process, and how this knowledge informs their approach to classroom instruction. The immigrant students' narratives will be compiled in a documentary film that will include footage of the social and environmental conditions along the US-Mexico border. By showing this documentary to WSU pre-service teachers, I will determine how/if the pre-service teachers' perspectives towards their immigrant students shifts once they have been exposed to first-hand immigration narratives provided by the students.

Board Placement: 63

Abstract Title: Climate Change and Ecological Models of Amphibian Populations in Palouse Prairie Wetlands

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Erim Gómez

Rodney Sayler

Abstract:

Climate change is projected to produce less summer precipitation and hotter and drier summers in eastern Washington and interior regions of the Pacific Northwest. We explored the ecological implications of future climate change on amphibian communities in Palouse Prairie wetlands from 2012-15 by sampling amphibian populations in 100+ wetlands. We used advanced modeling techniques (e.g., machine learning, predictive analytics) and analytical methods employing artificial intelligence (e.g., IBM Watson) to identify environmental factors associated with the distribution and abundance of 8,000+ amphibian larvae captured in Palouse Prairie wetlands.

We evaluated the hypothesis that abiotic factors (summer temperature, rainfall) associated with climate change and El Niño events strongly influenced seasonal patterns of flooding and drying and resulting characteristics of amphibian communities occupying prairie wetlands. We found that abundance, growth, and biomass of selected amphibian species were mediated by wetland permanency as well as the presence or absence of aquatic predators, such as goldfish or salamanders. Our models demonstrate that a matrix of interacting abiotic (e.g., weather related) and biotic factors (e.g., predator communities) combine with the seasonal flooding dynamics and spatial distribution of wetlands on landscapes to produce predictable ecological patterns in Palouse Prairie amphibian communities. We conclude that projected climate change will have negative impacts for both common and rare species and alter the abundance and distribution of most amphibian species in Palouse Prairie wetlands.

Board Placement: 64

Abstract Title: Hybrid Process for Conversion of Pyrolysis Oil into Lipid

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Xiaochao Xiong
Manuel Garcia-Perez
Shulin Chen

Abstract:

Lignocellulosic feedstocks are the most abundant renewable resources in the world. To use these materials as a carbon source for advanced biofuel production, a hybrid biorefinery process has been developed. The anhydrosugars were efficiently produced in the fast pyrolysis step, and aromatic compounds, derived from the lignin fractions in biomass, were also generated simultaneously. The high lipid producing bacterium *Rhodococcus jostii* RHA1 with a remarkable capability for degrading aromatic compounds was metabolically engineered to produce lipid, the precursor of energy-rich hydrocarbon from levoglucosan by heterologous expression of the gene encoding levoglucosan kinase (LGK). The expression level of the target gene, *lgk* in the recombinants was optimized to improve the growth performance and substrate utilization. The recombinants were able to utilize levoglucosan effectively, while accumulating lipids to more than 40% of cell dry weight (CDW) under nitrogen-limiting conditions. We are investigating the lipid yield from the generated pyrolysis oils mainly consisting of anhydrosugars, carboxylic acid and mono and oligo-phenols by the developed strains. This hybrid thermochemical and biochemical process offers a new option for the conversion of biomass into lipid-derived “drop-in” fuels and chemicals.

Board Placement: 65

Abstract Title: An Evaluation of Factors Influencing Consumer Purchases of Cut Flowers

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Zongyu Li

Vicki McCracken

Abstract:

Principal Topic

In 2013, USDA statistics indicate that at the wholesale level, 80% of fresh flowers sold in the United States are not grown in America, but imported from other countries. Shipping flowers from those countries to the United States incurs large transportation, refrigeration, and storage costs, leaving an enormous carbon footprint. Washington State is among the top ten cut flower producing states in recent years. As competition with international growers has increased the structure of the WA industry has changed resulting in more small-scale producers growing specific flowers that are not easily imported. This study identify factors influencing consumers' purchase decisions for cut flowers.

Method/Hypotheses

An online survey of Washington State consumers (general population, over age 18) was conducted in 2012. The survey topics include cut flower purchasing habits, food purchasing habits, opinions about cut flowers, and knowledge of plants, cut flower care, and imported cut flowers. A probit model was used to analyze the data.

Results/Implications

Preliminary results indicate that some factors (e.g. age, income and garden ownership) had similar impacts on both types of purchase decisions. The difference is that consumers more likely to buy for gift use were males, at higher education levels, and who valued variety in cut flowers. However, consumers more likely to buy for personal were married, and knew the expected longevity of the flowers, and had correct knowledge about how to keep cut flower last longer. These findings can help producers better identify market opportunities and barriers.

Board Placement: 66

Abstract Title: Introducing the Eddy Covariance technique to optimize the effectiveness of precision irrigation over Washington State vineyards

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Sayed Hossein Sadeghi

Pete Jacoby

Brian Lamb

Jinshu Chi

Patrick O’Keeffe

Shelley N. Pressley

Heping Liu

Abstract:

As water becomes scarcer, growers will face challenges in managing their limited water resources, while achieving high levels of grape quality and quantity. The problem is sharpened by projected climate change which indicates an increase in crop water stress with likely negative influences on the quality of the grapes and wines in near future. To optimize effectiveness of precision irrigation, factors including plant water status, evapotranspiration (ET), and photosynthetic rate (CO₂ exchange rate) must be accurately monitored during critical periods of the growing season. The Eddy Covariance (EC) method is one of the most accurate, direct and defensible approaches to achieve these objectives. This technique includes the using of a single tower equipped with micrometeorological sensors (installed at a height of 3m above the ground surface), and permits accurate assessment of the crop water stress and hypothesized rate in high temporal resolution. We installed an EC system over a commercial vineyard near Benton City, WA and report corresponding data for the very first time in the state of Washington. Using the EC method would not only ease irrigation scheduling, but also save over half the water which is currently used by growers through the erroneous estimation of ET. This could yield direct benefits worth hundreds of millions of dollars through water savings leading to the doubling of acreage in planted vineyards of wine grapes. In addition, it will have immediate impacts on reducing evaporation losses, disease and insects, as well as improving the health and longevity of the vines.

Board Placement: 67

Abstract Title: Excellence in Teaching Online: Testing the effectiveness of an online faculty development course

College/Campus: Global Campus, Global

Authors:

Rebecca Van de Vord

Abstract:

As online learning becomes more widespread, how do we prepare faculty to effectively teach in this environment in a way that is efficient for the institution and convenient for the instructor? In a time when resources are short, to what extent can a self-paced, non-facilitated faculty development course, utilizing minimal staff resources, improve online teaching and perhaps even positively impact the quality of on-campus teaching?

In 2011, WSU Global Campus launched "Excellence in Online Teaching." The course consists of five modules addressing; effectiveness of the online environment, creating community, engaging students, managing an online course, and academic integrity. The course is free for all WSU instructors. The course is also available to the public for a small fee. The modules consist primarily of text and video content. Participants must complete the course and a series of assessments at more than 80% correct in order to receive a certificate of completion. Over four years, 154 individuals have received certificates of completion, including 78 from out of state, and 8 international participants.

Spring 2015, course completers from the prior four years were surveyed to measure the long-term impact of the Excellence in Online Teaching course. The survey was distributed to 154 email addresses; 43 individuals completed the instrument for a response rate of 28.86%. Results suggest that the course has been highly effective in several ways including positively impacting online and face to face teaching, as well as student learning outcomes. The research presents the findings of this survey.

Board Placement: 69

Abstract Title: Making Sense of STEM Education: Professional Learning and Classroom Implementation

College/Campus: Education, Vancouver

Authors:

Tamara Nelson
Kristin Lesseig
David Slavit

Abstract:

There is little common agreement as to what STEM education means in terms of curriculum and student outcomes. This lack of clarity impacts what is provided to teachers through professional development and how teachers' understandings are translated into student learning opportunities. In this study, we examined the conceptualizations of STEM education by three different groups of educators: middle school teachers involved in a two-year PD project, teachers and a principal at a STEM-focused secondary school, and STEM education PD providers. We address these research questions:

1. Is a school or district faculty, including administration (and larger community), collectively making sense of STEM education? If so, what are the attributes of their common understandings? If not, what are the commonalities and differences across their individual meanings for STEM education?
2. In relation to ongoing sense-making, how do teachers implement their conceptions of STEM education in their classrooms?

Concept maps and interviews were used to capture the meanings teachers and others had constructed for "STEM education." We found that a majority of participants identified the following attributes for STEM education: (a) an interdisciplinary curriculum grounded in real world problems; (b) a need for ambitious instructional practices; (c) opportunities for students to apply disciplinary ideas to designing solutions or to sustained inquiry; and, (d) opportunities to practice communication and critical thinking. Classroom and meeting observations and artifacts were used to generate descriptions of how teachers implemented STEM education in their classrooms. Four models of STEM education implementation in three middle schools were identified.

Board Placement: 70

Abstract Title: Pilot Testing a Media Literacy-Based Curriculum to Enhance Youth and Parent Media Skills and Food Behaviors: Year 3 of 5

College/Campus: Communication, Pullman

Authors:

Michelle Kistler
Jill Shultz
Mary Katherine Deen
Marilyn Cohen
Shirley Calodich
Barbara Johnson
Michelle Kistler
Louise Parker
Tom Power

Abstract:

For Year 3 of this 5-year project, 59 parent/youth dyads across five Washington State counties received a six-session program called "FoodMania: Kids and Food in a Media-Driven World." The main objective of the curriculum is to improve family management of media influences to improve healthy food behaviors. Pretest/posttest survey results, feedback focus groups, and educator process evaluation logs were used to refine the curriculum for field testing. Parents and youth (ages 9-14) largely enjoyed the curriculum. Quantitative results suggested some changes in certain outcomes of interest, such as increased critical thinking toward media sources and content, increased efficacy toward healthy food behaviors, increased parental discussion with children, and greater availability of healthy foods in the home. Feedback focus groups conducted several weeks after the conclusion of the program described recurrent themes such as program-related parent-child interaction in the home during the course of the curriculum, and greater nutrition information efficacy. The quantitative and qualitative results also provided guidance for strengthening the curriculum and our assessment design before commencing field testing in Year 4. The revised curriculum will place greater emphasis on media literacy skills and parental mediation skills, and surveys will be revised to better tap outcomes of interest related to media literacy skills and food behaviors. Project Year 4 will consist of two full cycles of field testing with control groups, followed by 6- and 12-month delayed posttests ending in Year 5.

Board Placement: 71

Abstract Title: Extraction and Quantification Method for Triterpenoid Saponins from Quinoa by UV-Visible Spectrophotometry

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Ilce Gabriela Medina Meza

Nicole Aluwi

Steve Saunders

Girish Ganjyal

Abstract:

Quinoa (*Chenopodium quinoa* Willd) is an Andean crop with high nutritional value. Saponins are emerging phytochemicals found in the external layers of quinoa seeds (between 2-5%), conferring an intensely bitter flavor that is not desirable by consumers. Quantification of saponins is challenging, since they are found as a complex mixture of triterpene glycosides that are derivatives of oleanolic acid, hederagenin, and phytolaccagenic acid. The aim of this study was to quantify the total triterpenoid saponins in 28 varieties of quinoa grown in the state of Washington, developing a rapid extraction protocol coupled with a UV-Visible spectrophotometric quantification method. The total saponins were quantified using a calibration standard curve of oleanolic acid at $\lambda = 527$ nm. The content of saponin (expressed as % oleanolic acid) ranged from 0.67% (BBR variety) to 3.09% (Red Head variety). A commercial variety (Black) was used as reference. Compared to protocols reported in literature, this method reduces time and costs associated with extraction steps. Organic solvent-assisted washing and analytical fractionation are substituted by a hydrolysis step, followed by a liquid/liquid partition, which dramatically decreases the amount of organic solvent used. In conclusion, this methodology represents a good alternative for a faster quantification of total saponins in quinoa.

Board Placement: 72

Abstract Title: Recommendations for design of SMS-based health interventions

College/Campus: Communication, Pullman

Authors:

Jessica Willoughby

Robert Furberg

Abstract:

Cell phones are ubiquitous in many nations. Across 24 countries surveyed in a recent Pew report (2014), a median of approximately 80% of mobile phone users use short message service (SMS) text messages. In recent years, evidence has grown in support of using text messaging for health promotion. Text message interventions can be effective tools for health behavior change. However, developing SMS interventions can be difficult and may present unique challenges. A number of factors need to be taken into consideration. Additionally, while interventions that use SMS are on the rise, there is little in terms of standard approaches, methods, or reporting practices, which can make it hard to compare or replicate interventions. The primary goal of this presentation is to provide an evidence-based, minimum set of recommendations to guide intervention design.

A figure has been developed to describe the step-wise process that developers may go through when designing an intervention, highlighting critical decision points that must be considered. We suggest that six specific decisions must first be made before moving forward in the design process of SMS interventions, including intervention complexity, variability, scheduling, interactivity, and tailoring. Following design, we propose recommendations toward a standard for authors in reporting results of SMS-based intervention trials. This project has implications for the development of SMS-based interventions.

Board Placement: 74

Abstract Title: Management of ovicidal miticide resistance in the two-spotted spider mites *Tetranychus urticae* Koch, on Hops

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Adekunle Adesanya

Zhu Fang

Doulg Walsh

Laura Lavine

Abstract:

Humulus lupulus (Hop) is a specialty crop, cultivated mainly for its resins and oils in flavoring of craft beer. The US hop industry is estimated to be worth over \$200 million each year, with 99% of overall production from the pacific northwestern (PNW). Successful cultivation of hops in the PNW is threatened by a chronic hop pest; two-spotted spider mite *Tetranychus urticae* Koch (TSSM). Typically, growers apply various miticides to suppress TSSM populations. Among them, three ovicidal miticides etoxazole, hexythiazox and clofentazine have been commonly used in the middle of hop growing seasons for decades. By inhibiting chitin biogenesis in arthropods, ovicidal miticides make them more attractive than broad-spectrum miticides. Unfortunately TSSM has been documented to quickly develop tolerance and resistance to these miticides, which has been linked to control failures. In order to effectively cope with the ovicide resistance in TSSM populations, we standardized bioassay method to evaluate the efficacy of these miticides in a susceptible TSSM population. With the most effective bioassay method, we developed baseline dose response curves of TSSM populations susceptible to these three ovicides. Additionally, we screened five field-collected TSSM populations the presence or absence of a mutation, I1017F on the target site resistance-associated gene-chitin synthesis 1. The optimized bioassay method and molecular diagnostic tool will provide new information to growers through precisely predicting ovicidal miticide resistance in hop fields.

Board Placement: 75

Abstract Title: Factors Associated with Intentions to Negotiate Sexual Consent—Media Effects and Integrative Model

College/Campus: Communication, Pullman

Authors:

Jiayu Li

Abstract:

Sexual assault is a serious problem in the United States, especially among college women. The central role of sexual consent in legally defining sexual assault makes it an important research topic, yet the sexual consent negotiation, including actions of asking for consent, refusing sexual consent, and adhering to sexual consent decision, is relatively understudied. Although studies have examined how student communicate sexual consent, there is still a lack of knowledge about what factors influence their intention to negotiate sexual consent. The current studies used integrative model of behavioral prediction to explore the determinants of college students' intentions to negotiate sexual consent. Especially, the present study not only examine the effect of media exposure, but also separate passive media exposure from active information seeking. Survey data were collected from 310 undergraduate students from Washington State University. Findings suggested that passive media exposure, perceived norms, perceived behavioral control, rape myth acceptance have significant impacts on college students' intentions to negotiate sexual consent.

Board Placement: 76

Abstract Title: Honoring Tribal Legacies through Differentiated Instruction

College/Campus: WSU Spokane

Authors:

Ella Inglebret

Abstract:

A differentiated instructional (DI) approach is being advocated by education leaders as a means to build the capacity of each student through genuine engagement in holistic learning. Historically, DI has served as the foundation for teaching in Native American communities. Therefore, implementation of DI in schools can be informed by traditional, tribal educational practices. The current study involved examination of qualitative data represented in curricular materials designed for the Honoring Tribal Legacies (HTL) project sponsored by the National Park Service. Seven curriculum units were analyzed to identify underlying themes and educational strategies. These units consisted of 400 pages of text accompanied by diverse media forms developed in collaboration with educators from various tribes. A conceptualization of HTL curriculum themes and educational strategies was organized using three categories: content, process, and product. Strengths and needs of students were considered as diverse text types were used to access course CONTENT, such as patterns of nature and stories told through art, music, and the oral tradition. The educational PROCESS was characterized by multiple pathways for learning, including the interweaving of speaking, listening, reading, writing, using gestures, creating visuals, and handling artifacts. The PRODUCTS of instruction were aligned with individual student's attributes. As an example, a cultural map that is both a work of art and a source of knowledge could be constructed. The conceptualization of DI represented by the HTL curriculum can serve as a model for educators striving to meet the specific needs of each learner.

Board Placement: 77

Abstract Title: An issue of life or death: the use of environmental DNA to detect viable species in wilderness restoration and management

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Colleen Kamoroff
Caren Goldberg

Abstract:

Topic: The analysis of aquatic environmental DNA (eDNA) obtained from filtered water samples has become a cost-efficient way to detect aquatic vertebrates. eDNA is an alternative to conventional methods of visual surveys, electro-shocking, or gill-netting which can be time consuming, limit detection probabilities, and harm both target and non-target species. The method of analyzing aquatic eDNA samples to detect species is very sensitive and does not distinguish between live and dead animals. Knowing whether animals are alive or dead is critical to ecological interpretation of eDNA data.

Methods: Invasive fish removal projects in the Sierra Nevada is a unique opportunity for eDNA methodological validation, because, during fish removal, restoration sites accumulate dead fish carcasses. Testing completed and active restoration sites will validate that eDNA methods can differentiate between DNA from live versus dead sources. To determine the best method for detecting eDNA from live fish, we sampled water from buckets containing live and dead goldfish using varying filter pore sizes and at different depths of the water column. We also sampled water from restoration sites throughout the Sierra Nevada.

Results: Preliminary results suggest dead fish DNA is more degraded and smaller sized than live fish DNA, and DNA from dead individuals will only be found at the bottom of a water column. Comprehensive detection and quantification of living and dead aquatic species via eDNA is a current roadblock in ecological restoration. This research will improve our understanding of how detection of viable species can be done efficiently using eDNA.

Board Placement: 78

Abstract Title: Coping by crossdressing: An exploration of exercise clothing for obese heterosexual women

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Deborah Christel

Nicole O'Donnell

Linda Arthur Bradley

Abstract:

Over the past decade participation in physical activity for adult women has decreased while body size has increased. Overweight and obese individuals are considered the majority demographic in the United States, however plus-sized clothing sales are minimal in comparison to other segments. Furthermore, there is little known about the clothing practices of obese women who engage in physical activity. The current study addresses this research gap by exploring obese heterosexual women's clothing practices for exercise, with an emphasis on what women wear, their perceived choices, alternatives, and satisfaction. Lowe and Anspach's (1978) notion of freedom of dress was the guiding conceptual framework for in-depth interviews with (n=56) obese women. A majority of the women perceived having limited freedom in dress, and reported crossdressing in men's clothing to engage in physical activity, which resulted in a perceived lack of gender expression. Crossdressing is defined as wearing the clothing of the opposite sex and gender expression is a way in which a person acts to communicate gender within a given culture. Our sample indicated and the authors discuss, that as heterosexual women's clothing size increases, freedom in dress decreases. Our sample believes it is their personal responsibility to lose weight in order to increase their freedom in dress.

Board Placement: 79

Abstract Title: Tracking long-distance atmospheric smelter waste deposition in remote lakes using Pb isotope analysis

College/Campus: Arts and Sciences, Pullman

Authors:

Andrew Child

Barry Moore

Jeffrey Vervoort

Abstract:

Direct discharge of heavy metal pollution from mining and smelting operations into adjacent streams, lakes and rivers can cause long-term biological impacts. Several studies have addressed the biological effects of direct discharge of mining slag into aquatic habitats, but little work has been done on the biological impacts of diffuse atmospheric heavy metal pollution in remote freshwater environments. Since 1896, one of the largest non-ferrous zinc/lead smelters in the world, located in Trail B.C., has been discharging heavy metal laden airborne emissions. These emissions frequently are transported into the northeastern Washington state, where particulate metals, including lead, can be deposited into lakes and watersheds. Lake sediment cores contain records of past environmental conditions within watersheds, and may provide a timeline of fundamental chemical and biological relationships within aquatic ecosystems. The lead isotope composition of the primary ore used by the Trail smelter has a unique fingerprint. Therefore, we hypothesized if lead emissions were reaching lakes the composition of lake sediments would mirror the ore fingerprint. We analyzed the chemical composition and lead isotope compositions of sediment cores from five remote eastern Washington lakes to determine possible sources of atmospheric heavy metal deposition. Our results suggest that aerial deposition of smelter emissions may extend >130 km (80 miles) downwind of the smelter. Although lead, arsenic, and cadmium were found only in low concentrations, they are tightly correlated with lead isotopic results, which suggest that the source of the lead isotopes and these metals are likely from the Trail smelter.

Board Placement: 81

Abstract Title: In Search Of The Perfect Steak

College/Campus: Extension, Pullman

Authors:

W. F. "Frank" Hendrix

Jan Busboom

Mark Nelson

Abstract:

American beef is high quality, but tenderness is a concern. The current focused paradigm of beef quality grading is fat and hair color. The purposes of this ten year project were 1) determine if existing DNA technology could be used at the herd level to rank and select breeding cattle for tenderness and if so 2) scientifically confirm the ability of DNA marker technology, for the 18th chromosome to select for tenderness. The tenderness scale is T-1 to T-10 with T-10 being highest tenderness. Normal American beef ranks T-3 to T-4. While DNA tenderness technology is available, little research existed on inheritance, specificity and accuracy. Using DNA marker technology, I researched bulls and selected semen with high ranking DNA tenderness (T-9, T-10). Heifers were DNA tested and those with high rankings were artificially inseminated. Working with cooperating producers, 350 cows were part of the project. Over several generations, we discovered high tenderness ranking to be infrequent and inherited. A group of feeder cattle were raised on irrigated pasture until 900 pounds, commercially finished and harvested. Identical samples were tested for tenderness using a Warner Bratzler shear force machine. Results showed significant difference (<0.01) in tenderness between normal beef (T-3, 4) and selected tender (T-8, 9, 10) beef. The project showed guaranteed beef tenderness is an inherited trait. The technology is specific, accurate, cost effective and makes a significant difference in beef quality. DNA marker use enhanced beef quality and guaranteed tenderness independent of breed, method of finish or fat in the carcass.

Board Placement: 82

Abstract Title: Low Energy Spray Application (LESA) in the Pacific Northwest

College/Campus: Agricultural, Human and Natural Resource Sciences, Tri-Cities

Authors:

Troy Peters

Howard Neibling

Richard Stroh

Abstract:

Low Energy Precision Application (LEPA) and Low Energy Spray Application (LESA) involve lowering the elevation of the sprinklers on center pivots or linear move irrigation systems. It has been shown that these increase application efficiency and that it significantly decreases the pumping power requirements since they operate at lower pressures. Because of this, LESAs save water, save energy, and because more of the irrigation water reaches the soil crops can get better yields and quality. Because of several trials in the Pacific Northwest that resulted in excessive runoff, opinions were soured to this technology. One span of an existing pivot was converted to LESAs on six different pivots in Nevada, Idaho, and Washington. It was tried in alfalfa, mint, grass seed, beans, wheat, oats, and silage corn. It worked well with no to minimal runoff in every condition. All of the farmers expressed enthusiasm for the technology and plans to convert entire pivots to LESAs. The spray heads were placed at 12 inches from the soil surface, and the spacing was less than or equal to 5 ft apart. Soil moisture sensors at multiple depths in both the LESAs and MESA portions of the pivot were compared. The data clearly demonstrate that the LESAs were much more efficient and more water reached the soil. It worked well with the sprinkler heads below the top of the canopy even in tall crops like corn. Although LESAs are not universally applicable to all sites and soils, they conserve significant amounts of water and energy and benefit growers. They are under-utilized in the Pacific Northwest, and throughout many western states.

Board Placement: 83

Abstract Title: Sleep Physiology in Cultured Fruit Fly Neurons

College/Campus: WSU Spokane

Authors:

William Vanderheyden

Kevin Quigley

Ping Tashi

Sandip Roy

James Krueger

Abstract:

Sleep is an essential biological process and although there may be many reasons that sleep is required, the true function of sleep is still unknown. Recent evidence suggests that sleep may be an intrinsic property of developing neuronal ensembles. Rodent cortical neural networks in culture show an increase, over time, of sleep like properties such as slow wave power and action potential firing. In an effort to strengthen the argument that sleep is an intrinsic property of developing neuronal ensembles, we use cultured neurons from the fruit fly, *Drosophila melanogaster*, and show that the neuronal ensembles from the fly develop similar sleep-like electrophysiological traits in culture.

We compared electrical activity of 11 day old neural cultures from wild-type (Canton S) *Drosophila* to a baseline day (2 days after initial culture). Two tailed students T-test revealed a statistically significant increase in the number of action potentials per second ($p < 0.001$), an increase in slow wave power ($p < 0.001$), and slow wave correlation ($p < 0.001$). These preliminary data suggest that cultured fly neurons behave similarly to mammalian cells and that in-vitro measures of sleep-like properties can be measured in cultured fly neural networks. These studies are the first of their kind to describe the development of in-vitro sleep like states in the fly and open the door for pharmacological and genetic studies of sleep-like states using the highly genetically tractable organism *Drosophila melanogaster*.

Board Placement: 84

Abstract Title: Understanding Temperature Inversions and Improving Frost Forecasting for Central Washington Growers

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Jonathan Gramann

Gerrit Hoogenboom

Melba Salazar-Gutierrez

Abstract:

Vernal and autumnal temperature inversions pose a significant threat to grape vines and other crops in Washington State. Immediately before vines enter, or after they exit, dormancy, they are vulnerable to cold weather. Nocturnal temperature inversions occur when calm winds and cool soil temperature isolate a layer of air near the surface, allowing it to cool dramatically over the course of a night, creating observed temperature gradients up to 6 °C over thirty meters. Over the last year, AgWeatherNet has constructed seven "inversion towers" to monitor weather conditions at several heights between the surface and a maximum of sixty meters. Research is being done to investigate what factors control inversion formation, how those factors change between sites, and create predictive models for a low temperature and temperature inversion alert system. Results from a multiple regression using a forward selection procedure will be presented along with a classical statistical model. Further work to create a forecast system with the Weather Research and Forecast model (WRF) will also be described.

Board Placement: 86

Abstract Title: Using Atom Transfer Radical Polymerization to Create α,ω -heterotelechelic Polymers via One-pot Synthesis

College/Campus: Arts and Sciences, Pullman

Authors:

Timothy Strayer
Rock Mancini

Abstract:

Atom Transfer Radical Polymerization to Create α,ω -heterotelechelic Polymers via One-pot Synthesis

Atom Transfer Radical Polymerization (ATRP) is a method known to create polymers of low polydispersity (PDI), and is therefore useful in creating polymers of a discrete length. Protein-protein heterodimers have previously been created by methods that are not conducive to one-pot preparations. Therefore, a method to link two proteins together via a one-pot procedure would be desirable. It is thought that ATRP can be used to create α,ω -heterotelechelic polymers which have differing end group reactivity by grafting from a radical initiator and capping the polymer with a different radical initiator using a copper(I) halide/nitrogenous ligand complex as the chain activator. In preliminary reactions, polyHEMA was capped with an activated pentafluorophenol ester. After allowing the polymerization of HEMA to reach 95% conversion, the pentafluorophenol ester, along with additional catalyst, was added to affect chain capping. Upon dialysis, ^{19}F NMR of the purified capped polymer, the pentafluorophenol ester cap, and a mixture of the two was used to determine the extent in which the capping occurred. A portion of the resulting polymer was then stirred in phosphate buffered solution with bovine serum albumin (BSA) to form a protein-polymer conjugate. Future work will create protein-polymer-protein heterodimers using this method.

Board Placement: 90

Abstract Title: Consumption of raw-milk: A critical risk factor in the dissemination of antibiotic-resistant bacteria to Maasai people in northern Tanzania

College/Campus: Veterinary Medicine, Pullman

Authors:

Murugan Subbiah

Mark Caudell

Lisa Orfe

Robert Quinlan

Marsha Quinlan

Louis Mathews

Colette Mair

Douglas Call

Abstract:

In 2014 we conducted socio-economic surveys of Maasai (pastoralists; n=170) and Chagga (agriculturalists; n=100) households in northern Tanzania to identify factors that contribute to the prevalence and distribution of antibiotic resistant *E. coli*. Maasai households harbored significantly more resistant *E. coli* compared with Chagga. For example, the prevalence of tetracycline-resistant *E. coli* in people was 73.5% and 25.3%, respectively. Oxytetracycline is commonly used to treat cattle in at least 58% of interviewed Maasai households, but there was no difference in the prevalence of tetracycline-resistance *E. coli* in cattle (15.5% and 15.4%, respectively). A mixed-effects logistic regression demonstrated that consumption of unboiled milk was the best predictor for the prevalence of antibiotic resistance. Consequently, during 2015, 85 milk samples and 91 milk container swabs were collected from Maasai households. A subset of screened milk samples (n=30) was negative for tetracycline residues. Breakpoint assays were used to determine antibiotic resistance profiles of *E. coli* isolated from milk (n=5,508) and swabs (n=3,068). Tetracycline resistance was higher for swabs (62%) compared with raw milk (41.2%). These milk and swab isolates were also resistant to ampicillin (71.6%), streptomycin (18.7%), sulfamethoxazole (58%) and trimethoprim (66%). Our findings suggest that raw milk and milk storage containers are potentially important sources of antibiotic-resistant *E. coli*. Further characterization of isolates is in progress to determine the phylogenetic relationship of *E. coli* collected from milk and people. Regardless, basic hygiene practices (pasteurization, container disinfection) could reduce the otherwise high carriage rate for antibiotic-resistant bacteria in Maasai households.

Board Placement: 92

Abstract Title: Motivated Processing of Sexual and Violent Content in Music Videos

College/Campus: Communication, Pullman

Authors:

Tianjiao Wang

Abstract:

Sex and violence are biological motivators directly related to survival. The presence of such content, in real world or mediated messages, automatically activates the evolutionary motivational systems, which then guide cognitive, emotional and behavioral responses. This study tested the effects of two types of content commonly found in popular music videos -sex and violence - on how viewers processed such information. In a 2(sex: low/high) x 2(violence: low/high) x 2(message repetition) within-subjects experiment, participants watched music video clips that varied in the amount of sexual and violent content.

Results of this study suggested that sexual content in music videos activated the appetitive motivational systems and violent content activated the aversive systems. High-sex low-violence (HsLv) music video clips were rated as the most positive and most arousing while high-violence low-sex (HvLs) music video clips were considered to be the most negative and least arousing. Video clips high in both sex and violence (HsHv) produced a mid-level aroused response, a result commonly found when both motivational systems were activated. Based on the results of the continuous response measure (CRM) and the recall task, the HsHv clips were rated as the least enjoyable; however, they were better remembered compared to all the other types of clips. This study argues that the simultaneous portrayals of sex and violence in music videos will automatically elicit both appetitive and aversive motivational systems; thus such content may be processed more thoroughly.

Board Placement: 95

Abstract Title: Density Functionals from Deep Learning

College/Campus: Arts and Sciences, Pullman

Authors:

Jeffrey McMahon

Abstract:

Density-functional theory is a formally exact description of a many-body quantum system in terms of its density. In practice, however, an approximation to the universal density functional (DF) is required, which describes the energy as a function of density. The complexity of the form of the actual (though unknown) DF have resulted in approximations that do not consistently achieve the high accuracy required for many interesting situations.

Machine learning has recently been proposed as an approach to approximate the DF (or components of it), rather than specify its actual functional form. The power in this lies in that such methods are, in principle, capable of universal function(al) approximation. Conventional machine learning algorithms (such as those currently proposed), however, are limited in their ability to process data in their raw form, leading to invariance and/or sensitivity issues.

In this research, an alternative approach to DF approximation, based on deep learning, will be demonstrated. Deep learning allows computational models that are capable of discovering intricate structure in large and/or high-dimensional data sets with multiple levels of abstraction, without suffering from the issues described above. Results from the application of this approach to the prediction of the kinetic-energy DF for noninteracting electrons will be presented. A number of (additional) advantages will also be discussed, including the ability to learn and extract features directly from unlabeled data.

Board Placement: 97

Abstract Title: Farm Scale Effect in Modelling Carbon Footprint of Organic Farming Systems – Case Study of Two Farms in Washington State

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Cornelius Adewale

Lynne Carpenter-Boggs

Stewart Higgins

Abstract:

Estimating carbon footprint (CF) of farms and farm products can become a tool for consumers, retailers, policy makers, and farmers. Agricultural CFs can identify more climate-sustaining farms, crops, processes, and systems. Within a farm, a detailed CF can identify areas or practices where efforts to improve environmental efficiencies should be focused. A broad effort to footprint farms will require a scientifically sound yet simple estimation of the carbon sequestration and net greenhouse gas emission potential of each agricultural practice and activity. Although prior studies have led to development of carbon and ecological footprint calculators, none have been specifically designed to incorporate factors and conditions peculiar to organic farming systems.

In this study, a new Carbon Footprint Calculator (CFC) “OFoot” was used to examine two organic farms in Washington State. Farm size affected both total CF and the interpretation of CF of the whole farms and farm products. In particular, we examine how farm equipment and soil dynamics on differently sized farms affect CF per unit of harvested crop. The comparison suggests that optimizing farm equipment may be an effective method for reducing the CF of organic farming systems.

Without proper interpretation of the various factors contributing to the CF of a farm, there is a risk that agricultural mitigation effort could be misdirected and/or less effective. Using the case studies of two farms of very different size, this study highlights the need for the available estimates of CF to be refined scientifically and interpreted correctly for informing environmental policy.

Board Placement: 99

Abstract Title: Assessment of sweet cherry (*Prunus avium* L.) genotypes for resistance to bacterial canker disease

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Josephine Mgbechi-Ezeri

Lyndon Porter

Kenneth Jhonson

Nnadozie Oraguzie

Abstract:

Integration of alleles for resistance into new cultivars requires information on the health status of breeding germplasm. This study was designed to compare the efficacy of mid-rib, carborundum and shoot inoculation methods for discriminating disease responses, assess laboratory, greenhouse and field scores, as well as, fruit versus foliage, and also, correlate bacterial populations with symptom expression.

Cultivars namely Rainier, Sweetheart, Bing, Regina and Chelan, and advanced selections such as 'AA', 'BB', 'CC', 'DD', 'EE', 'GG' and their parent, 'PMR-1', were included in the study. Disease severity was assessed 8 days after inoculation for mid-rib and carborundum methods, and 8 weeks for shoot inoculation, using a 0-5 scale (where, 0 = no necrosis and 4= total necrosis).

All genotypes scored 0-1 with carborundum inoculation, while mid-rib and shoot methods separated disease responses into low and moderate ($p < 0.001$). 'Rainier', 'Sweetheart' and 'Bing' recorded significantly higher scores ($p < 0.05$). Correlation of disease responses between the laboratory and greenhouse was high ($r = 0.96$, $p < 0.001$), moderately high ($r = 0.56$, $P = 0.32$) for laboratory versus field, and generally moderate ($r = 0.50$, $P = 0.10$) for bacterial populations vs and symptom expression, and also for fruit versus foliage ($r = 0.37$, $P = 0.23$). The laboratory or green house can either be used for disease assessment while carborundum inoculation is not suitable. Population quantification and migration within the plant would be important for determining suitability of genotypes as parents.

Board Placement: 100

Abstract Title: Respondent Interaction with Survey Mode in an Assessment of Mental Health Services Outcomes

College/Campus: Office of Research, Pullman

Authors:

Rose Krebill-Prather

Danna Moore

Kent Miller

Strawn Matthew

Rodriguez Felix

Abstract:

The 2015 MHSIP Survey (Mental Health Statistics Improvement Program) is an annual statewide survey of consumers who have received outpatient services from Washington State's mental health providers. The survey examines quality of the delivery of state-funded mental health services. Prior to 2015, the MHSIP survey was conducted exclusively as a telephone survey. In 2015, the survey was adapted to include a web survey as an additional way of completing the survey with the hopes of increasing the response rate and to encourage more reticent and younger respondents into the survey.

A 35% response rate was achieved with 1549 adult mental health consumer responses split with 91% by telephone and 9% by internet. This study presents findings on factors (survey mode, demographic, and geographic) that are related to consumer ratings of outpatient services. Cross tabulation and statistical analyses were used to profile response differences across subgroups of respondents. Overall, our findings show a pattern where internet respondents were more likely to give negative assessments of outpatient services or be undecided, whereas telephone respondents were more likely to give positive responses (social desirability). These results suggest there is an interaction effect with telephone interviewers and the potential for satisficing. Furthermore, since the current rating scales allow for a neutral response, our findings also suggest that the presence of an interviewer or not may deter or contribute to respondents choosing this type of neutral non-committal response.

Board Placement: 101

Abstract Title: Influence of soft kernel texture on the flour and baking quality of soft durum wheat

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Jessica Murray

Alecia Kiszonas

Craig Morris

Abstract:

Durum wheat is predominantly grown in semi-arid to arid environments where common wheat does not flourish, especially in the Middle East, North Africa, Mediterranean Basin, and portions of North America. Durum kernels are extraordinarily hard when compared to their common wheat counterparts. Due to this extreme level of kernel hardness, durum is primarily milled into semolina; a coarse granular product utilized in pasta and couscous. Semolina is not nearly as versatile as flour, thus limiting the variety of products which can be produced locally in regions which grow durum. Via non-GMO homoeologous recombination, the puroindoline genes responsible for kernel softness in common wheat were introduced to durum. The subsequent soft kernel phenotype expression has allowed durum to be milled into flour and the utilization of durum wheat to be greatly expanded. The objective of this study was to evaluate the flour components, rheological properties, and baking quality of the new soft durum wheat class. Several check varieties were included: Xerpha, a soft white wheat, Espresso, a hard spring wheat, and Svevo, a hard durum wheat. These check varieties were used to make preliminary comparisons between soft durum and established wheat classes. Soft durum wheat exhibits a unique set of flour and baking attributes which allow it to be utilized in a wide variety of products traditionally made with durum semolina as well as flour. In the near future soft durum wheat may have a profound impact on the food supply chain in regions currently growing durum.

Board Placement: 102

Abstract Title: Critically Thinking about the Structure of a Critical Thinking Test

College/Campus: Education, Pullman

Authors:

Latisha Sternod

Brian French

Brian Hand

Abstract:

Critical thinking is an essential skill for students to develop through their formal and informal education. The measurement of these skills is a challenge, especially with younger students. Several critical thinking assessments exist, yet there is a lack of validity evidence to support score use from such assessments. This study provides internal structure validity evidence for the Cornell Critical Thinking Test (CCTT). The CCTT is intended for students in grades 4-14 to measure induction, deduction, observation, and assumptions skills. Confirmatory factor analysis with data from students' (N = 2265) evaluated several theoretical defensible factor models. Results did not support the original conceptualization of the CCTT structure. However, a bifactor model was supported. Implications for practice and future research are discussed.

Board Placement: 105

Abstract Title: Effort towards robotic apple harvesting in Washington State

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Abhisesh Silwal

Joe Davidson

Manoj Karkee

Changki Mo

Qin Zhang

Karen Lewis

Abstract:

Apple harvesting is not only labor intensive but also a time critical task requiring right amount of semi-skilled workforce at right time. The lack of mechanized harvesting system threatens the future of fresh market apple production because of the decreasing availability of farm labor force. Over past several decades, researchers have evaluated various types of mechanized apple harvesting systems with limited successes. No commercially viable robotic harvesting systems have been available yet, primarily because of the challenges posed by highly unstructured and biologically driven farming environment. This paper presents the novel approaches investigated at Washington State University to overcome these challenges. First, a machine vision system capable of identifying apples in a naturally clustered and occluded conditions was developed using an over-the-row platform. A platform with artificial lighting provided controlled imaging environment that minimized variability in lighting conditions and capability for night time operation. Then, hand picking dynamics were studied to understand optimal picking patterns and forces required to detach apples. Based on this study, an under-sensed power grasp end-effector was designed to meet requirements for robotic harvesting. Global vision system, robotic arm, and end-effector were then integrated and evaluated in lab environment as a proof-of-concept followed by field evaluation in a commercial orchard in Prosser, WA. Results showed a huge potential for in-field automated robotic harvesting system capable of accurately identifying, localizing, and picking fruit at relative high speed. However, significant challenges for commercial implementation still remains.

Board Placement: 106

Abstract Title: Lions, 'Literally'? : Herodotus' Lion Attack on Xerxes' Troops and his Description of the Battle at Thermopylae

College/Campus: Honors College, Pullman

Authors:
Robin Bond

Abstract:

In his account of Xerxes' march into Europe in 479 BCE, the ancient historian Herodotus reports that lions attacked the camels of the Persian forces ('The History', 7.125). Scholars have explored narrative connections in Herodotus' 'History' between the lion attack and the later battle of Thermopylae. For example, the lions may function as a "narrative omen" pointing ahead in the text to the role that the Spartans will play in the battle. The lion was associated with the royal Spartan families, and the reported lion attack may prefigure, in the narrative, the losses that Xerxes will suffer against the Spartans at Thermopylae.

I propose that the lion image, introduced by Herodotus through the attack, is developed in the Thermopylae passage and sections leading up to it in two additional ways: figuratively and thematically. Through a close reading of the battle account, I argue that Herodotus includes descriptive details portraying the Spartans as fighting like lions (a heroic comparison frequent in Greek poetry); Herodotus' investigative discourse on lion reproduction elsewhere in the work (3.108) characterizes the lion as, among other things, fierce but small in numbers (a theme developed around the Spartans in the sections before the battle). The connections between the Thermopylae passage and lion references elsewhere in 'The History' suggest the possible influence of poetry, such as Homer's 'Iliad', and also reflect a rich narrative web connecting different types of information – natural investigation, historical narrative, and local legends – in the earliest large-scale example of Greek historical prose.

Board Placement: 108

Abstract Title: Leading Offenders to Work: Correctional Industries in WA State

College/Campus: Arts and Sciences, Pullman

Authors:

Faith Lutze

Laurie Drapela

Roger Schaefer

Abstract:

Correctional Industries (CI) employs large numbers of inmates to work in businesses that simulate companies in the community that produce goods and services for sale. CI programs often hire inmates for positions that require reliable individuals who are willing to develop vocational skills and work with others to produce a quality product. Nationally, research shows mixed findings concerning whether inmates who participate in CI are more likely to become employed after release and less likely to recidivate. This study examines CI in Washington State and provides an outcome evaluation. The results show that CI significantly reduces recidivism, improves institutional behavior, and increases employment after release.

Board Placement: 110

Abstract Title: Ignite Your Future: Washington 4-H Teen Conference

College/Campus: Extension, Spokane

Authors:

Jan Klein

Abstract:

The last decade has been challenging for youth to transition to adulthood, earn a degree, get a job, and stand on their own financially. Nearly 6.5 million U.S. teens and young adults are neither attending school nor working. At the same time, businesses cannot find the skilled workers they need to compete in the ever-changing economy. Part of the challenge is the gap between young people's skills and the qualifications needed for available jobs. More than three-fourths of job openings in the next decade will require skills obtained beyond high school. McKindsey Global Institute predicts that by 2020, the United States will fall short of workers with college and graduate degrees by 1.5 million but will have a surplus of nearly 6 million unemployed individuals who have not completed high school. Washington State's 4-H annual Teen Conference assists youth in finding positive answers for their future. The 3-day event, focuses on identifying post-secondary educational options, career exploration, and life skill development for independence, including workforce preparation, while providing a campus life living experience. Over 60 workshops, activities, networking, and mentoring, connect youth to education and training pathways that prepare them for jobs and economic success. Pre/post evaluations indicate successful outcomes for students as they make plans and decisions for their future.

Board Placement: 111

Abstract Title: Columbia River Basalt Chemistry, Degassing, and Eruption Dynamics: Insights From Quenched Glassy Lapilli and Tuffs

College/Campus: Arts and Sciences, Pullman

Authors:

Klarissa Davis

Owen Neill

Abstract:

Flood basalt eruptions have the potential to produce large volumes of magmatically derived gases including chlorine, fluorine, sulfur, water, and carbon dioxide, which may cause climate changes and acid rain both regionally and on a global scale. The Columbia River Basalt Group contains some of the largest lava flows known on earth. In this study, we examine sulfur degassing from the Imnaha and Grande Ronde Basalt formations of the CRBG by focusing on quenched glassy lapilli produced during phreatomagmatic flood basalt eruptions. These quenched lapilli experience variable degrees of Na leaching however most other elements are pristinely preserved.

Primary eruptive vent areas for several lavas in the Imnaha and Grande Ronde Formations of the Columbia River Basalt exhibit phreatomagmatic character, due to the interaction of rising flood basalt magma with groundwater and/or surface water. Measurements of sulfur, water, and carbon dioxide are possible in some inclusions and can provide insights into periods of massive climate change on a global scale. Melt inclusions have ≤ 2900 ppm S, ≤ 3400 ppm CO₂ and ≤ 2.6 wt% H₂O, allowing estimates of atmospheric input from the main phase of Columbia River volcanism. By sampling older flows from the Imnaha and comparing them to the younger Grande Ronde we can better understand the evolution and source of these gasses.

Board Placement: 112

Abstract Title: Ripple Effects Mapping Three Perspective Outcomes of a Coalition

College/Campus: Extension, Pullman

Authors:

Rebecca Sero

Debra Hansen

Abstract:

The Northeast Washington Hunger Coalition was created in 2012 to “resolve the issue of hunger in our community.” Since that mandate, fourteen food banks and nine dedicated partners have been working together to get more healthy food in the homes of hungry families. Counting the pounds of new food delivered or number of dollars invested as a result of this new coalition are easy answers to ascertain the success – but does that tell the whole story?

Ripple Effects Mapping (REM) is a group participatory evaluation strategy for developmental and impact evaluation. The method engages program participants and stakeholders to retrospectively and visually map the chain of effects resulting from a complex collaboration. It treats stakeholders as integral, active contributors to the process, rather than as passive recipients of program evaluation results. This approach increases the potential for evaluation findings to be useful to all stakeholders of a program and motivates community members to sustain and deepen community development work.

This project conducted three Ripple Effects Mappings of the Members, the Staff and the Board, to gather the unique perspective of each critical aspect of the coalition. Through our process, we identified clear places of intersection that could lead to increased funding and improve inter-coalition relations. We also determined ways to better develop each group, all of which will ultimately create a stronger coalition moving forward. Lastly, we discovered new ways to deploy REM to discover outcomes from a complex community endeavor.

Board Placement: 113

Abstract Title: Understanding the molecular basis of *Fusarium solani* mediated root rot in *Pisum sativum*

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Bruce Williamson Benavides

Richard Sharpe

Eliane T. Bodah

Lyndon D. Porter

Amit Dhingra

Abstract:

Pisum sativum (pea) yields have declined significantly over the last decades. Root rot caused by the fungus, *Fusarium solani* f. sp. *lisi* (Fsp) is one of the predominant cause of decline in yields. To gain a comprehensive and comparative insight into the molecular changes that accompany Fsp infection we performed a time-course transcriptome analysis in a set of tolerant and susceptible *P. sativum* genotypes challenged with the pathogen. It is hypothesized that genes exhibiting differential expression, and associated polymorphisms in the genotypes tested, in response to Fsp challenge will confer tolerance or susceptibility to Fsp. Analysis of the transcriptome revealed a total of 49,269 shared genes between two sets of genotypes. A total of 1540 differentially expressed genes was obtained using a p value of <0.001 and greater than 5-fold change of expression. Of these, 152 genes show nucleotide differences (polymorphisms) across the tolerant and susceptible genotypes. Alignment analysis reported 17 and 15 unique sequences, from tolerant and susceptible genotypes respectively, and 8 shared sequences in both sets of genotypes, which correspond to previously reported disease related genes in plants. A subset of genes and associated polymorphisms were identified to be most likely involved in tolerance or susceptibility to *Fusarium*. The set of polymorphisms will be used to screen two F7 segregating populations generated from sets of tolerant and susceptible parents. This work is expected to result in the identification of gene-linked molecular markers that will enhance the efficiency of identifying pea varieties tolerant to Fsp through marker assisted selection.

Board Placement: 114

Abstract Title: Unmet Need for Dental Care among US Children with and without Disabilities in 2013

College/Campus: Nursing, Spokane

Authors:

Walid Al-Soneidar

Jae Kennedy

Abstract:

Background: There is widespread recognition of special health care needs of children with disabilities in the medical literature, including oral public health and pediatric dentistry. However, there are no recent national estimates of unmet need for dental care among children with disabilities, and existing research does not control for important factors like health insurance coverage.

Objective: To evaluate dental care access disparities among children enrolled in special education.

Methods: The study uses data from the Child Supplement of the 2013 National Health Interview Survey (NHIS). A Multiple logistic regression model was developed using the SAS v9.4 SURVEYLOGISTIC procedure to assess the effect of special education on reported unmet need for dental care, simultaneously controlling for factors such as race, ethnicity, age, gender, and health insurance coverage.

Results: Approximately 3.2 million children (or their surrogates) reported that they could not afford needed dental care in 2013. Controlling for race, ethnicity, age, gender, and health insurance coverage, children aged 2-17 with disabilities enrolled in special education were 1.5 times more likely to report unmet need than those children who were not enrolled in special education (AOR=1.5; 95% CI 1.1-2.2).

Conclusion: Children with disabilities appear to face financial barriers to obtaining needed dental services, and may also face other access barriers including special equipment, training, and service needs. Preliminary analyses also suggest that children enrolled in special education are likely to use dental services more frequently, leading to higher costs.

Board Placement: 115

Abstract Title: Testing the Limits of Proper Behavior: Women Students in and beyond the Weimar Mission Schools in Qingdao 1905-1914.

College/Campus: Arts and Sciences, Pullman

Authors:

Lydia Gerber

Abstract:

With the outbreak of WWI, less than a decade's worth of Weimar Mission education for girls in China came to a sudden halt. Based on a qualitative analysis of archival and published sources, predominantly from the Protestant Weimar Mission, this project examines the legacy of the missionary society' girls' schools and their impact on their students' lives. Approaching its theme "Testing the limits of proper behavior" in two ways, it first explores cases in which students challenged school rules. Secondly, it demonstrates that some students were successfully creating a life for themselves as working mothers and teachers by strategically modeling what the school deemed proper behavior, namely the complete submission to the parental authority of their in-laws.

This project argues that, surprisingly, these, in contrast to American mission schools socially conservative schools with their active support of traditional Confucian values served as a venue for "female empowerment" in our modern understanding of the term through the traditional Chinese conduit of "familial agency" as described by Lee-Lin Lee. Even though the working mother model the students embraced was viewed with distaste in contemporary Germany, missionaries quietly adjusted their school curricula to better support the more advanced dreams of the Chinese students and their families. This project contributes to the growing body of research on the dynamic nature of the missionary encounter between China and the West and its impact on women.

Board Placement: 116

Abstract Title: A Survey of University Counseling Centers' Perceptions and Experiences Pertaining to Emotional Support Animals (ESAs).

College/Campus: Education, Pullman

Authors:

Phyllis Erdman

Lori Kogan

Karen Schaefer

Regina Schoenfeld

Abstract:

The mental health of college students is a growing concern for college campuses. A significant percentage of students feel hopeless, depressed and potentially suicidal (American College Health Association, 2014). A growing number of students are requesting accommodations for emotional support animals (ESAs) to help mitigate these challenges. The Americans with Disabilities Act (ADA) provides clear policies to university counseling centers (UCC's) related to student requests for assistance animals to help with physical and/or psychological disabilities (Americans with Disabilities Act title II Regulations, 2010), but does not include ESA's. Because the legislation pertaining to ESAs differs from the laws governing disability service animals, there are currently no clear policies regarding ESAs to help guide UCC's. Consequently, colleges are faced with developing new policies and guidelines with very little guidance.

To assess how UCC's are handling student requests for ESAs, we conducted an on-line survey in which we asked the centers about their responses and knowledge of this growing concern; how they handle requests for ESAs; and whether their universities had specific policies covering this. We obtained 248 responses, and of these, over 50% indicated they have not yet been asked to write many letters of support for ESAs, but most of the UCCs indicated minimal knowledge on the topic, and a strong desire for guidance in creating official policies. This poster will provide details regarding this study and offer recommendations for establishing university policies.

Board Placement: 118

Abstract Title: Examination of the Impacts of Dimensionality on the Cognitive Dynamics Associated Educational Video Game Play

College/Campus: Education, Pullman

Authors:

Richard Lamb
Jonah Firestone
Chrstitine McManus

Abstract:

The purpose of this study is to examine and identify factors contributing to learning outcomes associated with the use of educational video games in Science Classrooms. Educational games and simulations provide educators with powerful tools for teaching students in the sciences. There are several types of games within the broad category of educational gaming including Serious Educational Games (SEG), simulations, and Serious Games (SG). In the educational setting, there are often factors that mediate successes and shortcoming that are often not identified. This study is designed to examine the use of interactive educational simulations, SEGs, and SG as part of the P-20 curricula in science. Specifically, the authors intend to assess the impact of dimensionality (i.e. 2D vs. 3D) on cognitive dynamics while students are engaged in the use of these innovative technologies. The results of this study are in line with previous research suggesting that use of SEGs foster greater cognitive action and an increase in positive affect toward learning in students, when compared to SGs and simulations. The results in this presentation stem from an analysis of ten science students play of SEG, SG, and simulation games for 15 hours over the span of one month. This study makes use of a neuroimaging technique known as Function Near Infrared Spectroscopy (fNIR). More to this point, effect size outcomes are suggestive of a cumulative medium effect for cognition ($d=.67$) and affect ($d=.51$).

Board Placement: 122

Abstract Title: Food Reasoning: The Influences of Emotional Framing, Food Knowledge and Media Exposure on Food Judgments

College/Campus: Communication, Pullman

Authors:

Jiawei Liu

Rachel Bailey

Abstract:

The study presented here examines how valence framing of more and less controversial foods interacts with individual differences in food knowledge and media exposure to influence believability judgments. Results indicate that negative valence frames were more believable overall. Further, food knowledge interacted with valence framing and controversy of food in an interesting way. Individuals with high food knowledge tended to be more susceptible to valence frames when making judgments about controversial foods, while individuals who were low in food knowledge were more susceptible to framing effects when dealing with information about non-controversial foods. Furthermore, we also found that individuals with higher media exposure were less susceptible to framing effects. These results are meaningful given the prevalence of obesity in the U.S. Message designers trying to encourage healthy eating should focus on two different framing strategies when framing controversial and non-controversial foods for different types of individuals.

Board Placement: 123

Abstract Title: Understanding flower diversification through a comparative transcriptomics approach: an example from *Achimenes* (Gesneriaceae)

College/Campus: Arts and Sciences, Pullman

Authors:

Wade Roberts

Eric Roalson

Abstract:

Flowers are among the most common ways that humans connect to nature due to their diverse colors and shapes. They remain one of the most visible products of evolution and represent an adaptation for plants to successfully reproduce through interactions with different pollinators. *Achimenes* is a small genus in the African violet family (Gesneriaceae) that is native to Central America and shows remarkable variation in floral form among closely related species. There are multiple derivations of colors, shapes, and petal spurs that correspond to bee, bird, and butterfly pollination. As such, this genus provides a strong and unique opportunity to study the genetic mechanisms involved in the diversification of flowers.

Floral diversity in *Achimenes* is likely related to patterns of gene expression and sequence variation. Using a comparative genomics approach, RNA was collected and sequenced from flowers in four species and three developmental time-points. Genetic data was compared within and among species using multiple statistical modeling approaches. We tested for significant differences in sequence and expression levels between orthologous groups, co-expression clusters, and genes displaying signatures of positive selection.

Distinctive expression and sequence differences were found in groups containing small numbers of genes involved in transcriptional regulation, pigmentation, and morphology. These results would suggest that differences in a small set of genes could contribute to large, visible changes in floral form between species of *Achimenes*. Our approach provides novel biological insight and a large dataset for additional study into the mechanisms involved in the evolution and development of flowers.

Board Placement: 124

Abstract Title: A validation of the conceptual change scale on climate change

College/Campus: Education, Pullman

Authors:

Carlos Anguiano
Bruce Austin
Olusola Adesope
Jessica Lester
Asaph Cousins

Abstract:

There is evidence that many students have misconceptions about basic science topics, such as climate change. These misconceptions usually interfere with the learning of new or related information. Research has examined the need for conceptual change to overcome misconceptions. Specifically, educational researchers have advocated for conceptual change, one which examines the role of cognitive, motivational and epistemic beliefs as foundational to inducing conceptual change. The purpose of this study is to examine the validity of the Conceptual Change Scale (CCS) developed by the authors to identify perceptions of undergraduate students regarding climate change activities. The data sample of 418 cases were randomly split into two halves. The results of the EFA were used to build a final theoretical model that was fit to the second split-half of the sample and tested using CFA. As a result of the analyses, a 10-item instrument with "expert", "change", and "interest" sub-scales were developed. The factor loadings and correlations produced by the final CFA model were comparable to those found by the EFA from the first split-half. The correlation between Expert and Change was $r = -.588$, $p < .001$ and between Expert and Interest $r = -.235$, $p = .007$. As with the EFA, the correlations were both negative in direction and the strength of the relationship between Expert and Change was stronger. Standardized factor loadings ranged from .489 to .841 and were all significant at $p < .001$ indicating that all items are reasonable measures of their latent constructs.

Board Placement: 125

Abstract Title: Problems Associated with Twelve-Hour Shifts for Nursing Staff

College/Campus: Nursing, Spokane

Authors:

Olivia Oden

Jae Kennedy

Abstract:

Objective: To review the peer-reviewed literature on nursing shift work and the role of longer shifts on professional burnout, worker safety, and patient outcomes.

Background: Between 30-50% of new nurses leave the profession within the first three years of graduation. Consequently, the profession is aging, with half of all practicing nurses being 55 or older. Fatigue brought on by consecutive long shifts is often cited as a reason for leaving the profession for young nurses.

Methods: Systematic review of the literature, using PubMed and the matrix method.

Results: Multiple studies suggest that twelve-hour shifts are an increasingly popular staffing model for nurses in hospitals and clinics. Though this model may seem efficient to HR and finance departments, and is even popular among many of those same nurses, it appears to be associated with greater absenteeism, higher turnover, professional burnout and diminished patient outcomes. The practice of scheduling employees for regular twelve-hour shifts has been identified as unsafe by other industries, and should be carefully evaluated in the health care industry.

Significance: Currently, national policies in health care administration do not address this issue, leaving the discretion of choosing these longer shifts up to administrators who may not fully recognize the threats these long shifts can pose.

Conclusions: Health care administrators, nurses, and nursing unions need to come together to critically evaluate whether these longer shifts truly save money, and whether they negatively affect professional longevity and patient care.

Board Placement: 126

Abstract Title: ExsE is a Negative Regulator for T3SS Gene Expression in *Vibrio alginolyticus*

College/Campus: Veterinary Medicine, Pullman

Authors:

Jinxin Liu

Doug Call

Abstract:

Type III secretion systems (T3SSs) contribute to microbial pathogenesis of *Vibrio* species, but the regulatory mechanisms are quite complex. We examined the classic ExsACDE protein-protein regulatory model from *Pseudomonas aeruginosa* in *Vibrio alginolyticus* using a host-cell contact model. Deletion mutants in *V. alginolyticus* demonstrated that T3SS is positively regulated by ExsA and ExsC and negatively regulated by ExsD and ExsE. Interestingly, deletion of ExsE enhanced the ability of *V. alginolyticus* to induce host-cell death while cytotoxicity was inhibited by in trans complementation of this gene in a wild-type strain, a result that differs from a similar experiment with *Vibrio parahaemolyticus* ExsE. We further showed that ExsE is a secreted regulator that confers limited impact for *V. alginolyticus* adhesion to Fathead minnow epithelial cells. In vitro Co-immunoprecipitation assay revealed that ExsE binds to ExsC to exert negative regulatory effect on T3SS genes. T3SS in *V. alginolyticus* can be activated in the absence of physical contact with host cells and an alternative signaling pathway appears to contribute to the regulation of ExsA. Consequently, like ExsE from *P. aeruginosa*, ExsE is a negative regulator for T3SS gene expression in *V. alginolyticus*.

Board Placement: 128

Abstract Title: The Cinema of Hou Hsiao-hsien: Culture, Style, Voice and Motion

College/Campus: Arts and Sciences, Pullman

Authors:

Christopher Lupke

Abstract:

Hou Hsiao-hsien is considered the most important filmmaker to emerge from Taiwan. This presentation is an outline of Christopher Lupke's recently published book on this important filmmaker. The presentation provides introductory information about the director and his films and highlights several themes and stylistic tendencies in his work. Hou Hsiao-hsien uses voiceover in many of his films; some films are highly political. Hou also is interested in the issue of motion and stasis. Finally, some of Hou's films are adaptation from classical Chinese literature. Lupke's presentation touches on all these subjects.

Board Placement: 129

Abstract Title: Exploring reactions to and perceptions of drinking-reduction programming targeted to university fraternity and sorority members

College/Campus: Communication, Pullman

Authors:

Nicole O'Donnell

Stacey Hust

Erica Austin

Stefani Whitney

Nicole O'Donnell

Jason Wheeler

Abstract:

Research indicates that members of fraternities and sororities are especially likely to engage in abusive drinking. Given the difficulties of reaching members of these groups with effective prevention programming, this study used six focus groups (total participant n = 28) to explore Greek students' perceptions of drinking-reduction programming and their specific reactions to a targeted abuse-prevention campaign. Fraternity members suggested that drinking is a rite of passage, an important part of networking and socializing, and indicated that negative consequences arising from drinking are not necessarily problematic. Participants held negative attitudes toward drinking-reduction programming and were concerned that fraternities are stigmatized by university prevention programs and society at large. Sorority members tended to view the prevention messages as constructive and generally endorsed drinking in moderation. Study implications address the potential to reduce reactance to alcohol-abuse programming and ways to increase the effectiveness of abuse-prevention campaigns targeted to Greek students.

Board Placement: 130

Abstract Title: Evaluating the Development of Life Skills Through a 4-H Adventure Education Challenge Course Experience

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:
Robby Cooper

Abstract:

Challenge courses can serve as an effective teaching vehicle in helping youth develop a variety of skills (Gillis & Speelman, 2008). The Washington State 4-H challenge course programming at Camp Long in Seattle, WA focuses on developing specific life skills in youth participants. Because of the camp's urban location, it is reaching thousands of non-white youth that are typically excluded from such adventure recreation activities (Stanfield, Manning, Budruk & Floyd, 2005).

We collected 696 matched pre and posttest surveys. A series of paired t-tests revealed a significant increase in all four of the 4-H life skills identified as program outcomes (decision-making, communication, teamwork and self-efficacy). We also found a greater impact on female and non-white participants (compared to male and white participants) for the teamwork life skill.

Findings of this study suggest that the Camp Long Challenge Programs serve as a valuable intervention in assisting youth participants with the development of important life skills. Further, findings of this study suggest that female and non-white participants may especially benefit from the programming at Camp Long. It is particularly interesting that female and non-white participants are showing greater gains in the life skill that involves inclusion and acceptance (teamwork).

Given that outdoor and adventure recreation programs are often less available to female, minority, urban and low-income participants, the programming at Camp Long offers an example of ways in which the developmental benefits of challenge programming can reach those who are often excluded.

Board Placement: 131

Abstract Title: Reversible trapping of solute atoms at grain boundaries in the intermetallic GdNi₂

College/Campus: Arts and Sciences, Pullman

Authors:

Ryan Murray
Debashis Banerjee
Gary Collins

Abstract:

The site preference of solute atoms in intermetallics is a subject of considerable recent interest in the theory of solutions. In a 2004 study, ¹¹¹In probe atoms in GdAl₂ were found to switch reversibly between occupying Gd-sites at low temperature and Al-sites at high temperature [M.O. Zacate and G.S. Collins, Phys. Rev. B69, 174202]. The observations were made through measurements of the nuclear quadrupole interaction at nuclei of In-probe atoms using the PAC method.

We present here results of new measurements on GdNi₂, which has the same crystal structure. ¹¹¹In probes were found to similarly occupy Gd-sites at low temperature and Ni-sites at high temperature. But below 400 °C, unlike for GdAl₂, a new signal was observed having a mean frequency of ~130 Mrad/s and a broad distribution width of about 50%. This is attributed to migration and trapping of ¹¹¹In probe atoms at lattice sink sites such as grain boundaries, which have a large multiplicity of local environments. The changes were reversible with temperature, showing that grain boundary sites act as a third alternative for solutes in binary compounds.

Additional measurements were carried out on GdNi₂ phases containing ~1 at.% of Cu or Si. Below 400 °C the discrete interactions again gave way to the frequency-broadened interaction, but with a much lower mean frequency, about ~15 Mrad/s. This is attributed to segregation of Cu or Si solute to grain boundaries along with the ¹¹¹In probes, leading to a lower mean frequency of the inhomogeneous interaction.

Board Placement: 133

Abstract Title: Plateau Native Women's Digital Storytelling Workshop

College/Campus: Arts and Sciences, Pullman

Authors:

Rebecca Goodrich

Abstract:

FirstPerson: A Digital Storytelling Workshop brings together women from the Columbia Plateau tribes to tell their personal stories by creating engaging short films. This summer workshop was a joint effort of the WSU Department of English and the Center for Digital Scholarship and Curation. Six women met for three days to share their insights about life and practice deep listening. They learned to digitize photographs, locate archival images and video in MASC, find appropriate music, and edit their assets into engaging short films. This workshop will be held again in Summer 2016.

Board Placement: 135

Abstract Title: Graft alters drought response in plants

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

James Crabb
Magnus Wood
Helmut Kirchhoff
Andrei Smertenko
Amit Dhingra

Abstract:

Principal Topic

Grafting is well-known to induce phenotypic changes in composite plants. Currently used for very specific reasons, grafting could provide other benefits including reduced water consumption. The second largest use of water in the US is irrigation (the first being electricity). This means there is potential to significantly reduce water use by cutting back on the water applied to crops. The problem is many crops require intensive irrigation to be most productive and profitable for growers. In this case, reduced water consumption and increased drought tolerance are synonymous. Grafting could provide an avenue for improving the water use efficiency of production varieties by grafting them to relatives with the appropriate genetic background.

Method/Hypotheses

Studies have been published regarding the effects of grafting on the drought tolerance of multiple crops from a physiological standpoint. By combining physiological observations with an analysis of gene expression in grafted and own-rooted plants, we aim to elucidate the exact biological pathways responsible for increasing drought tolerance and hence reducing water requirements. With this knowledge, it should be possible to identify specific rootstocks appropriate for this purpose.

Results/Implications

Quantification of physiological responses to drought including photosynthetic efficiency, peroxisome proliferation and internal water status have shown differences between own-rooted, trans-grafted and self-grafted plants at certain points, but no consistent trends have been observed yet. Results obtained do show clear drought responses and provide an opportunity for evaluation of the efficacy of methods used in measuring drought response. Additional work will include expression analysis of miRNAs associated with abiotic stress response.

Board Placement: 137

Abstract Title: Prescription Opioid Use in a Substance Abuse Sample

College/Campus: Arts and Sciences, Pullman

Authors:

Noel Vest

Sarah Tragesser

Abstract:

Principal Topic

Prescription opioid misuse in the United States is a major public health concern, especially among high-risk populations, including individuals receiving treatment for substance use disorder (SUD). Although borderline personality disorder's (BPD) relationship with alcohol and drug use in this population is well established, little data are available regarding BPD and prescription opioid use specifically. Therefore, it is necessary to identify personality factors which may be important within this subgroup of prescription opioid users.

Method/Hypotheses

To address this gap in the literature, we recruited 92 patients receiving substance abuse treatment to complete measures of prescription opioid use, BPD features, trait impulsivity, trait emotional dysregulation, age of onset of substance use, alcohol use, and cannabis use. The purpose of the present study was to examine the extent to which these variables are associated with lifetime prescription opioid use in a sample of patients receiving substance abuse treatment.

Results/Implications

Participants were trichotomized based on lifetime non-medical use of prescription opioids (daily users, moderate users, and non-users). After controlling for age, alcohol use, and cannabis use, participants in the daily use group endorsed higher levels BPD traits, higher trait impulsivity (urgency), higher trait emotional dysregulation (clarity), and earlier age of first use of all substances relative to the non-using group; the daily use group and the moderate use group differed only on sensation seeking (all p-values ≤ 0.05). This research is an important first step in identifying factors which may be important in the treatment and prevention of prescription opioid use disorder.

Board Placement: 139

Abstract Title: Effects of the Mid-Miocene Climatic Optimum and the Eruption of the Columbia River Basalt on Paleo-sedimentation Processes in Clarkia Lake, Idaho: Evidence from Tephrochronology

College/Campus: Arts and Sciences, Pullman

Authors:

Cassie Geraghty

John Wolff

David Gaylord

Owen Neill

William Rember

Abstract:

Mid-Miocene Clarkia Lake formed when a Priest Rapids Columbia River Basalt flow blocked the extant St. Maries fluvial system, causing the river to back up. The deep, anoxic lake bottom exquisitely preserved fallen vegetation, making the sediments a Lagerstätte—one of the world's best preserved leaf fossil sites. Up until recently Clarkia Lake's estimated age was generally relative, relying on index fossils and superposition to surrounding CRB flow deposits. This project attempts to better constrain the lake's mid-Miocene age and deposition rates using tephrochronology, chemically analyzing and correlating the tephra's geochemistry to volcanic centers of known ages. Many ash samples from various localities were collected and analyzed using electron microprobe analysis. Previous work by Ladderud et al. (2015) was replicated and confirmed, and two new ash strata were discovered: samples P33-5c and P37-10. Five different ash strata (P33-4, P33-5c, P37-4, P37-8, and P37-10) from varying stratigraphic positions have tentatively been correlated to the Santa Rosa Calico volcanic field's Cold Springs Tuff, located in northern Nevada. Based on these seemingly identical compositions, varying stratigraphic positions, and apparent soft sediment deformation, these layers are most likely the result of secondary ash deposition and reworking of one significant Yellowstone hotspot tephra deposit, rather than direct ash fall. These results provide clues into the complex hydrological processes within the surrounding mid-Miocene drainage system. Soon, further electron microprobe work will be completed on newly collected samples, and ICP-MS trace element analysis will be conducted on all samples to identify individual eruptions among similar compositions.

Board Placement: 140

Abstract Title: #Disconnected: Face-to-phone when face-to-face

College/Campus: Arts and Sciences, Pullman

Authors:

Alexander Spradlin

Carrie Cuttler

John Bunce

L. Mark Carrier

Abstract:

Previous research indicates that technology use is related to increased face-to-face communication and that there is a trivial relationship between technology use and decreased interpersonal connectedness. In the present study, we further examined the relationships between use of technology and interpersonal traits, focusing specifically on the relationships between interpersonal traits and time spent in face-to-face communication and face-to-phone communication (i.e., time spent using a cellphone while interacting with others) in an attempt to understand what drives face-to-phone communication and its potential consequences.

A sample of 962 students completed an online survey that measured their media use, empathy, personality traits, social support, attachment, and time spent in regular face-to-face communication and face-to-phone communication. Results show that time spent using media is significantly positively correlated with increased face-to-face and face-to-phone communication. Moreover, increased face-to-face communication was significantly associated with increased social support, increased extraversion, increased agreeableness, decreased openness, and decreased neuroticism. In contrast, increased face-to-phone communication was significantly associated with increased attachment anxiety, increased neuroticism, decreased conscientiousness, decreased openness, decreased agreeableness, decreased social support, and decreased perspective taking.

While the use of technology is associated with increased time spent in face-to-face communication, the correlations between face-to-phone communication and the interpersonal variables suggest that face-to-phone communication may decrease the quality of interactions. Given that personality and attachment are relatively stable traits, the correlations with these variables may suggest that certain aspects of personality, decreased empathy, and anxious attachment contribute to the drive to use one's phone while in the presence of others.

Board Placement: 142

Abstract Title: Education in the Anthropocene: Classroom Literature and Ecological Inquiry

College/Campus: Education, Pullman

Authors:

John Lupinacci

Jane Kelley

Kelly Puzio

Abstract:

Confronted by 21st century challenges facing STEM educators, schools are starting to teach students about social inequality, extinction, pollution, and climate change (AMS, 2012; Anderegg, 2010). Moving the dialogue on race, culture, and equity forward in educational initiatives, this research addresses the interconnectedness between an increase in environmental degradation with immense social suffering on the planet (Orr, 2004; Bowers, 2010; 2013; Kahn, 2010; Martusewicz et al., 2014). This poster illustrates educational research that addresses the quality and possible bias of the literature in the curriculum, since such materials may be fostering anthropocentrism—a human-centric worldview—in their treatment of environmental issues (Author, 2014, 2015a, 2015b, 2016). This poster presents research from a project that (Aim 1) examines K-12 literary curricular materials for human-centric thinking and (Aim 2) utilizes a co-developed evaluation rubric with a criteria for current classroom educators, and educational researchers, to evaluate curricula materials with a high potential to foster ecological inquiry and teach students to recognize and rethink anthropocentrism—or the view that humans are separate from and superior to all other living beings. The poster shares findings from a systematic review of children’s literature used in connection with social studies and science curriculum, the development of a user-friendly criteria for educators, and educational researchers, to evaluate curricular reading materials in the field, as well as a examples of both anthropocentrism and interspecies equity in children’s literature from the evaluated curricula organized by grade-level content, standards, and objectives that support the development of social justice and sustainability.

Board Placement: 144

Abstract Title: Neuronal/glial networks in tissue culture sleep

College/Campus: WSU Spokane

Authors:

Kevin Quigley

Dinuka Sahabandu

Ping Taishi

Kathryn Jewett

William Vanderheyden

Sandip Roy

James Krueger

Abstract:

Interleukin-1 β (IL1) and tumor necrosis factor α are well-characterized sleep regulatory substances. Previously, we used co-cultures of neurons and glia to characterize several in vitro electrophysiological parameters that define sleep of intact animals; they include action potential burstiness (BI – burstiness index), synchronization (SYN) of slow waves (SW) (0.5-3.5 Hz), SW power (μ V²) and enhanced evoked response potential (ERP) amplitudes. Over the course of neuronal/glial culture development these parameters emerge as the networks mature. If cultured networks are electrically stimulated, BI, SYN and SW power decrease suggesting a more wake-like state. In contrast, if treated with TNF, BI, SYN, SW power, and ERPs increase suggesting a deeper sleep-like state. Cultures also exhibit sleep homeostasis; after electrical stimulation a rebound increase in BI, SYN and SW power occurs. Recently we showed that the neuron-specific IL1 receptor accessory protein (AcPb) plays a role in physiological sleep and is required for responses to sleep loss. If cultures of cells derived from wild type mice are treated with IL1, SW power and ERP amplitudes increase indicating a deeper sleep-like state. Further, cultures derived from AcPb^{-/-} mice fail to “wake up” if electrically stimulated, and have distinct ERP responses to IL1. These data suggest that the in vivo sleep rebound deficits in AcPb^{-/-} mice are directly linked to the in vitro response deficits.

Board Placement: 148

Abstract Title: Planetarium & Observatory Summer Camp Workshop for Middle and High School Students in Washington State

College/Campus: Education, Pullman

Authors:

Kaylan Petrie

Abstract:

This study is important in the fields of STEM education, science learning in informal settings, and gender equity in the sciences. Studies show that girls lose interest in the sciences as early as elementary school if they are not given authentic experiences in the sciences (Quigley, 2014; Jones, Howe, & Rua, 2000) and supported to continue to pursue this interest in the future (Batsleer, 2013; VanLeuvan, 2004). This results in a disproportionate number of women who pursue science professionally, especially in the physical sciences, computer science, and engineering. Nurturing young women's interest in science via informal encounters with STEM has been suggested as a remedy to this imbalance, particularly involvement in science museums and after school programs (Esach, 2006; Readdick & Schaller, 2005). This case study assesses the climate of girls' inclusion in the sciences in Washington in the informal learning environment of an academic summer camp. The research questions that framed this study are: How do girls in 7th-12th grade see/describe the impact of academic summer camps on their interest in science, science self-efficacy, and STEM career selection? What role does the informal learning environment of an academic summer camp have in effecting students' interest and self-efficacy in science, and their desire to pursue STEM careers? Does summer camp participation affect interest in science, science self-efficacy, and STEM career selection among 7th-12th graders after controlling for gender? Data was collected via questionnaires and interviews, and the results of this study suggest the learning environment impacts self-efficacy for both genders.

Board Placement: 149

Abstract Title: What factors jeopardize whole transcriptome analysis using next generation sequencing approaches?

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:
Zhihua Jiang

Abstract:

Whole transcriptome analysis begins with preparation of next generation sequencing libraries from high quality total RNA or purified mRNA samples, followed by sequencing using state-of-the-art high throughput sequencers and data processing and analysis. During development of our whole transcriptome target sequencing (WTTs) method to capture 3' ends of transcripts, we observed several factors that jeopardized whole transcriptome analysis. Inappropriate primer design resulted in both recessive and dominant "amplification detours" that produced noisy reads and biased data. In addition, excessive PCR cycles and high concentrations of primers resulted in over-amplification of next generation sequencing libraries and reduced transcriptome coverage. Incomplete genome sequencing and partial gene annotation results in missing data, particularly when a 3' end sequencing approach is employed. Overlapping genes can transfer reads from one expressed gene to another non-expressed gene or cause non-strand-restricted reads (such as paired-end reads) to be unmapped. RNA-seq tends to enlarge whole transcriptome up-bottom boundaries, producing a much longer list of differentially expressed genes in comparison to the WTTs method. Furthermore, RNA-seq reads cannot be used to detect polyA sites or potential isoform switches in tissues at different time points. When an Illumina analyzer is used for sequencing, libraries with low diversity must be avoided. In brief, transcriptome analysis can be misleading if we do not pay attention to the factors that might cause biases, noisy data, artifacts and errors.

Board Placement: 150

Abstract Title: GenSAS v4.0: An all-in-one, web-based platform to enable comprehensive structural and functional annotation of genome sequences by biologists

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Jodi Humann
Taein Lee
Stephen Ficklin
Chun-Huai Cheng
Sook Jung
Jill Wegrzyn
David Neale
Dorrie Main

Abstract:

Generating genome sequences from organisms of interest is now both widespread and routine. The ability to extract useful biological information using annotation tools remains a significant challenge for non-computational biologists. While multiple tools are available to predict the genes and associated gene functions, the tools are run separately and the data needs to be compared and collated at the end of the process. Version 4.0 of the Genome Sequence Annotation Server (GenSAS, www.gensas.bioinfo.wsu.edu) allows researchers to annotate genome sequences using a user-friendly interface that packages numerous command-line based tools under one web-based platform. Through integrated instructions at each step, GenSAS guides users through the annotation process. The annotation steps include: uploading of genomic sequence; uploading of supportive repeat library files, species-specific (or species-related) protein and transcript files; execution of repeat masking tools (including de novo repeat identification); execution of gene prediction tools; consensus gene model creation; gene model refinement; functional annotation of gene model; optional manual curation of annotation; and assistance with organization of files for final publication. GenSAS integrates the JBrowse genome browser for data visualization and Web Apollo for manual editing of computational annotations. In addition to the integration of functional annotation tools in GenSAS v4.0, the program is configured to send jobs to a cluster which allows more users to run jobs concurrently, accelerating the annotation process.

Board Placement: 155

Abstract Title: Incremental Theories Predict Academic Success through Time Spent Studying

College/Campus: Arts and Sciences, Pullman

Authors:

Mycah Harrold
Joyce Ehrlinger
Kali Trzesniewski
Jordan Vossen
Julia Singleton
Bethany Spring

Abstract:

Research has demonstrated that incremental theorists (who believe intelligence to be malleable and able to be improved through effort) display increased academic success over time when compared to entity theorists (who view intelligence as more of a fixed trait). Little is known, however, about the specific behaviors that contribute to these differences in achievement and performance. The present study sought to fill this gap in the literature by exploring the hypothesis that incremental theorists may extend more effort during studying than entity theorists. Two hundred forty-three high school students completed the current study, which spanned 3 days in their regular math classes. On days 1 and 2, the students viewed a single math tutorial and on day 2, they also completed 14 practice questions on the material. A week later, the researchers returned and administered a test of sustained learning over the material. Results revealed that incremental theorists spent more time completing the practice questions which was associated with higher numbers of correct answers when compared to their entity theorist classmates. Higher scores on the practice questions predicted better performance on the final test. Results revealed an indirect effect of intelligence theory on sustained learning through the amount of time spent on practice problems and, in turn, success on those problems. Thus, incremental theorists may achieve more academically than entity theorists, in part, because they persist longer while studying.

Board Placement: 156

Abstract Title: Neglecting Success: Understanding Why First-Year College Students Ignore Educationally Purposeful Activities

College/Campus: Education, Pullman

Authors:

Evelyn Martinez

Kelly Ward

Abstract:

Strong-performing higher education institutions put policies and practices in place to promote student success and engagement (Kuh, Kinzie, Schuh, Whitt, 2005). "The more effort students expend in using the resources and opportunities an institution provides for their learning and development, the more they benefit" (Gonyea, Kish, Kuh, Muthiah, & Thomas, 2003, p. 4). Students underutilize educationally purposeful services such as tutoring/writing or math centers, professor office hours, studying for the recommended number of hours outside of class, etc. The purpose of this qualitative study is to understand the experiences, perceptions, and attitudes of today's college students who opt out of educationally purposeful activities, despite the efforts by the institution to provide them with opportunities to be successful. Understanding how first-year college students make sense of their experiences neglecting educationally purposeful services may provide insight into changes that can be made to improve the quality of academic effort for future first-year college students.

Board Placement: 158

Abstract Title: Novel pH-Dependent H₂S Donors and Their Biological Applications

College/Campus: Arts and Sciences, Pullman

Authors:

Jianming Kang

Ming Xian

Abstract:

Hydrogen sulfide (H₂S), known as a critical cell signaling molecule, is a mediator of many physiological and pathological processes. H₂S releasing agents or donors are not only important research tools, but also potential therapeutic agents. Research in our laboratory is devoted to developing novel H₂S donors that could release H₂S slowly in moderate amounts and/or in a highly controllable manner. In this presentation I will report a new series of controllable H₂S donors based on the phosphoramidothioate template. Their design, synthesis, H₂S releasing profiles, and H₂S-relevant bioactivity will be reported.

Board Placement: 161

Abstract Title: Satellite remote sensing of actual evapotranspiration from drylands of Washington State

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

M Azeem Khan
Claudio O. Stockle
Richard G. Allen
Ricardo Trezza

Abstract:

Evapotranspiration is the largest consumer of fresh water resources globally, so understanding its role in hydrological processes and water resource management is critical. Spatio-temporal information on actual ET (ET_a) can help us to better understand evaporative depletion that can be linked to land use, water allocation and water use in general. Large scale spatio-temporal ET information can be used in cropping system models for real time yield estimates and for decision support. Remote sensing (RS), especially from satellites, has the ability to capture the actual field conditions, and RS observations used with surface energy balance algorithms can provide widespread spatio-temporal ET_a estimates. This study estimated ET_a from typical dryland farming in Washington State for three consecutive growing seasons, 2013 onwards. The surface energy balance algorithm entitled "Mapping Evapotranspiration at High resolution with Internalized Calibration (METRIC)" was implemented with calibration for local soil properties and conservation tillage farming practices in the area. The study area has four flux towers deployed over 100 miles within a single scene setting of the Landsat 8 path 43 row 27. The ET_a was estimated as the residual of the surface energy balance by calibration at extreme conditions of land surface temperature (LST) within the particular land use category of the image. Due to the temperature increase associated with LST, it senses water stress in crops earlier than other indicators like NDVI. METRIC ET_a maps were compared against measurements at the four eddy covariance stations in each image for a total of 26 images in three years. Estimated and observed ET_a showed a strong positive linear correlation with a Pearson's *r* value of 0.90 to 0.98 for clear images, and above 0.70 even in partial cloud covered images. The RMSE ranged from 0.05 to 0.20 mm/day where a higher bias was normally detected in fallow periods. The Nash-Sutcliffe efficiency coefficient showed that METIRC has a maximum of 98% and minimum 82% efficiency for estimating ET_a. These evaluations provide evidence of the value of METRIC for spatio-temporal ET_a mapping at regional scales and indicate that METRIC can estimate ET_a with good accuracy at larger scales that include surface heterogeneity and atmospheric effects.

Board Placement: 162

Abstract Title: Vocational Rehabilitation: Predicting Employment Outcomes for Young Adults with Disabilities

College/Campus: Education, Pullman

Authors:

Marcus Poppen

Abstract:

This poster presents the results from a study exploring the effects of individual characteristics, in-school experiences, post-school experiences, and contextual factors on Vocational Rehabilitation (VR) closure status among 4,443 young adults with disabilities (21 years or younger) who received and completed services from Oregon VR between 2003 and 2013. Four logistic regression models were developed to test the effects of individual characteristics, in-school experiences, post-school experiences, and contextual factors on VR closure status. Seven risk factors were identified that decrease the probability of young adults with disabilities achieving a positive VR closure status: (1) being female; (2) having a primary disability of mental illness; (3) having a primary disability of traumatic brain injury; (4) having an interpersonal impediment to employment; (5) receiving Social Security Income at application; (6) closing VR services during federal fiscal year (FFY) 2008; and (7) closing VR services during FFY 2009. Five protective factors were identified that increase the probability of young adults with disabilities achieving a positive VR closure status: (1) participation in the Oregon Youth Transition Program; (2) earning at least a high school completion certificate by closure; (3) receiving a higher number of VR services; (4) closing VR services on or below the median number of days to closure; and (5) closing VR services during FFY 2004. These findings support the hypothesis that individual characteristics, in-school experiences, post-school experiences, and contextual factors are predictors of positive VR closure status among young adults with disabilities.

Board Placement: 163

Abstract Title: Obesity Moderates the Relationship Between Depressive Symptoms and Healthy Eating in Overweight and Obese Adults in Rural Kentucky

College/Campus: Nursing, Spokane

Authors:

Demetrius Abshire

Terry Lennie

Misook Chung

Martha Biddle

Debra Moser

Abstract:

Background: Although depressive symptoms have been linked to poor diet quality, little is known about this relationship among overweight and obese adults in rural Kentucky where rates of cardiovascular disease (CVD) are high. Identifying the impact of depressive symptoms on diet quality by obesity status may aid in identifying those at highest risk for CVD due to poor dietary habits.

Purpose: To determine if obesity moderates the association between depressive symptoms and diet quality in overweight and obese rural adults at high risk for CVD.

Methods: Rural adults in Kentucky (n=948, age=53±15; 73% female; 96% Caucasian; body mass index [BMI]=34±7; 67% obese) completed an assessment of depressive symptoms using the 9-item Patient Health Questionnaire and diet quality using a food frequency questionnaire that generated the 2005 Healthy Eating Index score. They were grouped into overweight (BMI 25-29.99kg/m²) and obese (BMI ≥30kg/m²) groups. Multiple linear regression was used to determine the moderation effect by entering the interaction term of depressive symptoms and obesity level.

Results: The interaction between depressive symptoms and obesity status was significant in predicting diet quality and indicated the relationship between depressive symptoms and poor diet quality was stronger in the overweight than obese group.

Conclusion: These findings suggest that the negative impact of depressive symptoms on diet quality is stronger among rural Kentuckians who are overweight compared to those who are obese. Treating depressive symptoms may facilitate healthy eating in this population, particularly among those who are overweight.

Board Placement: 164

Abstract Title: Solar Decathlon 2017

College/Campus: Engineering and Architecture, Pullman

Authors:

Phil Gruen

Darrin Griechen

Abstract:

Washington State University was recently selected to compete in the U.S. Department of Energy's 2017 Solar Decathlon Competition, for which our students will design, build, and market an approximately 800 square foot net-zero energy home over a two-year period. We envision our high-performance home advancing occupant well-being and environmental stewardship through the development and integration of adaptive components ready for smart grid technology. Future U.S. homes will exist as demand/response nodes within a system of intelligent urban infrastructure, and we are designing our home as a prototype for healthy living within this smart paradigm. Ultimately, we intend our home to become a visitor center in Spokane's University District—the heart of the city's "Smart City" initiative. Students will construct the house at WSU's PACCAR Building prior to the competition.

This hands-on, multi-disciplinary project involves students, faculty, staff, and administrators from at least five colleges and as many as fifteen different departments and programs throughout the university—in addition to industry sponsors, public agencies, and alumni. The Solar Decathlon is central to course content in three spring 2016 classes: two design studios in Architecture and the interdisciplinary "Technology Ventures" course featuring students from Engineering, Business, Communications, and Math. Given the high-profile nature of the Solar Decathlon, it is imperative to keep the campus community up-to-date. Our poster for Academic Showcase will broadly introduce the project and highlight in-progress developments from the spring classes. We expect to include early conceptual designs, materials investigations, and strategies for marketing the home to potential clients.

Board Placement: 165

Abstract Title: College Students and Legalized Marijuana

College/Campus: Communication, Pullman

Authors:

Doug Hindman

Abstract:

This study was informed by research in which group identity is shown to be a significant predictor of knowledge regarding heavily publicized topics. Drawing from the knowledge gap hypothesis and, its extension, the belief gap hypothesis, this study derived and tested hypotheses about changes in students' knowledge during the first three years following the legalization of recreational marijuana in Washington State.

Findings showed that, in general, knowledge levels about the law grew significantly during the four years of the study. Similarly, knowledge of both short-term and long-term health effects associated with marijuana use was significantly higher in 2015 than in 2012.

Board Placement: 167

Abstract Title: Effect of High-Low Light Intensity Cycle on the Photosynthetic Efficiency and Growth Rate of *Haematococcus pluvialis*

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Samantha The
Shulin Chen

Abstract:

Microalgae has been rigorously investigated as economically important organisms. This research focused on *Haematococcus pluvialis* as one of the richest source of ketocarotenoid astaxanthin, which has formidable antioxidant properties and been known to promote the pinkish hue in salmon, trout, and other animals. Astaxanthin was appraised as high as \$7150 per kg and has wide range of applications, including food, aquaculture, and nutraceuticals industries. Under certain stress conditions, *H. pluvialis* can accumulate astaxanthin up to 5% of its dry cell weight. Light is considered to be a major one affecting growth and astaxanthin formation. Several studies have been assessing the impact of using various light sources and periods, with the objective to improve overall efficiency. As the microalga also exhibits complex life cycle, higher biomass yield becomes important. Thus, the study focused on the effect of alternating high-low light cycle (high: 73–75 $\mu\text{mol m}^{-2} \text{s}^{-1}$, low: 3–4 $\mu\text{mol m}^{-2} \text{s}^{-1}$) compared to continuous light (30, 50 and 70 $\mu\text{mol m}^{-2} \text{s}^{-1}$), in order to achieve higher growth rate and photosynthetic activity.

Current results indicate that cultures grown under high–low light cycle reached higher specific growth rate at earlier cultivation time (highest value: 0.9808 day^{-1} , 1-minute interval, $t = 1$). The cultures also had more motile cells and prolonged green phase compared to the ones under continuous light. In addition, photosynthetic efficiency measurement showed an increase of net photosynthetic rate along with decreasing time interval, with 1-minute interval gave similar net photosynthetic rate to the continuous light.

Board Placement: 171

Abstract Title: Investigating Student Success at an Innovative Project-Based High School

College/Campus: Education, Tri-Cities

Authors:

Judith Morrison

Janet Frost

Chad Gotch

Amy Roth McDuffie

Bruce Austin

Abstract:

This project focused on experiences and perceptions of high school students after completing two years at an innovative, project-based high school. This school, defined as an entrepreneurial design STEM school, is a small school with 75 students in grades 11 and 12 and six teachers. The school does not have specific stand-alone classes; students and teachers meet regularly as students complete projects and solve real world problems. Students who graduated from the school in 2014 were administered a questionnaire to gather data on their perceptions and experiences at the school. Interviews with the six teachers were carried out as well as meetings and email conversations with the teachers and the administrator at the school. Findings show that 83% of the students reported being enrolled in college or technical school and reported an interest in a wide variety of intended major fields of study, with business and computer science receiving the most mentions followed by science, technology, and medical fields. Students described how the school had strong influences on their critical thinking, creativity, and communication skills and their relationships with the teachers were very positive, meaningful, and long-lasting. The teachers reported they focus on developing students' habits of mind, perseverance, creativity, resourcefulness, confidence, and similar characteristics and their relationships with students are essential to the success of the students. Our conclusions are that the social interactions and relationships between students and teachers are critical to the success of the school.

Board Placement: 172

Abstract Title: Promoting Evidence-Based Practice: Identifying the Barriers that Nurses Encounter in Promoting Mobility in Hospitalized Older Patients

College/Campus: Nursing, Spokane

Authors:

Gordana Dermody

Jennifer Zimmermann

Abstract:**Background:**

Insufficient promotion of mobility in hospitalized older adults is associated with an increase in functional decline which may lead to hospital re-admissions, hospital-acquired conditions, and nursing home admission, all of which decrease quality of life and place a financial burden on family and healthcare systems.

Significance: It is important to identify nurses' barriers to promoting mobility to build the evidence case for the development, and implementation of tailored interventions to improve the mobility of hospitalized older patients.

Methods:

A descriptive pilot study was conducted using convenience sampling (n=15) in a community-based hospital in Washington. The purpose was to: 1) Identify and describe the barriers nurse's encounter related to nurse knowledge barriers, nurse attitude barriers, and the nurse's perceptions of external barriers including patient factors, interdisciplinary factors and environmental factors; 2) and whether these barriers affect the quantity and frequency of mobility promoted by nurses in hospitalized patients.

Results:

The top 5 barriers that nurses (N=15) reported to be barriers to promoting the mobility of their patients includes: Patient condition (M=2.89, SD=1.37); being too busy (M=2.74, SD=1.25); searching for help from other staff (M=2.71, SD=1.49); not enough staff (M=2.51, SD=1.44); difficulty prioritizing nursing tasks (M=1.89, SD=1.02). This pilot study concurs with the evidence of other studies that nurses infrequently promote mobility in older adults on general medical acute care unit (Barber et al., 2014; Brown et al., 2009; Zisberg et al., 2011).

Board Placement: 176

Abstract Title: Combining insights to enhance success: Utilizing social, economic and biogeophysical data to improve bio-fuel site selection in the Pacific Northwest

College/Campus: Extension, Pullman

Authors:

Season Hoard
Natalie Martinkus
Mike Gaffney
Paul Smith
Preena Venugopal

Abstract:

Carbon emissions have increasingly garnered the attention of both the public and key government actors. International emission proposals have required the U.S. to examine sustainable biofuel production, and site-selection for biorefineries is particularly important for creating economically and environmentally sustainable aviation biofuel supply chains. Successful site selection depends on assessing community resources, including biogeophysical, economic and social assets. However, while social assets have consistently been found to impact successful economic development and environmental policy implementation, they are rarely incorporated consistently in site-selection modeling. One reason for the exclusion of these assets is a lack of quantitative measures that can be utilized to compare community performance on key social measures that impact implementation success. This study addresses this important oversight by creating the most complete quantitative measures of three key social assets: social capital, cultural capital, and human capital. We argue that social assets in combination with biogeophysical and other resources are important for successful site-selection, and ignoring these assets is detrimental to creating sustainable biofuel industries within the Pacific Northwest. We build on previous work by refining our social asset benchmarks using Census divisions to determine cut-offs and test the validity of these measures using case studies in the NARA Region. These benchmarks are then combined with newly updated Biogeophysical measures to identify potential communities for biofuel facilities in the MC2P and WMC regions. We argue that this refined framework will aid site-selection by identifying communities with the necessary resources to increase the likelihood of economic success and environmental sustainability.

Board Placement: 177

Abstract Title: Performance Comparison between an Electronic Method and a Protein Precipitation Method for Tannin Assessment in Red Wine

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Charles Diako
Scott Mattinson
John Fellman
Ross Carolyn

Abstract:

The use of precipitation equivalence point in protein precipitation tannin assays has been indicated to be crucial to the accuracy of tannin assessment. The re-solubilization of protein-tannin complexes after optimal binding makes the accuracy of the methods directly correlated with the precipitated protein quantification method used. The objective of this study was to compare the performance of a protein precipitation method based on precipitation equivalence point and an electronic tongue method as a rapid method for tannin assessment in red wine. Four samples each of Cabernet Sauvignon, Pinot Noir and Syrah were used in this study. Tannin content was determined using BSA protein precipitation involving the use of precipitation equivalence point. An electronic tongue was used to analyze the wines and the tannin contents of the wines determined from the seven sensor array response. Results show differences in the precipitation equivalence points for Cabernet Sauvignon (84 μ L, 0.81 au), Syrah (103 μ L, 0.72 au), and Pinot Noir (136 μ L, 0.87 au). Significant differences (p Syrah (2044 mg/L TAE) > Pinot Noir (1604 mg/L TAE). The concentration quantification of tannins from the electronic tongue output showed high correlations with the protein precipitation method: Syrah ($R^2 = 0.9966$), Pinot Noir ($R^2 = 0.8011$) and Cabernet Sauvignon ($R^2 = 0.9709$). Considering the strong relationship between tannin and the electronic tongue output, the electronic tongue could be used as a rapid method for red wine tannin assessment.

Board Placement: 178

Abstract Title: Measuring Impact of the Viticulture & Enology Certificate Programs at WSU

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Thomas Henick-Kling

Theresa Beaver

Arina Gertseva

Abstract:

Rapid growth in the Washington's premium wine industry, as well as a national demand for qualified vineyard and commercial winemaking, has created a need for a wine industry workforce. The Viticulture & Enology Certificate Programs are helping train the next generation of wine industry leaders through the online, science-based non-credit programs offered through WSU Extension. Given that the programs have been in existence for more than 10 years, last year there was a comprehensive evaluation of all components of the programs undertaken. This presentation provides an overview of the key findings from data and feedback collected from participants of the Viticulture & Enology Certificate Program over the last eight years. Based on the findings from this evaluation, as it has grown in size, the program has been able to provide valuable experience and opportunities which enhance personal and professional skills and competencies for an increasing number of participants. Our results show that the program will likely remain a unique and valuable program that will continue to build on its early successes. Most notably the program is effective in helping students improve wine and grape quality, in addition to facilitating networking between students industry.

Board Placement: 182

Abstract Title: Evaluating the effects of a pharmacist-led intervention program on blood pressure control within an employer sponsored healthcare clinic.

College/Campus: Pharmacy, Spokane

Authors:

Chelsea Hudak

Laurel Aaberg

Ronni Nemeth

Kyle Hinkley

Abstract:

National goals regarding blood pressure control are not being met with only 44% of patients controlled on their current antihypertensive therapy. Those at greatest risk for remaining uncontrolled include men, those less than 40 years old, and Hispanics. These key demographics comprise much of the workforce at the Stemilt Clinic. A pharmacist at the Stemilt Clinic can serve as a key ally in guiding both patients and providers to improve blood pressure control in this employer sponsored primary care clinic. The main objective of the study is to evaluate the impact of a pharmacist-led intervention on blood pressure control by month three versus conventional physician follow-up.

This single center, randomized, prospective cohort was approved by the Institutional Review Board. Non-pregnant adults prescribed at least one antihypertensive were eligible for enrollment. After informed consent was obtained, patients were randomized to monthly pharmacist follow-up or standard of care. At each pharmacist follow-up, standardized education was provided and adherence was assessed to address barriers.

Baseline data demonstrates a mean blood pressure of 142/88 mmHg (137-149/82-91 mmHg 95% CI) in this clinic population. Approximately 43% of these patients are controlled on their current therapy, on par with national statistics. Approximately 15.7% of these patients are on beta-blockers, a non-preferred agent per Joint National Committee (JNC) 8 guidelines and area for potential intervention.

The results of this study will help demonstrate the utility of pharmacists as a resource in improving blood pressure control in a primary care clinic.

Board Placement: 183

Abstract Title: Jazz Fusion in the Academy

College/Campus: Arts and Sciences, Pullman

Authors:

Frederick Snider

Abstract:

Many musicians and scholars of contemporary music believe that "Jazz fusion" was created by Miles Davis. Fusion was firmly established with his 1969 album, *Bitches Brew*. Jazz fusion, also known as fusion or jazz-rock, is a musical genre that developed by mixing rock electric instruments: electric guitar, electric bass, and electric piano, with rock rhythms, together with jazz acoustic instruments: trumpet, saxophone, and trombone, and amplifying them. Fusion has influenced contemporary musicians for nearly fifty years. F. David Snider, WSU Instructor of Jazz Bass and Coordinator of the WSU Combo Program, has created twelve orchestrations of contemporary fusion compositions including settings of Marcus Miller's *Rio Funk* and Jean Pierre, Billy Cobham's *Stratus*, which is newly arranged for the WSU Big Band I, Marcus Miller's *Splatch*, and Stanley Clarke's *School Days*. Each arrangement was scored in a "modern fusion" style specifically for university jazz ensemble configurations: big bands, small big bands and combos. Educationally, each orchestration will challenge every student, necessitating serious study in order to be performed correctly. Moreover, these pieces will help students gain vital proficiency in an overall fusion style that will help them to mature into successful contemporary jazz musicians. These orchestrations have been successfully performed by a number of university jazz ensembles and will be submitted to *Jazz Lines*, a top firm which has expressed interest in publishing the works.

Board Placement: 185

Abstract Title: AMPK improves gut barrier function via regulating histone modification of CDX2 promoter

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Xiaofei Sun

Meijun Zhu

Abstract:

Impairment in gut epithelial integrity and barrier function is associated with many diseases, such as inflammatory bowel disease, obesity and diabetes. The homeostasis of intestinal barrier is based on a delicate regulation of epithelial proliferation and differentiation. AMP-activated protein kinase (AMPK) regulates cellular differentiation. The objective of this study was to evaluate the regulatory role of AMPK on intestinal epithelial differentiation. Using mice with AMPK α 1-floxed gene cross-bred with VillCre mice to obtain AMPK α 1 Villin specific knockout mice, we found that epithelial AMPK knockout impaired intestinal barrier function and enterocyte migration. We further demonstrated that AICAR, an AMPK activator, improved the barrier function of Caco-2 cells as indicated by increased transepithelial electrical resistance (TEER) and reduced paracellular FITC-dextran permeability; consistently, AICAR enhanced the expression of epithelial differentiation markers and tight junction formation. Transfection of Caco-2 cells with AMPK WT, which enhance AMPK activity, improved epithelial barrier function and epithelial differentiation, while K45R, a dominant negative mutant, impaired. We further found that AMPK enhanced the expression of CDX2, the key transcription factor committing cells to intestinal epithelial lineage. CDX2 deficiency abolished intestinal differentiation induced by AICAR. AMPK-induced CDX2 increment was associated with the formation of H3K4me₃, a permissive histone modification in the CDX2 promoter, while reducing inhibitory histone modification, H3K27me₃. In summary, AMPK enhances intestinal barrier function and epithelial differentiation partially through inducing histone modifications in the CDX2 promoter.

Board Placement: 187

Abstract Title: High throughput method for quantification of peroxisome proliferation

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Andrei Smertenko

Abstract:

Plant peroxisomes maintain a plethora of key life processes including fatty acid β -oxidation, photorespiration, synthesis of hormones, and reactive oxygen species (ROS) homeostasis. It has been shown that plant adaptation to abiotic stress correlates with higher activity of peroxisomal ROS scavengers and more peroxisomes in cells; thus it has been postulated that stress promotes proliferation of peroxisomes. Our understanding of the signaling network controlling peroxisome proliferation is hindered by the lack of high-throughput techniques for measuring peroxisome abundance in plants. Counting peroxisomes in individual cells of complex organs by electron or fluorescence microscopy is expensive, time consuming, and unrepresentative. Here we developed a simple high-throughput technique for measuring peroxisomes using small probe Nitro-BODIPY, which, *in vivo*, fluoresces selectively inside peroxisomes. Induction of peroxisome proliferation by the drug clofibrate or by hydrogen peroxide results in a proportional increase of N-BODIPY fluorescence intensity in the total protein extracts. To demonstrate suitability of this approach for analysis of stress responses, we used salinity as a known inducer of peroxisome proliferation. While significant peroxisome proliferation was observed in wild-type *Arabidopsis* leaves following 5-hour exposure to NaCl, no proliferation was detected in a known salt-susceptible allele *fri1-6*. Likewise, two novel salt-susceptible loss-of-function alleles of Na⁺/H⁺ antiporter 7 (NHX7/SOS1) lacked peroxisome proliferation under salt stress. In conclusion, our technique enables quantification of peroxisomes in plant material, identification of genes controlling peroxisome homeostasis, and capturing stress-tolerant genotypes.

Board Placement: 188

Abstract Title: FTIR technology for the rapid assessment of pinewood and wheat straw biomass composition: effective wavelength detection and evaluations

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Sujala Bhattarai

Abstract:

Lignocellulosic plant biomass is a potential source for the biofuel production because of its abundant availability and environmental and economic benefits. The biomass compositions vary widely and the accurate determination of biomass composition is essential for the design of pretreatment and fermentation plants during the biofuel production. However, the existing methods for the chemical compositional analysis are time and labor intensive and expensive. Thus, it is essential to develop the rapid biomass composition detection method. Fourier transform infrared (FTIR) spectroscopy technique is rapid and non-destructive method of composition analysis and has been used in agriculture and food industry. This technique do not use additional chemicals, hence no chemical wastes and this technique can determine multiple sample constituents simultaneously. The objective of this study is to explore the Fourier transform infrared (FTIR) spectroscopy technique as a tool to evaluate the compositional analysis of pinewood and wheat straw. The concentration of glucan, xylan, galactan, arabinan, mannan, lignin, ash, and extractives in pinewood and wheat straw is evaluated. In this study, the effective wavelengths for predicting biomass composition is determined from spectral data obtained from FTIR spectroscopy and composition data obtained from wet chemical analysis. Stepwise regression analysis and stepwise discriminant analysis will be used to select effective wavelengths. The selected wavelengths will be evaluated using statistical algorithms such as linear discriminant analysis, quadratic discriminant analysis, and support vector machine developed in Matlab. The results from this study could be applicable in developing the real time biomass composition monitoring systems in bio-industries.

Board Placement: 190

Abstract Title: A functional-structural model to understand apple tree growth and development

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Ying-Tsui Wang

Melba Salazar

Gerrit Hoogenboom

Abstract:

Understanding the interaction of horticultural practice management and environment with apple tree growth and development is a key step to achieve successful production. Traditionally, studies are carried out by conducting field trials which are expensive and time-consuming and it is challenging to capture the dynamic responses on abiotic and biotic changes. With the recent advances of computer technology and accumulation of scientific knowledge, a system approach allows us to organize the available interdisciplinary information into quantitative models for virtual experiments in horticultural research. The goal of this study was to use a functional-structural apple model (FSAM) to study the impact of horticultural practices containing pruning and bending on tree fruit growth and development and ultimately fruit production. A database with topological and physiological data from two apple cultivars 'Fuji' and 'Red Delicious' was constructed. Based on the existing research of apples and our experimental data, the FSAM integrates tree architecture, carbohydrate allocation, organ functionality and the effects of horticultural practices, and is driven by environmental factors. The results of this study will consist of 3D visualization and quantitative output. The three-dimensional representations of simulated trees can be displayed using a daily time step. The quantitative data can be provided to evaluate the impact of horticultural management on the balance of vegetative and reproductive growth based on the number of shoots and flower buds, and eventually predict fruit yield. The demonstrations with FSAM will facilitate the adoption of desired management strategies for efficient production.

Board Placement: 192

Abstract Title: Improving daily sperm production in bulls via transient hypothyroidism in pre-pubertal development

College/Campus: Veterinary Medicine, Pullman

Authors:

Muhammad Salman Waqas

Jon Oatley

Amy Kaucher

Melissa Oatley

Abstract:

The study hypothesis was to increase daily sperm production in the bull by increasing Sertoli cell (SC) number through induced transient hypothyroidism in pre-pubertal life. We devised a treatment strategy to induce hypothyroidism during the developmental window of time when Sertoli cell proliferation ceases. First, we conducted immunostaining for an SC marker (Sox9) and marker of proliferation (Ki67) on cross-sections of testes from calves at 1-10 months of age to define the developmental point when Sertoli cell proliferation ceases as 4.5-5 months of age. Next, we treated Angus calves (n=4) with the drug Methimazole (2mg/kg body weight) from 4-6 months of age to temporarily induce hypothyroidism. Controls were age matched calves (n=3) that did not receive treatment. After six weeks of treatment, lower serum levels of Thyroxine and Triiodothyronine in the treatment group as compared to the control group demonstrated effectiveness at inducing hypothyroidism. At 12 months of age, the ultrasonography of testes, epididymides, rete testes, seminal vesicle glands and ampullae suggested a delay in testicular maturation for treated bulls along with lower sperm/ml of ejaculate. At 20 months of age, total sperms/ejaculate (35% more), semen volume and scrotal circumference/kg body weight was greater for treated bulls compared to the control. In addition, ultrasonography of reproductive tract showed more maturation of the tract as compared to 12 months of age. Assessment of sperm production is ongoing and based on the observation of delayed maturation, it is anticipated that treated bulls will continue to have improved characteristics compared to controls.

Board Placement: 194

Abstract Title: Biowaste-to-jet fuel additives : Hydrophilic and Aromatic Interaction Models of Lignin in a PEO-PPO-PEO block Co-polymer Micellar System

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Mohammadali Azadfar

William Hiscox

Shulin Chen

Abstract:

Increasingly, lignin is being considered as a renewable source of value-added aromatic compounds and fuels. Significant economic barriers to use of this feedstock arise from the cost of chemical plant equipment needed for various chemical processing steps, and also the cost of chemicals, particularly solvents. Our hypothesis for copolymer micelle incorporation of lignaceous species includes a "hydrophobic-hydrophilic interaction model", in which lignin derivatives with amphiphilic characteristics, known to be abundant in the effluent of pretreatment of various lignocellulosic materials, have an affinity for these micelles, and tend to form relatively organized structures within them. In this regard, we proposed to use the solubilization ability of block copolymer micelles toward lignin derivatives to create lignin nanoreactors in the aqueous environment of pulping and pretreatment effluents, greatly reducing costs, and opening possibilities for selective chemistries for further up-converting lignin biopolymers to value-added products. Our previous characterization of nanostructural self-assembly of lignin derivatives incorporated in polyethylene oxide-block-polypropylene oxide-block-polyethylene oxide (PEO-b-PPO-b-PEO) micelles in aqueous alkaline solution, utilizing liquid-state ^1H NMR, revealed evidence that copolymer micelle-guest interactions and the loci of incorporated guests depend on both chemical functional group characteristics of guests (i.e., polarity, H-bonding ability) and π - π interactions between aromatic/conjugated groups. Hereupon, this research endeavors to demonstrate oxidation reactions of lignin model compounds can be selectively conducted in micelle-lignin nanostructures in aqueous media, leading to the production of lignin-based phenolic monomers. Also, real-time monitoring of the reaction progress by NMR will be presented.

Board Placement: 195

Abstract Title: Rape myth acceptance, self-efficacy, and perceived norms: Factors associated with the intentions to report and seek help after being sexually assaulted

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Kathleen Rodgers

Stacey Hust

Liu Jiawei

Abstract:

College students are at high risk for sexual violence (SV), and having experienced SV puts a student at risk for a wide range of physical, psychological, social, and academic problems. Despite the high prevalence of sexual assault (SA) on college campuses (an estimated 1 in 5 women), fewer than 5% of all sexual assault victims report to police or campus authorities; they are more likely to seek informal services than formal. Using the integrated model of behavioral prediction, we tested three determinants of a student's likelihood to report or seek help for SA: rape myth acceptance, perceptions of peers' likelihood to seek help or report SA, and efficacy to seek help or report a SA experience. Primarily white first-year WSU students living on campus answered survey questions as part of a larger campus-wide SA prevention evaluation study (n = 204). Intention to seek help for and intentions to report a SA were regressed separately on three main-effects variables controlling for background variables. Perceived social norms and efficacy to seek help or report SA predicted intentions to seek help or report. Students who knew a SA victim and who had high efficacy had stronger intentions to reach out to formal and informal supports should they experience a SA. Seeking help is critical to accessing medical and social services that can minimize the trauma of SA. Cultivating norms and efficacy to report and seek help is critical to encourage students' intentions to report and seek help for sexual assault.

Board Placement: 196

Abstract Title: Time-dependent areal mass density for disc-shaped substrates in a high voltage corona-activated flow stream at atmospheric pressure for argon/acetylene admixtures

College/Campus: Engineering and Architecture, Pullman

Authors:

Shuzheng Xie
Rokibul Islam
Bashir Hussein
Karl Englund
Patrick Pedrow

Abstract:

Our WSU reactor uses corona discharge to generate Atmospheric Pressure Weakly Ionized Plasma (APWIP) using an array of high voltage needles-to-grounded planar electrode configuration. When acetylene/argon gas mixture flows through the APWIP reactor, charged particles and neutral radicals are generated. Argon is the carrier gas and acetylene is the precursor species. Radicals resulting from acetylene bond scission by free electron impact are incident on the substrate while charged species are intercepted by the grounded screen. Free Radicals then condense on and deposit the plasma-polymerized film.

In this research we use a 40-needle array energized with 60 Hz AC voltage in the range 5 to 15 kV RMS. Plasma processing takes place downstream from a grounded planar screen (the opposing electrode). The needle-to-screen gap is in the range 4 to 10 cm and its E-field generates weakly ionized plasma via streamers and back corona. Substrates are potassium bromide, mica, wood, paper, and gold-covered solids. Radical transport is via convection and diffusion thus the size of the disc influences time-dependent areal mass density. Early plasma-polymerization is accompanied by nucleation-site-dominated nodules but longer term deposition results in a film that fully covers the substrate. We will report on time-dependent areal mass density associated with run times in the range 5-60 minutes. Film thickness will be measured using instruments that include visible light microscopy, TEM, and SEM. Others in our research group are studying areal mass density for early times (1-5 minutes) when nodule growth (at nucleation sites) dominates the deposition process.

Board Placement: 199

Abstract Title: CHANGING THE FACE OF PHARMACY PRACTICE: TRAINING STUDENT PHARMACISTS TO PROVIDE INNOVATIVE PATIENT CARE SERVICES IN COMMUNITY PHARMACY

College/Campus: Pharmacy, Spokane

Authors:

Jennifer Czapinski
Jennifer Robinson
Julie Akers
Jennifer Czapinski

Abstract:

OBJECTIVE: To create a course designed to educate student pharmacists with the knowledge and skillset needed to provide expanded patient care services in a community pharmacy setting.

METHODS: The course was delivered to 132 second-year student pharmacists during the first week of the fall 2015 semester. The course was comprised of independently completed online modules and quizzes, a live seminar, and knowledge and skills assessments. Student performance on both assessments was collected. A pre- and post-live seminar survey of student comfort in providing these services was performed. After completion of the course, students anonymously provided evaluation and constructive feedback.

RESULTS: After completion of the online training modules 76.4% of students agreed or strongly agreed they were comfortable providing the services included in the training. Following the live seminar 94.4% of students agreed or strongly agreed they were comfortable providing the services, an increase in comfort of 18%. All students met competency on both the knowledge and skills assessment, during either the initial assessment or reassessment.

CONCLUSIONS: The course combining online modules with a live seminar was successful in facilitating students' understanding of pharmacist provided patient care services, use of collaborative drug therapy agreements for prescriptive authority, and increased comfort level and willingness to perform the services in a community pharmacy setting.

Board Placement: 200

Abstract Title: Evaporative Cooling: Sunburn Suppression Benefits and Influence on Microbial Survival

College/Campus: Agricultural, Human and Natural Resource Sciences, Global

Authors:

Manoella Mendoza

R. Karina Gallardo

Ines Hanraran

Karen Killinger

Abstract:

In Washington State at least 10% of apple cullage is attributed to sunburn each year. The use of overhead evaporative cooling (EC) decreases the apple surface temperature leading to a decreased likelihood of sunburn development.

In 2012 and 2013, two field trials were conducted to analyze the sunburn incidence of Gala, Golden Delicious and Fuji apples under two treatments (EC and untreated control) and two canopy locations (high and low). Packout analyses were conducted based on sunburn data results, for the three varieties in both years, using different crop load scenarios.

Applying open source irrigation water for EC treatment can pose a serious threat to human health if water is found to be contaminated. To evaluate this risk of contamination, a field inoculation examination was conducted in 2014 to assess generic *E. coli* die-off rates under commercial orchard settings. Weather data were collected to investigate possible relationships between environmental conditions and bacterial die-off rates.

In both years, the use of EC diminished sunburn incidence, except for Fuji in 2013. Overall, higher canopy location presented more sunburn than fruit in lower canopy positions. Packout analysis results show that EC increased net returns for all varieties in both years, and for all crop load scenarios. Both EC treated and untreated fruit showed a minimum of 2.5 log average reduction 8 hours after inoculation. EC had positive effects regarding the generic *E. coli* die-off rates for Golden Delicious and did not negatively impact microbial die-off, considering the weather and water application rates.

Board Placement: 202

Abstract Title: USING CHLOROPHYLL METER AND TISSUE TESTING TO DETERMINE IN-SEASON NITROGEN NEEDS IN TIMOTHY HAY PRODUCTION

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Steve Norberg
Don Llewellyn
Steve Fransen
Shannon Neibergs

Abstract:

Timothy hay is the largest grass hay commodity in Washington State and the majority of hay is exported to Japan and other countries. Very little research work has been done on determining optimum nitrogen rates for this commodity or a tool for in-season adjustment of nitrogen rate.

We hypothesized that in-season nitrogen status of timothy could be assessed using a Soil Plant Analysis Development (SPAD) units or by nitrogen content of leaf samples. A calibration of these parameters would be accomplished so farmers would be able to in-season apply the nitrogen using fertigation. The SPAD meter measures how much of red light is absorbed and infrared light transmitted by the sample and gives a greenness measurement (SPAD unit). These SPAD units are compared to an over-fertilized strip in the field and relative chlorophyll units (RCM) are calculated ($\text{SPAD in question} / \text{SPAD over fertilized} = \text{RCM}$) averaged over at least 20 measurements. The objective of the research conducted is to calibrate the SPAD meter and tissue testing for nitrogen in timothy and determine their effectiveness.

Research was conducted at two Washington State University Experiment Stations located near Prosser, and Othello, Washington using different nitrogen rates. Results indicate that the vegetative stage (stems 6 inches in length) will be the most accurate time to assess nitrogen status using RCM and leaf tissue nitrogen content. Results also indicated that both tools RCM and tissue testing will be useful tools to predict in-season nitrogen to maximize yield and profit.

Board Placement: 203

Abstract Title: The Influence of Fuel Reduction Treatments on the Nutritional Ecology of Mule and White-tailed Deer in Northeastern Washington

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Stephanie Berry

Lisa Shipley

Abstract:

To reduce the chances of large fires, federal forests are reducing fuel loads through thinning and prescribed burning. By opening the canopy, these actions can potentially increase the nutritional value of habitats for deer. Our project examines the effects of canopy cover and time since thinning on the quality and quantity of forage, nutritional carrying capacity and nutrient intake rates of tractable Mule Deer (*Odocoileus hemionus*) and White-tailed Deer (*Odocoileus virginianus*) in the Colville National Forest in northeastern Washington. We sampled the biomass and nutritional quality of understory biomass in 29 stands over two seasons that ranged from 20 – 100% canopy cover and 0 – 20 years post-thinning. In addition, we measured bite rate, bite size, diet composition, and diet quality of tractable deer – 4 mule deer and 4 white-tailed deer. Forage biomass increased with decreasing canopy, and showed a curvilinear relationship with time since planting. We also examined the response of deer harvesting rates and diet quality to canopy cover and time since thinning. Mule deer had a higher bite rate than white-tailed deer. The results of this project can help managers identify and plan thinning treatments to create habitats that better meet the nutritional needs of wild deer.

Board Placement: 204

Abstract Title: BENEFICIAL EFFECTS OF MOOD ON COGNITIVE CONTROL

College/Campus: Arts and Sciences, Pullman

Authors:

Amy Nusbaum

John Hinson

Paul Whitney

Abstract:

Principal Topic

Mood is often assumed to influence cognition: negative mood is detrimental and positive mood is beneficial. However, prior studies manipulating mood have shown inconsistent effects of negative and positive mood on a critical aspect of cognition, cognitive control. Cognitive control involves adapting information processing to the requirements of a particular situation, and is a critical aspect of multi-tasking. The goal of this project was to examine whether two facets of cognitive control, cognitive flexibility, the ability to adjust to changing environmental circumstances, and inhibitory control, the ability to resolve conflict or interference, were similarly affected by mood.

Methods/Hypotheses

A standardized mood manipulation was used to induce a positive, negative, or neutral mood in different groups of participants. Participants then performed a task switching procedure that required using a rule to respond to stimuli and adapting to changes in that rule. Variables of interest were differences in reaction time to switch vs. non-switch trials (cognitive flexibility) and differences in reaction time to different stimulus contingencies (inhibitory control).

Results/Implications

The results showed that mood affected some aspects of cognitive control, but not others. Individuals in both positive and negative mood groups had lower switch costs, indicating greater cognitive flexibility. However, the ability to resolve interference did not differ among mood groups. This indicates that negative mood, often thought to be a detriment, actually serves as a benefit in situations such as thinking flexibly. Additionally, it suggests that differing mood states do not always act on cognitive functions in opposing directions.

Board Placement: 205

Abstract Title: Collaborative Modeling in the Spokane River Basin: Engaging Stakeholders to Explore Basin-wide Water Management Strategies

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Melanie Thornton

Allyson Beall

Abstract:

Complex issues related to climate change cannot be understood from a single disciplinary perspective, thus collaboration among diverse perspectives is essential for addressing regional water resource management strategies. The Spokane River Basin is a sub-basin of the Columbia River that spans the state line between northwestern Idaho and northeastern Washington. Management of this basin is complex because of interstate, multi-jurisdictional responsibilities and the dynamic interaction between groundwater and surface water. This research focuses on a collaborative modeling project in the Spokane River Basin that will allow stakeholders and scientists to jointly address key issues related to regional water resource decisions. This collaborative modeling process works iteratively with stakeholders in the region to create a user-friendly model of issues relevant to their water management systems. We developed a collaborative hydrologic model, based in OASIS software that integrates technical scientific information and historical data with local knowledge and interests to explore basin-wide management strategies. OASIS uses a fully configurable linear programming solver to simulate water routing and is designed to optimize system performance based on user-defined goals and constraints. Collaborative modeling provides an integrated process for making water allocation and water use decisions in the basin, which allows for a more integrated water resources management strategy. Collaborative modeling sessions enabled stakeholders to explore different water management alternatives and evaluate management strategies that best suit the needs and interests of the entire basin. This participatory process aims to better understand how water resource decisions may change in the context of climate change.

Board Placement: 206

Abstract Title: Effective Transfer via Demonstration in Reinforcement Learning

College/Campus: Engineering and Architecture, Pullman

Authors:

Zhaodong Wang

Abstract:

Intelligent agents, autonomous entities which perceive through sensors and act upon environments, can help automate tasks in everyday life. Agents with learning abilities will be able to complete assigned work without step-by-step instructions and even accomplish tasks for which they were not originally designed. Reinforcement Learning (RL), one successful method to learn how to act in sequential decision making tasks, may require impractical amounts of time. This research focuses on speeding up autonomous learning by allowing one (source) agent to transfer its knowledge to another (target) agent.

Our previous approach summarized source agent knowledge into static rules that target agent can follow to improve learning. The new method again takes data demonstrated by a source agent and summarizes it, but also provides confidence levels in the demonstration. The key contribution of this work is to show that this confidence can be leveraged to significantly improve learning - knowledge transferred with low confidence is less likely to be useful than knowledge transferred with high confidence.

Our methods are implemented and validated in a simulated robot soccer game, showing our method significantly outperforms both our previous transfer learning method and learning without transfer. In addition to transfer from a source agent, knowledge can also be transferred in this manner from a human demonstrator. The results are an important towards allowing RL agents to learn faster in complex problems from other agents or humans, and thus allow robots to autonomously learn in more real world tasks.

Board Placement: 207

Abstract Title: Communication and Democracy: Understanding Effects of Exposure to Agreement and Disagreement on Democratic Ideals Through Information Processing Strategies

College/Campus: Communication, Pullman

Authors:

Myiah J. Hutchens

Chan Chen

Jay Hmielowski

Michael Beam

Abstract:

Grounded in the ideals of deliberative democracy, this study examines the relationship between exposure to counter-attitudinal and attitude consistent political communication and the belief that discussion leads to better decision-making. Using data collected in the week prior to the US midterm election, we examine both the direct effects, and indirect effects mediated by systematic and heuristic processing. We determined that exposure to disagreement is associated with beliefs that discussion leads to good decisions both directly and indirectly through increased systematic processing and reduced heuristic processing. Exposure to agreement has positive indirect effects via increased systematic processing, and negative effects via increased heuristic processing.

Board Placement: 208

Abstract Title: Interactions between pairs of solute atoms in the intermetallic GdAl₂

College/Campus: Arts and Sciences, Pullman

Authors:

Gary S Collins

Ryan Murray

Abstract:

The interaction between solute atoms in metallic systems is an important topic in the theory of solutions. Solute atoms in a binary phase such as GdAl₂ normally occupy substitutional sites of either of the two constituent elements. A pair of neighboring solute atoms may experience an attractive or repulsive interaction, whose strength and sign will depend on the sites they occupy and how far apart they are. In a naïve picture of coulombic interactions, the interaction energy would depend on the effective charges of the two solutes at the sites they occupy.

Experiments were carried out on highly-ordered GdAl₂ to measure interaction enthalpies between extremely dilute ¹¹¹In solute atoms and Ag impurities present at a concentration of about 1 at.%. We used the method of perturbed angular correlation of gamma rays (PAC) that is sensitive to the local environment of ¹¹¹In probe atoms.

In the absence of other impurities, ¹¹¹In solutes were previously shown to preferentially occupy Gd-sites at low temperature and Al-sites at high temperature [M.O. Zacate and G.S. Collins, Phys. Rev. B69, 174202 (2004)]. With Ag-impurities, new signals were observed for In-probes that were attributed to different near-neighbor impurity configurations of Ag-atoms. By measuring changes in site fractions of the new signals with temperature, it was determined that In-probes on Gd-sites repel Ag-solutes from near-neighbor positions, whereas In-probes on Al-sites attract nearby Ag-solutes. Interaction enthalpies were determined from temperature dependences. Additional results will also be reported.

Board Placement: 209

Abstract Title: β 4 integrin and vimentin intermediate filaments associate and positively regulate alveolar epithelial cell motility

College/Campus: Veterinary Medicine, Pullman

Authors:

Zachary Colburn

Susan Hopkinson

Jonathan Jones

Abstract:

The distal lung alveolar epithelium is critical to gas exchange. Damage to the alveolar epithelium is associated with common lung diseases, including acute lung injury and chronic obstructive pulmonary disease. Although the etiology of these diseases has been well studied, the repair mechanisms of the alveolar epithelium remain relatively unknown. Recent data, however, indicate that alveolar epithelial repair is associated with increased expression of the matrix receptor β 4 integrin in a subset of alveolar type II cells. We hypothesized that β 4 integrin facilitates repair by regulating cell motility. To test this hypothesis, we stably knocked down β 4 integrin expression in the immortalized lung epithelial cell line A549 and observed the effects on cell polarity, speed, and processivity, a measure of directed migration. β 4 integrin knockdown cells less frequently possess a single lamellipodium compared to controls, indicating poor polarization. Knockdown cells also exhibit a mild reduction in speed (~15%) and a greater than 25% reduction in processivity. This phenotype is rescued by infection with an adenovirus encoding GFP-tagged β 4 integrin. Immunocytochemical analyses of A549 cells indicate that puncta of β 4 integrin, which co-localize with the cytolinker plectin, localize along vimentin intermediate filaments (VIFs) in lamellipodia. Since lamellipodial VIFs were less frequently observed in knockdown cells compared to controls, we tested the role of vimentin in regulating motility by transfecting cells with a plasmid encoding GFP-tagged dominant-negative vimentin. Cells expressing dominant-negative vimentin exhibited reduced speed. These data implicate a role for β 4 integrin-VIF interaction in regulating motility, possibly by stabilizing lamellipodia.

Board Placement: 210

Abstract Title: Functional complementation of the Inv/Mxi-Spa Type III Secretion System translocators in Salmonella

College/Campus: Veterinary Medicine, Pullman

Authors:

Jessica Klein

Leigh Knodler

Abstract:

Bacterial pathogens employ various molecular tools to manipulate their prey. The Type III Secretion System (T3SS) is one such virulence factor uniquely adapted for transkingdom communication between bacteria and their eukaryotic (plant or animal) hosts. These nanomachines function as molecular syringes, orchestrating injection of bacterial effector proteins and toxins into a host target cell. Such “effectors” ultimately modulate host signal transduction pathways, effectively permitting bacteria to commandeer cellular host processes for optimal invasion, colonization, or evasion. This process of translocation/injection is mediated by the T3SS translocon, a pore-forming complex that disrupts the host membrane to facilitate passage of bacterial effectors. T3SSs are divided into several families. One such family, termed “Inv/Mxi-Spa”, is often associated with initiating bacterial invasion of eukaryotic cells. Salmonella, for example, is a common cause of food-borne gastroenteritis and possess an Inv/Mxi-Spa T3SS necessary for its uptake into mammalian cells. We hypothesize that a functional conservation of the Inv/Mxi-Spa translocon and its associated stabilizing proteins exists across bacterial genera. To study the functional relatedness of these proteins, we used invasion-deficient Salmonella mutants (lacking translocation proteins of interest) as surrogates for expression of other Inv/Mxi-Spa translocators from various pathogenic bacteria, and restoration of host cell invasion as a readout for complementation. We identified several human pathogens with Inv/Mxi-Spa systems capable of restoring invasion to mutated Salmonella, thereby indicating conserved function among these relatives. This represents the first in-depth investigation of functional relatedness within the Inv/Mxi-Spa T3SS family, and implicates a shared potential therapeutic target among Inv/Mxi-Spa pathogens.

Board Placement: 211

Abstract Title: A novel family of microtubule associated proteins: searching for plant morphogenesis regulators

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Sharol Schmidt

Andrei Smertenko

Abstract:

Both plants and animals are comprised of complex tissues containing high degrees of cellular order; however unlike most animal cells, the position of plant cells is permanently fixed owing to a rigid cell wall. The mother cell expands and a new cell wall is built between the daughter cells. As such, tissue patterning in plants depends on the ability of the mother cell to correctly position the division plate (cell plate). Inside each cell is a cytoskeleton, containing microtubules, that controls the orientation of the cell plate. Microtubules can grow, shrink and change direction which allows for the rearrangement of the cytoskeleton as mitosis progresses. Microtubule movements are controlled in part by microtubule-associated proteins. These proteins can stabilize, pause, shrink, cleave and even initiate new microtubules. However, our knowledge about proteins that govern organization of mitotic plant microtubules remains incomplete. We have identified a novel family of plant-specific proteins that interact with microtubules both in vitro and in vivo which we have named MACET. MACET family proteins each have a distinct microtubule labeling pattern which indicates different functions. Furthermore, we have shown binding of MACET family members to distinct mitotic arrays and also demonstrated a role in cell wall formation in plant roots. For these reasons, we hypothesize the MACET family is involved in plant tissue patterning. Our goal is to characterize MACET family members and reveal novel insights into microtubule dynamics during mitosis.

Board Placement: 212

Abstract Title: RANGE EXPANSION OF THE CALIFORNIA FIVESPINED IPS BARK BEETLE AND ITS OUTBREAK IN WASHINGTON STATE

College/Campus: Extension, Pullman

Authors:

Todd Murray
Glenn Kohler
Beth Willhite
Chuck Hersey

Abstract:

In 2010, the California Fivespined Ips beetle, *Ips paraconfusus* was recorded for the first time in Washington State. A novel bark beetle outbreak developed during the subsequent years in the Columbia River Gorge.

A collaborative effort initiated by Washington State University Extension, Washington State Department of Natural Resources and the USDA Forest Service, Forest Health Division gained resources to study the distribution of the newly documented *Ips paraconfusus*, in relationship to its ecological counterpart most commonly found in the region, *Ips pini* or pine engraver. The collaboration also sought to develop management strategies and educational outreach for landowners do reduce the severity of the unique bark beetle outbreak.

Using pheromone traps deployed across the state, a new range of *I. paraconfusus* has been described. Populations of CFI have been found as far north as McChord Air Force base, just south of Tacoma and as far East as Goldendale, in Klickitat County. Previous ranges have only documented CFI occurring in the northern realms of the Willamette Valley, OR.

After six years of continual outbreak in the Columbia River Gorge, effective management strategies were identified and disseminated throughout the affected communities. Since 2010, 22 workshops, field days and demonstrations have been delivered to 1,200 landowners and land managers. Ninety-seven percent of the workshop participants said they will manage slash differently when thinning pines. Since 2014, 77 landowners treated 597 acres for fuel reduction and removal of 39 hazard trees as a result of the projects effort.

Board Placement: 213

Abstract Title: Advancing Oceania: Towards an Oceanic Critical Race Theory

College/Campus: Education, Pullman

Authors:

Jeremiah Sataraka

Abstract:

In this paper I attempt to articulate an emergent Oceanic Critical Race Theory (OceanicCrit) by building on the foundations of Critical Race Theory (CRT) and its various branches (TribalCrit, LatCrit, AsianCrit, and QueerCrit). I examine these four branches of CRT in particular to find common ground between them. Through this examination, I propose a set of OceanicCrit tenets, which are both unique to Oceanic communities (similarly done by the work of the four branches of CRT) and applicable to CRT as a whole. These tenets include ideas around environmental racism and the role climate change has played in disproportionately impacting Oceanic communities, the imperialisation of Oceanic minds, the militarization of Oceania, the role mass media has played in perpetuating dominant narratives of Oceanic people, and the increasing awareness around multiracial and queer identities of Oceanic people.

Board Placement: 214

Abstract Title: Rural environment to global workplace: industry collaboration in interior design education

College/Campus: Agricultural, Human and Natural Resource Sciences, Pullman

Authors:

Genell Ebbini

Kathleen Ryan

Abstract:

Relevance

Preparing interior design students to practice in a global market at a competitive level is a challenge for interior design programs in rural 'destination' locations with limited access to the design profession. In response, a problem-based studio model was developed in collaboration with an urban industry partner. Although the Council of Interior Design Accreditation (CIDA, 2014) outlines interior design education that translates across universities, regions, and countries, there are significant challenges for the 35% of interior design programs located in rural regions.

Strategy

The studio's primary objective was to advance interior design students' competencies in creative problem-solving in the context of global practice, espousing real-world professional conditions utilizing practice-oriented tasks. Students designed future workplaces for the largest e-commerce retailer in the world (Snyder, 2015) for their global offices in London, Hyderabad, Sao Paulo, Tokyo, and Beijing. Global engagement consisted of collaborative points of interaction utilizing distance technology, face-to-face and on-campus interactions with international students from the project countries.

Outcomes

The integration of the design industry in this studio provided the students with real-world experience in effect raised the level of students' knowledge and expectations of the interior design industry considerably. The use of technology was an important element in the execution of this studio model (Asojo, 2007).

Advancing Design Knowledge

Utilizing distance technology, the program's rural location did not hinder the ability of students to engage globally. The findings demonstrate that through technology a rural interior design program is able to compete competitively in a global market.

Board Placement: 215

Abstract Title: Investigation of ecophysiology and fungicide sensitivity of *Lambertella corni-mar*is isolates from apple

College/Campus: Agricultural, Human and Natural Resource Sciences, Global

Authors:

Achour Amiri
Katie Mulvaney
Aaron Hawkins

Abstract:

Several fungal diseases can infect apple fruit and cause postharvest decays after months of cold storage. In a survey conducted in apple packinghouses in Central Washington, a new decay was found and later characterized as *Lambertella corni-mar*is. The epidemiology and management of this new fungal species are unknown. Therefore, we initiated the current study to investigate some eco-physiological aspects of *L. corni-mar*is and evaluate its efficacy to several fungicides used to control apple diseases in pre and postharvest. We evaluated the impact of nutrients, temperature, pH, water activity on growth of *L. corni-mar*is in vitro. Furthermore, we evaluated the sensitivity of 100 isolates of *L. corni-mar*is to five fungicides i.e. fludioxonil, thiabendazole, pyraclostrobin, pyrimethanil, and boscalid in vitro on agar plates and in vivo on detached fruit. Overall, *L. corni-mar*is can grow equally on a range of nutrients whereas its growth is significantly reduced at 5°C and completely inhibited at pH values higher than 7. The sensitivity of *L. corni-mar*is seem to be higher to fludioxonil and pyraclostrobin whereas higher rates of the other tested fungicides may be required to achieve desired disease control. Results from this study will help understanding the epidemiology of the disease and in developing efficient control strategies.

Board Placement: 216

Abstract Title: Avoidance of APOBEC-induced mutations by error-free lesion bypass.

College/Campus: Veterinary Medicine, Pullman

Authors:

James Hoopes

Luis Cortez

Steven Roberts

Abstract:

APOBEC family cytidine deaminases mediate anti-retroviral innate immunity through editing of single-strand (ss) DNA intermediates in a retrovirus's life cycle. The off-target activity of two of these enzymes, APOBEC3A and 3B, are implicated in the generation of multiple human cancers. We have recently established in eukaryotic cells, A3A and A3B preferentially deaminate ssDNA formed during lagging-strand synthesis of chromosomal DNA replication. As DNA repair mechanisms cannot operate on ssDNA, failure to remove APOBEC-induced damage may make the activity of these enzymes particularly mutagenic.

We hypothesize that APOBEC-induced deaminations may be mitigated by their conversion to abasic sites, which stall replication forks and induce one or more DNA damage tolerance mechanisms. To determine whether any of these mechanisms are responsible for avoiding APOBEC-induced mutations, we ectopically expressed APOBEC enzymes in yeast deficient in tolerance mechanisms [*ubc13Δ*, error-free lesion bypass; *siz1Δ*, homologous recombination; *rev3Δ*, translesion synthesis (TLS)] and measured mutation frequencies using the reporter gene *CAN1*.

We show that approximately 77% of the APOBEC-induced deoxyuridines are processed in an error-free manner, 14% by mutagenic TLS, and 9% remain unprocessed as deoxyuridine. This is the first quantitative comparison of bypass pathway choice in eukaryotic chromosomal DNA. Our results indicate that highly mutagenic deoxyuridines are frequently converted to fork-stalling lesions ahead of the replication fork, where error-free bypass is utilized at a higher frequency than TLS when these lesions are encountered. This lesion exchange may be a general mechanism to avoid mutations in contexts where DNA repair pathways cannot function efficiently.

Board Placement: 219

Abstract Title: Are practice tests effective for learning? A meta-analysis of the testing effect

College/Campus: Education, Pullman

Authors:

Olusola Adesope

Dominic Trevisan

Narayankripa Sundararajan

Abstract:

The testing effect is a well-known concept that refers to gains in learning and retention that can occur when students take a practice test on studied material before taking a final test on the same material. Research demonstrates that students who take practice tests often outperform students in non-testing learning conditions such as restudying, practice, filler activities or no presentation of the material. Due to a lack of evidence-based meta-analysis, students, researchers, teachers, and policy makers lack a comprehensive understanding of the different conditions under which practice tests enhance or inhibit learning. This meta-analysis fills this gap by examining the effects of practice tests versus non-testing learning conditions. Results reveal that practice tests are more beneficial for learning than restudying and all other comparison conditions. Mean effect sizes were moderated by the features of practice tests, participant and study characteristics, outcome constructs and methodological features of the studies. These results are of interest to researchers in this area and may guide discussions around the use of practice tests to advance student learning. In addition, results of this meta-analysis provide a platform to help policy makers and educational stakeholders rethink other ways in which tests could be used rather than the often controversial and hotly debated use for high-stakes decision-making. Once stakeholders realize the benefits of tests as tools for learning and not just summative assessments for making high-stakes decisions, the results of this research are expected to transfer to school contexts and used in making research-informed educational policies.

Board Placement: 220

Abstract Title: Governing Nucleation in CdZnTe Production via Modified Seeded Vertical Bridgman Growth

College/Campus: Engineering and Architecture, Pullman

Authors:

Jedidiah McCoy

Santosh Swain

Kelvin Lynn

Abstract:

Cadmium Zinc Telluride (CZT) exhibits unprecedented advantage over other materials for radiation detection in homeland security and medical imaging applications. However, economic fabrication of detector grade CZT is greatly hindered by low single crystal yield. Thermo-physical properties of CZT render as grown ingots prone to high poly-crystallinity. Even when high single crystal yield is achieved, the process is costly and time demanding. Seeded crystal growth in combination with pyrolytic Boron Nitride (pBN) crucibles has been implemented to address two specific aspects in fabricating appreciable quantities of detector grade CZT: controlling initial nucleation sites and inhibiting melt to ampoule wall adhesion. This involved re-designing the standard experimental furnace setup as well as manipulating different growth parameters. Initial growths were performed with a 55x58mm seed crystal and placed within a graphite coated flat bottom quartz ampoule with an inner diameter of 60mm. Seeded growths were performed with pre-grown polycrystalline doped CZT as charge material. Adjusted parameters for optimization included growth rate and interface gradient. Latter growths were conducted within a pBN crucible. Several different temperature profiles were attempted with varying results. Promising results have been obtained which demonstrate improvement from previous seeded growth attempts. Discussion will be presented on the single crystal yield as well as the electrical properties and the performance of these ingots as radiation detectors.

Board Placement: 223

Abstract Title: Conditional Classroom Cooperation: Cost, Benefit, and Risk in Student Prosociality

College/Campus: Arts and Sciences, Pullman

Authors:

Joshua Premo

Richard Lamb

Andy Cavagnetto

Abstract:

It was suggested by Trivers (1971) that the relative benefits and costs of a social act are important determinants of an individual's decision to perform it. As such, it would be expected that conditional cooperation is shaping contemporary prosocial behavior. The current study reports on a test of this idea in regards to student perceptions of their classroom environment. This was accomplished through the structural equation modeling of data collected from 845 undergraduate science students from 41 laboratory classrooms. Results support that classroom conditions which increase the possibility of benefits (reciprocity and friendship) raise student valuation of their classmates leading to greater student willingness to expend resources on them. Additionally, both reciprocity and student valuation of their classmates concurrently contribute to a student's support for the enforcement of cooperation in the classroom. These dual pathways suggest that both group characteristics and personal gain may independently cue the enforcement of cooperation in order to maximize benefit while minimizing long-term costs. The final cumulative model of these two findings had acceptable fit to the collected data ($\chi^2 = 457.55$, $df = 162$, $\chi^2/df = 2.82$, $RMSEA = .046$, $CFI = .945$, $SRMR = .046$) and shows that student prosociality is strongly influenced by their perception of the potential benefits and costs (including risk) in the classroom environment. Empirical support for this model emphasizes that student prosocial behavior is conditional, and implies that attempts to increase prosociality must account for this in order to affect behavioral change in the classroom.

Board Placement: 224

Abstract Title: Sphero Robotics

College/Campus: Education, Pullman

Authors:

Susie Skavdahl

Abstract:

Sphero robotics is simple program that can be used for students at a very early age. Several of the apps offered, free on Apple and Android devices, have the capability of teaching students coding skills in a simple step-by-step format. This is a perfect program for bringing STEM curriculum into grades K-12. By teaching Elementary Education majors how to use Sphero robotics coding, they will learn to combine each of the STEM elements into one lesson. My presentation covers the various uses for Sphero robots in a classroom setting and how they are being used to teach coding in classrooms across the country.

Board Placement: 225

Abstract Title: Into terra incognita: Private Artem Vavilov and the Russian Expeditionary Force in France during the Russian revolutions.

College/Campus: Arts and Sciences, Tri-Cities

Authors:

Brigit Farley

Abstract:

In 1915, reeling from the loss of 400,000 men in the first weeks of the Great War, the French government cast about urgently for more manpower. Its ally, Tsarist Russia, was meanwhile suffering from an acute shortage of munitions. By December, the two sides had struck a fateful deal: Russia would send two brigades to France, and the French government would supply its ally with half a million rifles.

The Russian Expeditionary Force arrived in Marseille in the spring of 1916 and headed straight for the front. But after a period of training, the soldiers found themselves in uncharted territory: their country had vanished with the fall of the Romanov dynasty. Private Artem Vavilov left a rare memoir of what came next. Just prior to their first major campaign, France's ill-fated 1917 Nivelle offensive, Vavilov and some of his comrades—now citizen soldiers of a Russian "democracy"—began debating their continued participation in the war. Consequently, they incurred the ire of French authorities, who viewed them all as dangerous radicals in a time of widespread "indiscipline" in the ranks. Their fate represents an untold tale of the Great War.

Private Vavilov's personal testimony, as well as evidence from Columbia University's Bakhmetev archive, spotlight and personalize this little-known Great War episode from 100 years ago. They underscore the seismic effect of Russia's revolutions on Russian and French troops half a continent away from Russia.

Board Placement: 226

Abstract Title: Integrating 3D Printing into the Art History Curriculum (IRB 14933)

College/Campus: Arts and Sciences, Pullman

Authors:

Hallie Meredith

Abstract:

There is no local art museum with ancient material for students taking art history classes. To mitigate this and to give students the experience of viewing art from antiquity, in Autumn 2015, Fine Arts majors and non-majors enrolled in World Art History I were given an assignment incorporating 3D printed sculptures. Material was selected from Prehistoric to Medieval times, western and non-western works of art. Resources were generously provided by Academic Outreach and Innovation.

In this pilot study, qualitative research took the form of pre- and post-assignment questionnaires and student reflections. Individually, students analyzed a pair of sculptures. The overarching goals were to engage introductory level students new to the history of art by providing an experience working with three-dimensional versions of real works of art and, concurrently, to motivate majors and students familiar with the history of art by learning about and viewing lesser known pieces related to topics introduced in class.

Studying printed sculptures had a demonstrable impact on how students approached three-dimensional work; highlighting the important experience of analyzing a work in person. For example, students generally found that it was preferable to approach sculpture as a whole before turning to details. In addition, students noted the importance of the angle of viewing when identifying and presenting visual evidence.

This semester I am conducting a broader study. The focus of this investigation is whether 3D printed models have the potential to help students learn better as part of both the introductory and upper-level art history curriculum.

Board Placement: 227

Abstract Title: IT-Enabled Governance of Corporate Takeovers: Time for Say-on-Takeovers?

College/Campus: Business, Pullman

Authors:

Joseph Vithayathil

Vidyanand Choudhary

Abstract:

We study the potential for IT and a proposed new structure: IT-enabled owner-governance, which shifts control of the takeover decision from the board to shareholders, to improve shareholder surplus and social welfare. We develop and compare analytical models of IT-enabled owner-governance to the current practice of delegated governance in the context of informedness, which captures the informational state. Increasing informedness shifts the preference of shareholders and the social planner towards IT-enabled owner-governance. The shareholders and acquirer are aligned in their preferred governance structure when informedness is sufficiently high. This result is surprising because typically in a non-cooperative game with competing parties, one party's gains usually come at expense of the other party. We model the bargaining power of the target firm and find when bargaining power is low, IT-enabled owner-governance produces greater social surplus. When bargaining power is high IT-enabled owner-governance produces greater social surplus provided informedness is sufficiently high. We model board entrenchment based on private incentives which highlight the tension between remaining independent and favoring a takeover. We capture this tension with a metric denoted as the Board Incentive Ratio (BIR), which determines the level of informedness at which takeovers decline. Scholars have highlighted the role of takeovers as a disciplinary force in governance, and the decline of takeovers diminishes this disciplinary force on boards. Our results demonstrate that IT plays a role in determining the takeover governance structure, and policy implications suggest a shift to new forms of takeover governance may be desirable.

Board Placement: 231

Abstract Title: Activity Recognition Using Graphical Features

College/Campus: Engineering and Architecture, Pullman

Authors:

Syeda Akter

Lawrence Holder

Abstract:

Activity Recognition is important in order to facilitate elderly residents' and their caregivers' needs. This problem has been widely investigated using different methods including probabilistic and Markovian approaches. The focus of this paper is to perform activity recognition more accurately than existing approaches using non-intrusive sensors. We represent motion sensors of smart environments in a graph and resident's movements as edges in the graph. Then graph-based features are extracted and used as input for a Support Vector Machine. These features have been combined with motion-sensor based features. This method has been compared with three other widely used approaches, Naive Bayes, Hidden Markov Model (HMM) and Conditional Random Fields (CRF) on three different datasets from three smart apartments. In all cases, the method based on graphical features outperformed one of the state of the art methods for activity recognition.

Board Placement: 232

Abstract Title: Actin- and tropomyosin-binding properties of the N-terminal region of leiomodin

College/Campus: Engineering and Architecture, Pullman

Authors:

Thu Ly

Natalia Moroz

Dayton Wooldridge

Dmitri Tolkachev

Alla Kostyukova

Abstract:

Leiomodin (Lmod) is an actin filament nucleator and a muscle homolog of tropomodulin, a capping protein localized at the pointed end of the actin filament. Recent studies have shown mutations in Lmod are associated with lethal nemaline myopathy in human and dilated cardiomyopathy in mice. The ability of Lmod to bind and nucleate actin is enhanced by tropomyosin (TM), a rod-like coiled coil protein spanning along and stabilizing actin filaments. Currently it is unclear whether Lmod has an actin-binding site at the N-terminal region. It is also not known how many regions in Lmod interact with TM. Based on our previous data obtained from pyrene-actin polymerization assays, we hypothesize Lmod has an N-terminal actin-binding site and only one TM-binding site. In this study, we use nuclear magnetic resonance (NMR) to confirm the existence of the actin-binding site and employ in-vitro binding assays to characterize TM-binding properties of Lmod. For these purposes, we design and purify four peptide fragments Lmod[45-94], Lmod[85-123], Lmod[1-201] and Lmod[1-201(L30E)]. Our NMR analysis indicates Lmod[45-94] interacts with actin while Lmod[85-123] does not. Lmod[45-93] thus represents an interactive site with actin and Lmod[85-123] is not an extension of this site. In addition, our native gel electrophoresis data show that Lmod[1-201] binds to only one TM, and Lmod[1-201(L30E)] does not bind TM because the mutation L30E destroys the only TM-binding site in Lmod. These results enhance our understanding of actin and TM-binding properties of Lmod and bring us one step closer to elucidate Lmod's physiological role in muscle cells.

Board Placement: 233

Abstract Title: Temperature Related Climatic Impacts on Surface Infiltration Rates of Pervious Concrete

College/Campus: Engineering and Architecture, Pullman

Authors:

Brandon Werner

Liv Haselbach

Abstract:

Previous studies have indicated that pervious concrete systems might have decreased hydraulic performance under wintertime conditions due to temperature drops and snow or ice. This study explored the impact of ambient temperature on the surface infiltration rates at several locations on a placement in Pullman, WA based on the hypothesis that an increase in viscosity at lower temperatures will result in a lower infiltration rate. Testing was performed using a modified ASTM C1701. The results indicate that ambient temperatures can impact the infiltration rates significantly. There was an approximately 50% decrease in surface infiltration rates over temperatures from around freezing to around 80°F (27 °C). However, clogging from runoff, landscaping activities, etc. over time had a much larger impact, especially in the higher infiltration ranges. These temperature variations should also be considered when determining when maintenance might be required on a pervious concrete installation.

Board Placement: 235

Abstract Title: Framing and agenda interaction of Ebola virus disease under the globalization era: a cross-national study of news coverage in China, US, Japan, and UK

College/Campus: Communication, Pullman

Authors:

Qian Yu

Li Zhou

Abstract:

This study analyzes news coverage of the Ebola Virus Disease (EVD) in China, U.S, Japan, and UK to examine variations in news attention cycles, framing, and to investigate agenda interactions. A content analysis was conducted on 730 news articles from highly circulated and prestigious newspapers in these four countries during the period of March, 24 to December 31, 2014. The findings revealed that news attention patterns by the four newspapers consistently adhered to the development of EVD monitored by the World Health Organization (WHO); common characteristics shown in reporting types, news frames, sources, and predominant tones used by the four countries' coverage on portraying the EVD; agenda interactions with different extents were identified among the four newspapers. This study enriches understanding of how journalists with variations in media systems, cultural values, and social ideologies construct a global health risk. Limitations and future directions are also discussed in the ending part.

Board Placement: 236

Abstract Title: Depictions of sustainability in children's books

College/Campus: Education, Pullman

Authors:

Rani Muthukrishnan

Jane Kelley

Abstract:

We examined how the images in seven nonfiction books written for children introduced sustainability and supported the overall goals of environmental education. All 384 images found in the books were coded for actions (creating, consuming, recycling and other), by gender or age group, and portrayal of nature, objects, humans, settings, and associations with nature. It was observed that nearly half the images (48%) in the books depicted objects other than nature (16%) or people (31%). One half of the images of people portrayed them as consumers. A gender bias was noted in the depictions, with 33% of female images portraying consumer behavior. While only 16% of males were depicted as consumers, 12% of the images with males were depicted to be engaged in recycling behavior. Only 4% of the images with females were represented as engaging in recycling behavior. Of the 32% of images depicting nature, individual plants rather than natural ecosystems were portrayed. Depictions of man-made systems predominated the images. The pictures did not establish or depict the connection between consumerism and depletion of natural resources or pollution. The implications of these results in supporting the goals of environmental education and sustainability are discussed.

Board Placement: 237

Abstract Title: Meal Feasibility in Division 1 Athletics

College/Campus: Other, Spokane

Authors:

Mary Cummings

Michael Wolfe

Lindsay Brown

Janet Beary

Abstract:

Washington State University's (WSU) student-athletes' nutrition needs are met at the Crimson Hub, a fueling bar that offers and prepares a variety of nutrient dense healthy foods. Athletes can receive a mid-day meal from the Gray W Legends Lounge, a conventional kitchen model, Monday-Thursday. This study examines adding a Gray W meal service on Fridays for athletes. It was hypothesized that the price of adding a meal service to the Gray W would equal the cost of Crimson Hub operations on Fridays; making it practical to close the Crimson Hub. By defining costs we averaged the price per head and compared resources to the budget restrictions. Athletes (n=120) were observed choosing food items at the Crimson Hub. Food items taken by the athletes from the Crimson Hub were documented and priced according to the current cost list. The mean cost per person was calculated and compared to the cost of the proposed Friday meal service. Contradictory to the hypothesis, the meal service price per head was \$4.69 and the cost per person at the Crimson Hub was \$2.40, making the meal service financially impossible. To accommodate for cost, the proposed solution is to conduct a pilot meal service on select Fridays. As NCAA regulations become more relaxed regarding the feeding of Division I student athletes it is imperative that more fueling choices become available. An additional meal service offers and promotes consistent eating habits to maintain each individual's recommended dietary intake.

**GPSA
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ABSTRACTS**

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Board Placement: 191

Administrative and Information Systems

Abstract Submissions

Name: Amrina Ferdous

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Abstract Title: Predicting class membership using Imputation methods for clinical variable for hepatocellular carcinoma (HCC)

A good analysis should not exclude missing observation. Missing observations are often found while analyzing data in Biostatistics. However, it is important to include all the necessary gene variables as well as clinical variables to analyze hepatocellular carcinoma (HCC). This study aims at imputing group membership for clinical variable by using some imputation technique. Logistic regression model has been selected for this work. SAS 9.2, a commercially available statistical software has been used to analyze the data set. The analysis has been performed excluding and including clinical variable: platelets. A comparison has been made of the two procedures. Hypothesis testing for testing the significance of coefficient of APC, P15, P73, P14, P16, DAPK, RAR_, RASSF1A, O6MGMT, E_cadherin, Platelets has been performed. We have concluded that the logistic model including predicted values for the clinical variable: platelets is better than the logistic model excluding platelets.

Board Placement: 168

Administrative and Information Systems

Abstract Submissions

Name: Yuchao Ma

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Abstract Title: Gait Pattern Examination of Low Vision Persons Using Networked Wearables

Many studies have reported that glaucoma patients experience mobility issues such as walking slowly and bumping into obstacles frequently. However, little is known to date about how a person's gait is impacted due to glaucoma. In this study, we design and development a gait analysis approach using a shoe-integrated sensing system, and accompanying machine learning techniques to quantitatively examine gait patterns in glaucoma patients. The customized sensor platform is utilized in a clinical trial conducted with 9 glaucoma patients and 10 age-matched healthy participants. The signal processing and machine learning algorithms automatically detect effective gait cycles and extract both steady-state and spatio-temporal gait features from the signal segments. We perform machine learning algorithms to distinguish glaucoma patients from healthy controls, and identify several prominent features with high discriminability between the two groups. The results demonstrate that classification algorithms can be used to identify gait patterns of glaucoma patients with an accuracy higher than 94% in a 10-meter-walk test. It is also demonstrated that gait features, such as evenness of the sway speed along medio-lateral direction between the two feet, are significantly different (p -value < 0.001) between older adults with and without glaucoma. These results suggest that wearable sensors can be used for continuous and real-time assessment of gait and mobility problems in individuals with low vision.

Board Placement: 121

Administrative and Information Systems

Abstract Submissions

Name: Bei Peng

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Abstract Title: A Need for Speed: Adapting Agent Action Speed to Improve Task Learning from Non-Expert Humans

Principal Topic

As robots become pervasive in human environments, it is important to enable users to effectively convey new skills without programming. Most existing work on Interactive Reinforcement Learning focuses on interpreting and incorporating non-expert human feedback to speed-up learning; we aim to design a better representation of the learning agent that is able to elicit more natural and effective communication between the human trainer and the learner.

Method/Hypotheses

We are interested in studying whether users can interpret the behavior of the adaptive speed agent correctly and how user performance will change in response to the changing speed of the agent. We developed the LAMBIDAS approach to implement the adaptive speed agent. Our domain is a simplified simulated home environment. The participant needs to train a virtual agent to accomplish tasks by giving reward and/or punishment in a variety of simulated environments. We collected data from 165 users from Amazon's Mechanical Turk to gain insights and/or final results.

Results/Implications

Our results show that 1) our novel adaptive speed agent dominates different fixed speed agents on four evaluation metrics (training accuracy, wall clock time, number of time steps, and amount of explicit feedback), 2) the agent's action execution speed can be successfully modulated to encourage more explicit feedback from a human trainer in areas of the state space where there is high uncertainty, and 3) different training conditions do affect user performance and preference.

Board Placement: 136

Administrative and Information Systems

Abstract Submissions

Name: Edwin Sanusi

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Abstract Title: Emotions after Business Failure: The role of mixed emotions on opportunity evaluation and exploitation

Business failure is a traumatic experience for many entrepreneurs. While some may quickly start new businesses, others never return to self-employment. This decision can be largely shaped by the entrepreneurs' emotions after the business failure. In contrast to previous research on emotions and entrepreneurship, this study assesses the effects of mixed emotions on subsequent opportunity evaluation and exploitation. In a scenario-based study, many participants reported a mix of positive and negative emotions as expected results from business failure, consistent with cognitive appraisal theories of emotions. Mixed emotions did not significantly affect evaluation of subsequent opportunities, but did influence reported likelihood of exploitation.

Keywords: business failure, mixed emotions, business opportunity, evaluation, exploitation

Board Placement: 132

Administrative and Information Systems

Abstract Submissions

Name: Ethan Spangler

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Abstract Title: Allies with Benefits: US Effect on European Demand for Military Expenditures

The US-European security relationship has been an international staple since the establishment of the North Atlantic Treaty Organization in 1949. However, over the course of the 21st Century US interests and attention have been drawn elsewhere. To understand what consequences this shift in attention may have, it is first important to establish what kind of security relationship the US and Europe have. Do European nations see the US military expenditures as a complement to their own forces or as a substitute? Thus it is the goal of this paper to estimate the link between US and European military expenditures.

Past work in this area has found mixed evidence concerning the effect of US military expenditures on European military expenditures. Some studies have found a negative relationship, insinuating that some European states free-ride off US protection. Others found a positive relationship, denoting a complementary nature with US defense spending. This paper applies new data to the topic.

The most important contribution of this paper is the instrumentation for regional US military expenditures. Using information obtained through the US Department of Defense Base Structure Report, which details all active US base and personnel deployments, I instrument for US military expenditures in Europe. This better depicts the factors facing European policymakers than previously used total US military expenditures. This new information is applied to a panel dataset of 26 European countries for years 2000 to 2012. Results show a positive relationship between US and European military expenditures.

Board Placement: 141

Administrative and Information Systems

Abstract Submissions

Name: Gina Sprint

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Abstract Title: Detection and Analysis of Changes in Everyday Physical Activity Data

Principal Topic

Inexpensive wearable sensors have enabled widespread collection of personal physical activity data. Wearable fitness devices, such as the Fitbit, count steps during the day and measure sleep quality at night. Often users wear such devices to track their progress towards achieving a health goal. Consequently, a computational framework to automatically and unobtrusively detect changes in physical activity data collected from wearable devices could help motivate users to reach their health goals.

Method/Hypotheses

Using machine learning algorithms and statistics, we aim to detect and analyze changes in physical activity data from wearables. Our approach computes over 25 relevant metrics, such as the number of walking bouts per day. We hypothesize detected changes in these metrics are representative of users' progress towards their health goals. To investigate this hypothesis, we compared two weeks of Fitbit data from individuals (N=12) participating in a health intervention study. Data were collected one week before the intervention and one week after. The intervention consisted of education, goal setting, and goal tracking for various health categories including exercise and sleep.

Results/Implications

Results indicated statistically significant changes in participants' physical activity data were reliably detected with our metrics and associated algorithms. Upon a detected change, additional analysis identified the metrics that exhibited the most improvement (i.e. increased duration and frequency of walking bouts) for each participant.

In summary, change detection and analysis algorithms offer several advancements to computer science and fitness tracking by providing personal, objective, and automatic goal tracking without additional overhead for the user.

Board Placement: 68

Administrative and Information Systems

Abstract Submissions

Name: Jing Sun

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Abstract Title: MOBILE COMMERCE AND ORGANIZATIONAL PERFORMANCE: DEVELOP A MODEL OF MOBILE COMMERCE BUSINESS VALUE

Principal Topic

As an extension of electronic commerce (e-commerce), mobile commerce (m-commerce) has been significantly adopted by organizations to conduct business. Given the importance of m-commerce, this research seeks to gain a better understanding of m-commerce business value. Thus, this research explores the following key research questions in this concern: (1) what have been done in the field m-commerce business value; and (2) how m-commerce investments and capabilities create business value.

Method

A total of 16 articles from leading information system journals and other journals are reviewed. With the guidance of the IS success model by Delone and Ephraim (2003), this paper reviewed m-commerce value from the perspectives of technology, individual and organizational level.

Results/Implications

The research approaches, guiding theories and the findings in each category are presented to illustrate the principle dimensions of the research enquiry. Finally, this paper proposes a model of m-commerce business value to guide future research in this area. This literature review contributes to both academia and practice. The contribution to academia of this literature review is threefold: (1) provides a synthesis of key research findings; (2) identifies gaps in research, and (3) shows paths for overcoming the current research limitations by providing a research agenda. To practitioner, this research answer the question that whether the investment of m-commerce will increase the business performance. Based on the literature review, both theoretical and empirical evidences can be found to support the business value of m-commerce.

Board Placement: 36

Agricultural and Natural Sciences

Abstract Submissions

Name: Katie Adolphsen

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Abstract Title: Understanding symbiotic nitrogen fixation relationship efficiencies through genetic manipulation of host-symbiont pairs

Nitrogen is the major limiting nutrient in agriculture. The production of synthetic nitrogen fertilizers is expensive and a major source of greenhouse gas emissions. An alternative source of nitrogen for plant growth comes from the symbiosis between soil bacteria called rhizobia, and legume plants. The legume forms root nodules, specialized organs that house the bacteria within an environment that allows the bacteria to convert atmospheric nitrogen into compounds the plant can use. Our goal is to improve this relationship, called symbiotic nitrogen fixation (SNF), to reduce crop dependence on synthetic fertilizers.

The legume host-symbiont pair, *Sinorhizobium meliloti* and the barrel medic *Medicago truncatula*, is one model used to study SNF but it is partially effective and the plant shows signs of nitrogen deficiency. A closely related bacterium, *Sinorhizobium medicae*, has a more effective relationship with the same legume. We identified a small set of proteins made in *S. medicae* nodules that are not present in *S. meliloti*.

We hypothesized that some of these *S. medicae* proteins contribute to the efficient symbiosis between *S. medicae* and *M. truncatula*. By moving the genes encoding these proteins from *S. medicae* to *S. meliloti* we tested this hypothesis. One protein, predicted to breakdown a toxic by-product of metabolism, improves symbiotic efficiency of *S. meliloti* with *M. truncatula*. We also introduced this gene into the bacterium that nodulates pea plants, *Rhizobium leguminosarum*, and found increased nodule formation, indicating that this gene may have broader applications in understanding the interaction between hosts and their bacterial symbionts.

Board Placement: 184

Agricultural and Natural Sciences

Abstract Submissions

Name: Probir Kumar Das

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Abstract Title: Precision in pollination management for tree fruit yield security

Bloom and fruit set are annual worries for growers to maintain yearly crop potential of an orchard. Ten of the largest fruit species we grow in WA relies on bees for pollination. Currently, pollination has become an important issue facing agriculture with threat of declining honey bee (*Apis mellifera*), mainly due to colony collapse disorder. Another key issue is pollinizer (i.e., trees planted as pollen-source), competes main cultivars for water, nutrients and energy inputs. They also serve as a harbor of pollen sourced diseases.

Our project goal is to develop a pollination system for tree fruits, ensuring full replacement of pollination from bees and pollenizing from trees.

In 2014 and 2015, several field trials in concert with lab studies have taught us how we can improve our pollination process. In both season, 'Tieton' sweet cherry (*Prunus avium* L.) significantly increased (15% and 10%) by supplemental pollination over natural, which was due apparently to increased pollen deposition. Proof of concept trial on both sweet cherry and apple proved efficacy of precision pollination strategy, generating fruit set in bee exclusive environment. In 2015, from pollen rate trial in 'Jazz' apple, we have noticed, our approach has the ability to serve as a precision tool for crop load management.

From convincing results of these trials, we were able to find the electrostatic application as promising strategy for adequate fruit set and optimal fruit quality. Our method could render power of pollination to growers, while saving water, energy inputs, and reducing environmental foot prints.

Board Placement: 93

Agricultural and Natural Sciences

Abstract Submissions

Name: Danielle Guzman

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Abstract Title: Genetic Diversity Analysis of Pear using Target Region Amplification Polymorphism (TRAP)

Danielle Guzman, Seanna Hewitt, Rachel Daniel, Marco Galli, Nathan Tarlyn, Kate Evans and Amit Dhingra

Department of Horticulture, Molecular Plant Sciences, Washington State University

Principal Topic

The pear (*Pyrus Communis*) breeding efforts in the US are focused on developing rootstocks with desirable traits such as dwarfing, disease resistance, vigor, precocity, and cold tolerance. One of the challenges encountered towards this goal is finding genetically diverse parent material and genotypes that are adapted to the US environment.

Method/Hypotheses

We have established a pear seedling population from crosses between 'Bartlett', 'd'Anjou', and 'Comice' genotypes that have survived in the US environment for over a century. Further, we have also established a population where the pollen were exposed to gamma radiation prior to pollination with the aim of enhancing genetic diversity in advanced varieties. This approach has been demonstrated to enhance genetic diversity via the generation of aneuploids. We phenotyped the seedlings and analyzed the genetic relationship among these pear seedlings using Target region amplification polymorphism (TRAP) molecular markers to identify individuals with desirable agronomic traits. TRAP analysis is a cost effective and efficient PCR-based approach used to produce multiple polymorphic markers around targeted gene sequences.

Results/Implications

TRAP reaction produced a total of 32 polymorphic loci in a population of 185 individuals. The polymorphisms were scored and analyzed using the software programs STRUCTURE, CLUMPP and DISTRUCT, which grouped the pear individuals into sub-populations based on their genetic similarities. From this analysis we identified 14 distinct sub-populations within the main pear population. This information is expected to strengthen the pear breeding efforts in selecting genetically diverse individuals either as parental material or direct candidates for rootstock trials.

Board Placement: 186

Agricultural and Natural Sciences

Abstract Submissions

Name: Seanna Hewitt

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Abstract Title: Transcriptomic analysis of cold induced, ripening-related, gene expression in Bartlett and D'Anjou pears

Principal Topic

As a climacteric fruit, ripening in European pear (*Pyrus communis*) is characterized by a burst of respiration accompanied by concomitant ethylene biosynthesis. Unlike most other fruits pertaining to this category (including apple, banana, and tomato), pears require a range of cold-temperature exposure to induce ripening. The extent of cold conditioning required varies by genotype—e.g. 'Bartlett' pears require 15 days of chilling at 0-5°, whereas 'D'Anjou' pears require 60 days of chilling. The physiological and hormonal responses to cold temperature storage have been well characterized in pear; however, the molecular mechanisms underlying this phenomenon are not well understood.

Method/Hypotheses

We conducted a time-course sampling of Anjou and Bartlett pear fruit exposed to partial and complete cold conditioning. Quantitative reverse transcription polymerase chain reaction (qRT-PCR) analysis, complemented by subsequent total RNA sequencing allowed us to identify genes in ripening related pathways that display differential levels of expression as a result of cold conditioning.

Results/Implications

The genes of greatest interest that were differentially expressed throughout conditioning and ripening were ethylene, respiration, and auxin-related transcripts. Additionally, we have identified differential expression of several transcripts in response to cold-temperature exposure which appear differentially regulated according to pear variety. This method of RNAseq validation of qRT-PCR gene expression analysis allows for a focused investigation of candidate genes involved in the control of cold-induced fruit ripening in a complex, non-model system.

Board Placement: 32

Agricultural and Natural Sciences

Abstract Submissions

Name: Nannette Huber

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Abstract Title: Assessment of Non-Point Source Phosphorus Pollution Potential in the Increasingly-Urbanized Puget Sound Region

Principal Topic

The health of Puget Sound is directly connected to its watersheds through the transport of nutrient-laden sediment and other materials by surface runoff. Phosphorus loading is a particular concern as phosphorus is the limiting nutrient for algae, cyanobacteria, and other aquatic plants in both fresh and brackish waters. While non-point source pollutants, such as phosphorus, can be difficult to quantify, the first step to controlling these inputs is to develop an understanding of their sources.

Method/Hypothesis

This study used spatial and statistical analysis to quantify and categorize non-point source phosphorus pollution as it relates to land use, slope, soil texture, and erosion potential in the Puget Sound region of the State of Washington.

Results/Implications

The resulting data were used to determine which land areas around Puget Sound are most likely to be a source of non-point source phosphorus pollution entering area streams. This analysis found that soluble reactive phosphorus loading to surface waters in the Puget Sound region is most likely to come from areas with an urban land use, moderately-steep slope, and “medium” erosion potential. Forested areas are least likely to contribute to soluble reactive phosphorus loads. Total phosphate loads were not correlated with any land use, slope, soil texture, or degree of erosion potential. In addition to spatial trends, temporal trends in non-point source phosphorus data were examined. Non-point source phosphorus loads were also shown to have a seasonal trend, with the lowest phosphorus loading occurring during the spring and highest during the wet, fall months.

Board Placement: 230

Agricultural and Natural Sciences

Abstract Submissions

Name: Edgard Jauregui

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Abstract Title: Intramolecular interaction of the Calcium/Calmodulin-dependent Protein Kinase (CCaMK) in *Medicago truncatula*

Principal topic

The calcium/calmodulin-dependent protein kinase (CCaMK) is an important effector protein of Ca²⁺/calmodulin-mediated signaling. CCaMK has been established as a critical regulator of plant-microbe symbioses. It contains a Ser/Thr kinase domain in its N-terminal, and two regulatory domains: a calmodulin-binding/autoinhibitory domain and a visinin-like domain. Recent studies have revealed the presence of two phosphorylation sites, S343 and S344, in CCaMK. Preliminary results suggested that these two phosphorylation sites are critical for an intramolecular interaction between the different domains of CCaMK.

Method/Hypotheses

Our published data revealed that S343D and S344D mutants were drastically compromised in their affinity to calmodulin (CaM), but our unpublished data indicated that the synthetic-peptides corresponding to the mutated CaM-binding domains are able to interact with CaM. These results led us to hypothesize that there is an intramolecular interaction involving S343 and S344, and other region(s), most likely the kinase domain of CCaMK, which is critical for its activity. In order to test this hypothesis, we created a series of progressive deletions in the CCaMK protein to determine the area in the kinase domain that interacts with these phosphorylation sites. The deletion mutants were subjected to calmodulin-binding assay to observe their recovery of affinity to calmodulin.

Results/Implications

The progressive deletion, along with calmodulin-binding assays, has revealed that there is an area of 50 amino acids that interacts with the phosphorylation sites S343 and S344. As expected, this area is located within the kinase domain, suggesting that the intramolecular interactions with the phosphorylation sites regulate the kinase activity of CCaMK.

Board Placement: 197

Agricultural and Natural Sciences

Abstract Submissions

Name: Benjamin Kilian

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Abstract Title: Detection of genome wide polymorphisms in *Prunus avium*

Principle Topic

Prunus avium represents a genetically narrow germplasm. At the gene sequence level, sweet cherry varieties are nearly identical while concurrently demonstrating remarkable variation in physical traits valued by the industry. These traits, including fruit size, color, and mature harvest window, can significantly impact product value. Growers need to be able to positively distinguish between varieties in order to predict those specific traits. We are interested in providing a timely, positive identification of unique genetic differences between closely related sweet cherry varieties.

Methods/Hypothesis

We hypothesize that combining sequence data with specific molecular biology techniques will allow us to identify genetic sequence (DNA) differences between closely related sweet cherry varieties. We used Target Region Amplification Polymorphism (TRAP) to identify differences between five sweet cherry varieties. The TRAP assay is a PCR-based technique using a known genetic sequence and multiple random sequences that are visually represented using a gel to display precise genetic differences between samples. Following TRAP, DNA bands were isolated, purified and the sequence data were comparatively analyzed among sweet cherry varieties.

Results/Implications

We implemented an approach to identify sequence differences based on the TRAP assay. This is an efficient and economical complementary approach to whole genome sequencing to identify specific genetic differences among closely related plant varieties. This method provides a framework from which molecular markers can be derived to distinguish between closely related varieties. This will allow sweet cherry growers to genetically verify their product to predict future outcomes and it can easily be adapted for use by plant breeders.

Board Placement: 35

Agricultural and Natural Sciences

Abstract Submissions

Name: Megan Lewien

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Abstract Title: EVALUATING THE ACCURACY AND EFFICIENCY OF CHLOROPHYLL FLUORESCENCE IMAGING FOR IDENTIFICATION OF HEAT TOLERANT WHEAT GERMPLASM

Principal Topic

Precise, accurate and rapid measurement of traits is important for the improvement of new plant varieties. Chlorophyll fluorescence imaging (CFI) can potentially improve selection in wheat breeding as it can be used to rapidly and non-invasively quantify photosynthetic performance and measure plant stress. Heat stress is becoming a major limiting factor to wheat production throughout the world, due in part to a reduction in photosynthetic capacity and associated yield.

Method/Hypotheses

The object of this study is to assess the advantages of using CFI for early detection of heat stress on wheat over standard evaluation methods. At the Washington State University Phenomics facility, CFI measurements were taken twice a day for 10 days under heat stressed conditions on eight elite spring wheat lines from the Pacific Northwest with variable levels of heat tolerance. Standard heat stress evaluations, including portable fluorometer and chlorophyll concentration measurements, were taken during the experiment as a means of evaluating CFI accuracy and efficiency.

Results/Implications

Both the CFI and portable fluorometer detected a rapid decline in photosynthetic yield after eight days of heat stress in the susceptible lines and a stable photosynthetic yield over the same period in the tolerant lines. CFI measurements indicated an increased photo-protective activity in the heat tolerant lines. Overall, there were no significant advantages to using CFI over standard heat stress evaluation methods. CFI is an accurate method for studying photosynthesis but is not recommended for efficiently selecting for heat stress in wheat breeding.

Board Placement: 52

Agricultural and Natural Sciences

Abstract Submissions

Name: Yu Ma

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Abstract Title: GENOME-WIDE SNP IDENTIFICATION, LINKAGE MAP CONSTRUCTION AND QTL MAPPING FOR MINERAL NUTRIENTS IN PEA

Principal Topic

The advent of next generation sequencing technology has expanded the capacity for high throughput single nucleotide polymorphism (SNP) development, trait mapping and marker-assisted selection (MAS) in many crops. This research focused on identification of SNP markers using genotyping-by-sequencing (GBS) in pea, construction of a high-density linkage map and comparative mapping with other closely related legumes, and identification of quantitative trait loci (QTLs) for seed mineral nutrient concentration and content.

Method/Hypotheses

We used GBS to generate genome-wide SNPs through universal network enabled analysis kit (UNEAK) software in an F6-derived recombinant inbred line (RIL) population. Using the SNPs and previously published SSRs, we constructed a linkage map through OneMap software and comparative maps with other legumes by pairwise alignment using the BLASTN algorithm. QTL analysis for all the traits was performed across two locations and conducted using composite interval mapping software.

Results/Implications

1609 high-quality SNP markers were discovered through GBS. 1683 markers including 75 previously published markers and 1608 SNP markers were mapped in a linkage map with a map size of 1310.1 cM. The highest level of synteny was observed with comparisons to the genome of *Medicago truncatula*. For the QTL study, 51 seed nutrient concentration QTLs, 53 seed nutrient content QTLs and 6 seed weight QTLs were identified. The QTLs explained from 2% to 43.3% of phenotypic variance. This study provides an important resource for development of a set of tools to enable MAS to increase levels of mineral nutrients in pea.

Board Placement: 107

Agricultural and Natural Sciences

Abstract Submissions

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Abstract Title: Genome-wide Association Mapping of Preharvest Sprouting Traits in PNW White Winter Wheat

Preharvest sprouting (PHS), the germination of grain on the mother plant under cool and wet conditions, is a reoccurring problem for wheat farmers worldwide. PHS susceptibility can lead to degradation of starch granules which results in low Falling Numbers (FN). Low FN grain produces poor quality bread and cakes. PHS susceptibility is also associated with lower seed dormancy. Too much seed dormancy can result in poor seedling emergence of winter wheat. Association mapping can help increase breeding efforts towards PHS tolerance by identifying genetic loci contributing to PHS-related traits in PNW germplasm. This study evaluated a panel of 469 white winter wheat cultivars and elite breeding lines. The panel was genotyped using the 90k SNP Illumina iSelect array and 25,968 polymorphic markers were identified. PHS tolerance was examined using two PHS-related traits: 1) spike wetting tests and 2) falling numbers. A mixed model analysis was used to obtain BLUPs for all of the PHS-related traits over 2-3 environments in Washington State and also to determine loci association. Association mapping was conducted using the GAPIT R package with principal component and kinship matrix analyses incorporated. The panel had three kinship groups based on the end-use class and breeding program of origin. Similar loci were identified in both the falling numbers and spike wetting tests. However, a large number of significant loci were only found in one test and not the other. Novel loci identified in this study can improve PHS tolerance in a breeding program through marker assisted selection.

Board Placement: 85

Agricultural and Natural Sciences

Abstract Submissions

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Abstract Title: The role of watershed properties in governing headwater catchment streamflow response to climate change

Headwater catchments are important sources of surface water supply, groundwater recharge and, thus, groundwater supply for agricultural activities in the Yakima River Basin (YRB, one of the most important agricultural basins in the western U.S). These catchments are vulnerable to projected climate change in future decades, particularly if their runoff is dominated by snowmelt. Recent regional studies projected climate change to cause continued decline in snowpack and earlier snowmelt resulting in low summer flow in streams. However, average large scale response to climate change might not be the same at smaller scales, when considering the differences in physical characteristics, such as soil and geology. The goal of this study is to assess how three headwater catchments in different parts of the YRB respond differently to climate change in terms of groundwater recharge and streamflow, and the extent to which these differences are due to physical properties, such as those that govern subsurface response. A Regional Hydro-Ecologic Simulation System (RHESSys) is used with statistically downscaled climate projections for the 2040s and 2080s from eight global climate models driven by two different representative concentration pathways, RCP4.5 and RCP8.5. Our preliminary results show that catchments having the least conductive soils and no contribution from deep groundwater is the least impacted by change in terms of timing of the peak and magnitude of change. Whereas the catchment that has contribution of deep groundwater experiences the most drastic change. This shows how vulnerable catchments that have their streamflow contributed by groundwater are under warming climate.

Board Placement: 217

Agricultural and Natural Sciences

Abstract Submissions

Name: Bodh Paudel

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Abstract Title: Soil Amendment with Green Manures and Seed Meals Improve Soil Health and Enhance Soil Microbial Activity in Potato and Douglas-fir

Principal Topic

Fusarium root rot is one of the most common soil borne diseases of conifer seedlings. This disease is a serious problem on many different species of conifers and generally occurs wherever bare root nursery stock is produced. Verticillium wilt in potato is one of the major threats in potato. Soil fumigation with methyl bromide/chloropicrin in Douglas-fir and metam sodium in potato has been major control tactics. Due to safety and environmental concerns, these chemicals have been increasingly restricted. The soil-borne pathogens must be managed for profitable production and more cost-effective and environment friendly management options are needed. This became a major concern to farmers in countries including US where it is used for the production of economically important crops including forest seedlings and vegetable. However, growers have continuously used it under critical use exemption. Consequently, finding alternatives has become crucial.

Method/Hypotheses

Organic soil amendments such as green manures (GM), composts, and brassicaceous crop residues are gaining interest for safer disease management via biofumigation and enhancement of soil and plant health. We hypothesized that one or more Brassica seed meals or green manure will reduce pathogens in soil and enhance soil health and beneficial organisms. Field studies in Washington State evaluated the effects of various GM and Brassica seed meal amendments on beneficial soil organisms and activities, as well as soil borne pathogens, in two different cropping systems. Treatments in the Douglas-fir study included selected Brassica GM and seed meals and those in the potato study included both brassicaceous and non-brassicaceous GM with four replications in randomized completely block design.

Results/Implications

In the Douglas-fir study, soil density of *Fusarium* spp. was significantly lower in *B. juncea* green manure (BjGM) (1.77 log CFU g soil⁻¹) compared to chemical fumigation (2.43 log CFU g soil⁻¹) and untreated control (2.55 log CFU g soil⁻¹); whereas the soil density of potentially antagonist *Trichoderma* spp. was greatest in fumigated plots (3.7 log CFU g soil⁻¹) followed by BjGM (3.42 log CFU g soil⁻¹). Dehydrogenase enzyme, an indicator of soil microbial activity, tended to be highest with GM treatments and lowest in fumigated soil in both Douglas-fir (0.73 µg TPF g⁻¹ hr⁻¹ in BjGM vs. 0.46 µg TPF g⁻¹ hr⁻¹ in control) and potato studies (1.63 µg TPF g⁻¹ hr⁻¹ in barley GM vs. 0.94 µg TPF g⁻¹ hr⁻¹ in control and 0.99 µg TPF g⁻¹ hr⁻¹ in fumigated soil). Mineralizable nitrogen content followed similar trends as dehydrogenase. In the potato study, both brassicaceous and non-brassicaceous GMs improved several indicators of soil health compared to control. The *B. juncea* GM before potato significantly contributed to N uptake and potato yield. The incorporation of brassicaceous and non-brassicaceous GM seemed to be a promising practice for long-term soil management in potato cropping systems. These studies also demonstrated that incorporation of GM improves soil microbial activity, N uptake and crop productivity. Green manure application can be considered as a component of crop management for improving soil productivity and N availability.

Board Placement: 152

Agricultural and Natural Sciences

Abstract Submissions

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Abstract Title: AtSR1 Regulates Plant Immunity through the Perception of Salicylic Acid

Principal Topic

Intracellular calcium transients play a fundamental role in plant immunity, through the regulation of salicylic acid (SA) biosynthesis via Ca²⁺/calmodulin (CaM)-dependent transcription factors such as signal responsive1 (AtSR1) and CaM-binding protein-likeG (CBP60g). However, whether Ca²⁺ signal transduction is also involved in SA signal perception is unclear.

Method/Hypotheses

Preliminary data indicated that an AtSR1-binding cgcg-box exists in the promoter region of NPR1, an SA receptor. We hypothesize that the Ca²⁺-mediated signal regulates the perception of SA signal through transcriptional control of NPR1. To test this hypothesis, disease resistance and related phenotypic changes were observed and interactions between the AtSR1 protein and DNA fragment in the NPR1 promoter were examined using electrophoretic mobility shift assay (EMSA) and ChIP-PCR.

Results/Implications

Disease resistance tests revealed that the growth of Pst DC 3000 in *atsr1* was reduced during PAMP-triggered-immunity (PTI), but there was a significant increase in the growth of the pathogen in *atsr1* during effector-triggered-immunity (ETI). The *npr1* and the *atsr1 npr1* double mutants were more sensitive to Pst DC3000 than the wild-type. Furthermore, in the double mutants, constitutive expression of PR1 and the dwarf-phenotype of *atsr1* were restored to wild-type levels. This suggests that AtSR1 regulates NPR1-dependent immune pathway. In addition, it was also observed that the transcription of NPR1 was negatively regulated by AtSR1. EMSA data indicated that AtSR1 interacts with NPR1 promoter fragment *in vitro*; this interaction is further confirmed in planta, using ChIP-PCR in AtSR1-2HA plant. These findings provide a novel mechanistic link coupling calcium signal to SA perception in plant immunity.

Board Placement: 98

Engineering and Physical Sciences

Abstract Submissions

Name: Baran Arslan

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Abstract Title: Nanoscale Interactions Measured between Lignocellulosic Biomass and Carbohydrate-Binding Module: The Effect of Surface Lignin Coverage on Nonproductive Binding

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The lack of fundamental understanding of the type of forces that govern how cellulose-degrading enzymes interact with lignin limits the design of new strategies for efficient conversion of biomass to bioethanol. Lignin content is recognized as the most influential substrate characteristic affecting the efficacy of enzymatic hydrolysis. Specifically, the inhibitory effects of lignin by physically blocking the enzyme accessibility to the substrate or by facilitating nonproductive binding to cellulases are known to be critical. In a step to improve our fundamental understanding of such interactions, nanoscale forces acting between the model cellulase carbohydrate-binding module (CBM) of cellobiohydrolase I (CBH I) and a set of model lignocellulosic substrates with controlled composition were measured using atomic force microscopy (AFM). Three pretreatment techniques were used to prepare the model substrates. These are kraft, sulfite and organosolv pulping methods. Our results indicated that the overall adhesion forces of biomass to CBM increased linearly with surface lignin coverage with kraft lignin showing the highest forces among lignin types investigated. It was also shown that hydrophobic and Lifshitz-van der Waals (LW) forces dominated the binding forces of CBM to kraft lignin whereas permanent dipole-dipole interactions and electrostatic forces facilitated the interactions of lignosulfonates to CBM. Our results indicated that the organosolv treated substrates were characterized by the least adherent forces to enzymes. This suggests that organosolv pretreatment can yield substrates with lower nonproductive binding of cellulases to lignin. Understanding how enzymes interact with lignin would allow protein engineers to design better enzymes for effective hydrolysis or researchers to develop unique pretreatment technologies to avoid nonproductive binding of cellulase to lignin by altering its structure and surface properties.

Board Placement: 96

Engineering and Physical Sciences

Abstract Submissions

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Abstract Title: A Novel Arterial Wick for Gas-Liquid Phase Separation

Principle Topics

Liquid-gas phase separation under microgravity conditions represents a challenge for Rankine-cycle nuclear power systems being considered for a manned Mars mission. Similar challenges are present in micro-scale electrochemical systems on Earth such as liquid-fuel fuel cells that generate CO₂ bubbles that need to be removed from small channels. We are developing a hydrophobic wick for the removal of bubbles from water. Similar systems could possibly be used to absorb oil drops from underwater leaks.

Hypotheses / Methods

An extension spring coated with a superhydrophobic layer can be used to absorb air bubbles of various sizes from water under varying flow conditions and gravity levels and transport the air to a constant-pressure reservoir. It is expected that the optimum bubble size for absorption will have a diameter on the same order as the channel diameter and that the channel can withstand industrially relevant flows on the order of 1 m/s. The novelty of the wick relative to other possible geometries has to do with the fact that the porosity constitutes a single connected spiral slot with an outer v-groove allowing bubbles to attach and spread rapidly over the surface, enhancing the rate of absorption. A high-speed imaging system is used to study the bubble absorption process.

Results/Implications

Efficient phase separation based on capillarity is possible with this static phase separation process. Preliminary results show a nearly complete absorption of a stream of bubbles with a flow rate of 100 mL/min by a 6 mm diameter channel.

Board Placement: 143

Engineering and Physical Sciences

Abstract Submissions

Name: Thomas Ferron

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Abstract Title: Spectral analysis of resonant scattering to quantify phase behavior in organic blends

Principal Topic

Carbon based materials have gained attention in recent years due to novel functionalities these systems allow. With benefits including chemically tunable optical and electronic properties, earth abundant materials, and easy manufacturing it becomes important to understand these materials on a fundamental level. However, with low levels of crystallinity, complicated three-dimensional structures, and low contrast traditional characterization techniques become less effective. Recent studies utilizing resonant x-rays have shown sensitivity to phase behavior, but a quantitative characterization is vital to correlate nanostructures to organic structure-function relations. Here we develop methodology and techniques to measure important morphological characterization of a model block-copolymer using absolute scattering intensity. Techniques are applied to popular organic solar cell blends to draw conclusions about morphology.

Method/Hypotheses

We hypothesize that by applying appropriate physical corrections we can recreate the phase diagram of a model block-copolymer by measuring absolute scattering intensities using Resonant Soft X-ray Scattering. Model block co-polymers with varying nanostructures and volume fractions are investigated. Signal corrections for complex fluorescence signals, non-spherical scattering patterns, and varying interfacial lengths are developed leaving a correlation between absolute scattering and volume fraction.

Results/Implications

A multi-domain analysis of spectrally resolved scattering was found to accurately measure domain volume fraction and composition for our model block co-polymer with applied physical corrections. Until now the ability to interpret complicated signals as a function of X-ray energy and scattering angle has been underdeveloped. This research will push our understanding of popular organic devices by developing a powerful technique to measure these complicated nanostructures.

Board Placement: 29

Engineering and Physical Sciences

Abstract Submissions

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Abstract Title: Synthesis of small molecule immunostimulants

For over a century now, vaccines have been one of the most important ways of combating and fighting against diseases. But the problem with pure recombinant or synthetic antigens in modern-day vaccines is that they are generally less immunogenic than older style live, killed or inactivated vaccines. There is need for safer and more effective adjuvants for human consumption, The imidazoquinoline compounds, of which the FDA approved imiquimod is a member have been proved to induce better immunogenicity compared to other adjuvants. It is due to this regard that in this research an imiquimod derivative will be combined with a specific antigen peptide to make a self adjuvanting vaccine. The synthesized imiquimod derivative will have a synthetic arm that will enable the attachment of the antigen peptide to make a self adjuvanting vaccine. It is also hypothesized that attaching several imiquimod residues to the antigen will elicit better immunogenicity. By targeting toll like receptors 7/8, it's proposed that the self adjuvanting vaccine will elicit the production of locally generated cytokine effectors that operate towards a Th1 cell mediated immune response. In turn, this generates cytotoxic effectors which will be exploited clinically in the treatment of viral infections. It is hoped that this synthetic immunostimulant will not only be safe for human consumption, but will also incite better and more effective immunogenicity in the treatment and prevention of infectious diseases like HPV, HIV and so forth.

Board Placement: 16

Engineering and Physical Sciences

Abstract Submissions

Name: Mohammed Amin Khamehchi

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Abstract Title: Anisotropic expansion dynamics of Bose-Einstein condensates with spin-orbit coupling

Quantum degenerate gases are atomic vapors cooled to temperatures of just few billionths of a degree above absolute zero. At these ultralow temperatures, a gas can undergo a phase transition and form a novel state of matter called a Bose-Einstein condensate (BEC). Over the past few years, technological advances, such as “dressing” the atoms with suitably tailored laser fields, have made it possible to exploit BECs for novel investigations of the fundamental foundation of nature. A central paradigm is that atoms have a dual nature, behaving as both particles and waves at the same time, which is described by the theory of quantum mechanics. In our lab at WSU we are conducting a series of experiments with BECs aiming at the characterization of this intriguing state of matter.

We present the observation of a surprising anisotropy of expansion, accompanied by the formation of dispersive shocks, when a BEC with spin-orbit coupling is released from an atom trap. Using laser cooling and related techniques, we first prepare a BEC that we confine in a focused laser beam. Additional lasers then induce a coupling between the spin (an internal degree of freedom) of the atoms and their motion. This so-called spin-orbit coupling plays a fundamental role in condensed-matter systems, and a detailed understanding of this coupling is of importance for a wide range of problems ranging from novel materials to spintronics. Our results demonstrate that BECs are a very powerful tool to investigate quantum mechanical phenomena in a precisely controllable setting.

Board Placement: 117

Engineering and Physical Sciences

Abstract Submissions

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Abstract Title: Analysis of CACC impact on self-organizing traffic jam

The main purpose of this research is to study the effects of increasing penetration rates of Cooperative Adaptive Cruise Control (CACC) vehicles on a traffic flow on roadways containing human-driven vehicles. From prior studies, they indicate that increasing ACC vehicle penetration rates triggers human-driven vehicles to easily make a self-organized traffic jam on roadways. By using extra information available to CACC vehicles, we might be able to avoid the situation at high penetration rates and result in improved traffic flow, reduced emissions, and smaller travel time delays.

The main hypothesis of the research is that the information from CACC vehicles may reduce the chances forming self-organized or phantom jams. The information content may have positions and velocities of platoon's leader including several neighboring vehicles. Also, it may include distant information of traffic flow states available from connected infrastructure elements.

In this paper, the dynamics of self-organized jams are modeled as a stochastic aggregation process via the master equation. The results are expected to indicate that CACC results in significantly better traffic flow conditions and a reduced chance of human driver-triggered self-organized jams, as compared to ACC vehicles.

Board Placement: 50

Engineering and Physical Sciences

Abstract Submissions

Name: Morteza Mehrnoush

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Abstract Title: Turbo-Equalization for Two Dimensional Magnetic Recording

Principle Topics

Magnetic recording technology is approaching the limit of the data storage density on magnetic disk with one-dimensional data tracks. Two-dimensional magnetic recording (TDMR) is a newly proposed technology that utilizes read and write-head designs together with novel signal processing and coding techniques to increase the storage density on magnetic disks. TDMR is likely to be available more quickly than alternative emerging technologies like heat-assisted-magnetic-recording (HAMR), which require the recording medium to be redesigned.

Method/Hypotheses

The main problems in TDMR which are affecting the data bits while writing on and reading back from the disks are: two-dimensional intersymbol-interference (2D-ISI), noise, and overwrite effect. To deal with these problems, we propose a coding and signal processing system. In transmitter part of proposed system, we use channel encoding to make the data resistive to TDMR channel model. In receiver, we use 2D-ISI detector with a decoder in a turbo-equalization approach. 2D-ISI detector remove the 2D-ISI and noise problems and encoder/decoder removes the overwrite effect.

Results/Implications

The results show that our proposed system compared to the results in literature achieves a storage density improvement of 0.6 Terabits/in² and 16.4(dB) SNR improvement for one iteration. By doing several iterations between 2D-ISI detector and decoder, 1.3(dB) SNR improvement compared to one iteration is achieved. The best achieved storage density in proposed system is 8.8 Terabits/in² at SNR=11.6(dB). This storage density is close to the goal of 10 Terabits/in² set for TDMR, which is an order of magnitude better than the best commercially available systems.

Board Placement: 30

Engineering and Physical Sciences

Abstract Submissions

Name: Jorge Pires

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Abstract Title: Two Dimensional ISI/ICI Equalization for Multicarrier Communication over Shallow Underwater Acoustic Channels

The Shallow Underwater Acoustic Channel (SUAC) presents challenges for achieving reliable communication. Multipath introduces Inter Symbol Interference (ISI) in the time domain. Doppler spread causes Inter Carrier Interference (ICI) in the frequency domain. These effects make the channel prone to bit errors. Therefore, transmission of information relies on digital signal processing. We have developed an iterative row-column ISI/ICI equalizer which exploits the two dimensional interference model to correct bit errors, using a trellis algorithm to derive bit probabilities which are passed to a channel decoder.

The SUAC is used by Autonomous Underwater Vehicles (AUVs) for underwater exploration and mine defusing. Another application is aquatic environment monitoring with underwater sensor networks.

We base our research on the paper by S. Das and P. Schinter "Max-SINR ISI/ICI- Shaping Multicarrier Communication over the Doubly Dispersive Channel". We replicate their results using a MATLAB software simulation. Utilizing an Iterative Maximum Likelihood Equalizer (IMLE), they achieve a Bit Error Rate (BER) of 10^{-3} for a Signal to Noise Ratio (SNR) of 10 dB. Our hypothesis is that, given that the IMLE is suboptimal, the performance of the system can be improved with our ISI/ICI equalizer.

Previous work has shown that the ISI/ICI equalizer provides a performance within 0.1 dB of the theoretical limit for the averaging channel. We anticipate that, applying this novel approach to the SUAC, will result in substantial performance improvement, and thus, better power efficiency. This is important for AUVs and sensor networks, which often have a limited power supply.

Board Placement: 109

Engineering and Physical Sciences

Abstract Submissions

Name: Violet Poole

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Abstract Title: Strange Conductivity of Strontium Titanate

Strontium titanate is a complex oxide semiconductor with many interesting properties, such as superconductivity and magnetoresistance. Many properties depend on the type and amount of defects in a sample, which are altered by annealing. SrO annealed samples show persistent photoconductivity (PPC) at room temperature. This means that the resistivity drops significantly when exposed to blue light and persists for days without decay.

In this work we are optimizing the annealing conditions that lead to PPC, by making it a three step process: 1) Vacuum anneal, 2) SrO anneal, 3) Open-air anneal. The vacuum anneal introduces oxygen vacancies which has been previously shown to be necessary for PPC. The SrO anneal causes PPC and the open air anneal removes excess charge carriers.

Resistivity and other electrical measurements, such as carrier type, are conducted with Hall-effect measurements. Infrared, ultraviolet and visible spectra were also taken since certain changes can be seen here after an annealing step or during light exposure.

We have found that the amount of SrO powder used is important. Additionally the open air anneal acts as an eraser of PPC. By removing excess charge carriers prior to Hall measurements we see a possibly weakly p-type material before illumination, as seen with two different types of electrical contacts. While this result could be a surface or interface effect, p-type doping would be an important achievement for complex oxide materials.

Board Placement: 145

Engineering and Physical Sciences

Abstract Submissions

Name: Begum Rabeya Rushi

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Abstract Title: The Impacts of Columbia River Treaty Scenarios on Agriculture, Hydropower Production and Flood Risk in a Future Climate

Principal Topic:

The Columbia River Treaty (CRT), a treaty between the U.S. and Canada, ratified in 1964. For proper operation of dams in the upper Columbia River for flood control and hydropower benefits the CRT is now a functional agreement between these two countries. Starting from 2024, U.S. or Canada can terminate or bring changes in the Treaty provisions with a 10 year advance notice leading to potential changes in reservoir operations and water resource availability. In addition, climate change also has a great influence on Columbia River hydrology and water resources.

Method:

The objective of this study is to assess the impact of possible changes in the CRT on agriculture, flood control and hydropower production under projected climate change scenarios. A reservoir operation modeling tool, known as the Columbia River Simulation Model (ColSim), is utilized for simulating reservoir operations. Streamflow inputs to ColSim are obtained from a coupled land surface hydrology and cropping systems model known as VIC-CropSyst implemented on 1/16th degree resolution at a daily time-step. This coupled model is also applied to estimate agricultural demand and this demand is compared to the legally-available water supply under different treaty and climate change scenarios for impact assessment.

Results and Implications:

Our study shows flood protection, hydropower generation and agricultural production are mostly impacted under different CRT scenarios. There is a possibility of 32% increase in release and eventually it will decrease 19% in August and 16% in September for post-treaty scenario due to Change in Minimum Flow Target during the spring (April –June) (85-100 Kcfs) at Lower Granite Dam. For hydropower, there is only 44% increase in July, but during other months it will decrease gradually. This study also comes up with a supply-demand analysis of available water and identification of those locations where less water become available for agriculture and where water is already highly allocated. . This study will be a helpful tool for the resource managers to deal with future uncertainties in water availability, especially during the summer due to changes in the treaty.

Board Placement: 153

Engineering and Physical Sciences

Abstract Submissions

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Abstract Title: Life Extension of Li-Ion Batteries by Micro-Additive Manufacturing of Meso-porous Electrode Materials

It has been shown that the 3D porous anode material can improve the Li diffusion rate and performance due to providing shorter diffusion path to the internal portion of electrode, higher surface area, and aiding the diffusion stress relaxation by providing more space for lithiation expansion. Building and shaping a porous structure in micro scales is a key challenge in this process. In this study a new approach of direct micro-additive manufacturing has been presented which is capable of building structures with controlled porosity of nano to micro-scales. By using the aerosol jet printing technology some mesoporous structures have been fabricated in different 3D geometries and variety of materials. Beside all the conventional advantages of additive manufacturing (such as low waste materials, no harmful subtractive solvents, complex geometries, etc), gradually graded composition, low binder fraction in the deposited material, and the capability of printing on flat or curved surfaces are the most important advantages of the proposed method.

An aerosol jet direct micro-additive method as well as different sintering methods has been demonstrated to create the 'breathing' porous structures with the feature sizes controlled to greater than two orders of magnitude - from 200 nm to 100 um. Different sintering methods have been applied to cure the green fabricated structure and improve the electron transportation through the electrode material and build the nano-porosity as the second level of porosity. High power photonic flashes, laser beam, and heat have been utilized as energy sources and the microstructure of cured material has been characterized and compared by SEM, fluorescence microscopy, electrical properties measurements, and battery cell performance.

Board Placement: 119

Engineering and Physical Sciences

Abstract Submissions

Name: Anish Shivaram

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Abstract Title: In vivo response of laser processed porous titanium implants for load-bearing implants

Titanium (Ti) based load bearing implants like hip and knee prosthesis tend to fail in 10-15 years and one of the main reasons for the failure is due to poor interfacial bonding between the bone and the implant surface. One way of improving the in vivo life of the implant is by having a porous metal coating on the implant surface. In this work, porous titanium implants, with 25 volume% porosity, were fabricated using Laser Engineered Net Shaping (LENS™) to measure influence of porosity in bone tissue integration in vivo. Surfaces of the LENS™ processed porous Ti implants were further modified with TiO₂ nanotubes to improve cytocompatibility of these implants.

We hypothesized that interconnected porosity created via additive manufacturing will enhance bone tissue integration in vivo. To test our hypothesis, in vivo experiments using distal femur model of male Sprague-Dawley rats were performed for a period of 4 and 10 weeks. The objective of this study was to understand the effects of porous titanium implants, with and without surface modification, towards interfacial bonding in vivo between implant and bone-tissue. In vivo samples were characterized via micro-computed tomography (CT) and histological imaging, scanning electron microscopy, and mechanical push-out tests. Our results indicate that porosity played the most important role to establish early stage osseointegration forming strong interfacial bonding between the porous implants and the surrounding tissue, with or without surface modification.

Board Placement: 47

Engineering and Physical Sciences

Abstract Submissions

Name: Nick Treat

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Abstract Title: Drawing Inspiration from Nature to Develop Sustainable Solar Energy Production Systems

At WSU the McHale research group focuses efforts into studying the molecular behavior of light harvesting aggregates to develop a sustainable approach to growing energy demands. Most recently these efforts have focused on dye sensitized solar cells (DSSCs) constructed with natural betalain pigments as the light-harvesting component. By utilizing dyes produced by nature to protect plants from light induced stress we take a nature-inspired approach to energy research. Specifically, the fundamental properties of the pigments are studied by spectroscopic techniques. By characterizing the potential of these pigments for DSSC applications we gain an understanding of the methodologies that can be taken to improve upon existing DSSC technologies. Recently, our group has shown that aggregates of betanin form on the surfaces of the titanium dioxide films used in DSSCs. These aggregates show a dramatic increase in light harvesting efficiency by broadening the spectrum of the dyes. Utilization of this aggregate effect has allowed us to produce a DSSC with 3% total energy conversion efficiency; a record for natural dye based DSSCs. Improvement of a DSSC's performance by inducing aggregation is an unprecedented occurrence as aggregation of dyes has been shown on many occasions to impede performance.

Board Placement: 175

Engineering and Physical Sciences

Abstract Submissions

Name: Jie Xu

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Abstract Title: Evaluation of thermal resistance of fresh and freeze-dried *Enterococcus faecium* NRRL B-2354 in wheat flour using both TAC and TDT cells

Salmonella outbreaks in low-moisture foods have created great concerns among consumers, research communities and food processing industry. *Enterococcus faecium* NRRL B-2354 is considered as an effective surrogate microorganism against *Salmonella* for validation of thermal processing technologies and systems. Thermal inactivation studies can be influenced by factors that are intrinsic and/or extrinsic to the bacterial pathogens. The objective of this research is to evaluate two factors, namely, the pre-inoculation history of bacteria (intrinsic) and water activity (a_w , extrinsic) on the thermal resistance of *E. faecium* NRRL B-2354.

Organic wheat flour was inoculated with of fresh (1010 CFU/g) and freeze-dried (1013 CFU/g) *E. faecium* NRRL B-2354 culture, separately, and conditioned to a_w 0.45 with final bacterial populations 108 CFU/g after equilibration. Inactivation studies were conducted at 80°C using TAC and TDT cells in parallel. The TAC cell was able to maintain a constant a_w , while the TDT cell maintained a constant sample moisture contents while allowing the elevation of a_w during the heating treatment.

Thermal resistance of *E. faecium* NRRL B-2354, as reflected by $D_{80^\circ\text{C}}$ values, in TDT cells (5.56 ± 0.49 min for fresh and 5.67 ± 0.62 min for freeze-dried bacteria) were lower than those in TAC cells (10.22 ± 0.97 min for fresh and 8.62 ± 0.96 min for freeze-dried bacteria), which is likely a result of the increased a_w in wheat flour (from 0.45 to 0.70) when heated from 23 to 80°C. Irrespective of the cells used, freeze-dried *E. faecium* NRRL B-2354 in wheat flour showed a similar thermal resistance compared with fresh bacteria, while maintaining a higher thermal resistance than that of *S. Enteritidis* PT30. The results of this study suggest that freeze-dried bacteria may provide stable inoculum that eliminates the influence of bacterial intrinsic factors on the thermal resistance performance. Given that the freeze-dried bacteria have a long-term persevered property, and it may provide a convenient culture to develop a standard protocol for validation of thermal processing in the future.

Board Placement: 234

Engineering and Physical Sciences

Abstract Submissions

Name: Congyi Zhang

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Abstract Title: MODELING RETAINING STRUCTURES IN 2D FEA USING BEAM-SOLID CONTACT ELEMENT

Principal Topic

Retaining structures are widely used on highways and sidewalks, and it is crucial to assess their abilities to sustain extreme weather conditions and natural hazards. To tackle this issue, we model cantilever retaining walls and adjacent soil with different properties, using FE software OPENSEES, under static loading and earthquake induced dynamic loading. The simulated results would be compared with theoretical results to test the FE model's capability.

Method/Hypotheses

Beam-Solid contact element has been implemented into OPENSEES capturing frictional stick-slip and gapping behavior between soil and structure. This element has been used in some sheet pile before, however, it has not yet been applied to cantilever retaining walls. Besides, this element is primarily used in static loading cases, and rarely used in dynamic loading cases. In this project, we would not only further explore the functions of this element, meanwhile parametric study on wall heights, soil types also be conducted to verify the robustness of this element.

Results/Implications

The beam-solid contact element makes modeling of interaction between structure and soil much easier, and the modeling results should match the theoretical ones. This model should shed some light to the geotechnical engineering design code, and later help engineers to design better fundamental structures, more significantly it would help us understanding structures in sever earthquakes as we are experiencing more and more these days.

Board Placement: 80

Medical and Life Sciences

Abstract Submissions

Name: Laura Ahlers

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Abstract Title: Characterization of the Innate Immune Response to the West Nile Virus subtype Kunjin Virus

Principal Topic

Arthropod-borne viruses, or arboviruses, such as West Nile virus, Dengue virus, and Chikungunya virus, have been the cause of several worldwide epidemics. West Nile virus, which is a species of flavivirus, appeared in the United States in 1999 and is now the leading cause of domestically acquired arbovirus infection. Importantly, there is an ongoing epidemic of another flavivirus, called Zika virus, in Central and South America with recent spread to the UK. Although arboviruses impact populations across the globe, treatment and vaccination options are limited. To fill this need, we seek to understand the innate immune response to arbovirus infection.

Method/Hypotheses

Innate immune response pathways are evolutionarily conserved between diverse species, which allows disparate phyla to similarly respond to viral challenge. While previously known to infect arthropods, our lab has discovered that Insect Iridescent virus-6 (IIV-6) is able to infect both insect and mammalian hosts. We hypothesized that the mammalian immune response to IIV-6 will be protective against subsequent arbovirus infections. In this work we showed that a robust immune response is initiated through an RNA-sensing pathway in mammalian cells during infection with IIV-6. Functionally, we determined that IIV-6 primes an immune response in mammalian cells that restricts subsequent flavivirus infection.

Results/Implications

Our work suggests that insect viruses can be used to activate the innate immune response of mammalian cells for subsequent arbovirus infections. Taken together, this work has implications for the development of vaccines and therapeutics specific for arboviruses, such as West Nile and Zika virus.

Board Placement: 179

Medical and Life Sciences

Abstract Submissions

Name: Estela Arciniega

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Abstract Title: Leydig cell gene expression changes with the cycle of the seminiferous epithelium in the mouse.

Principal Topic:

In the U.S., 15% of couples suffer from infertility and 50% of those cases are attributed to male factors. Enhancing our understanding of sperm development (spermatogenesis) will allow for the development of novel treatments for infertile men. It is known that androgens, produced by Leydig cells, and retinoic acid (RA) are both needed for spermatogenesis. Our laboratory has demonstrated that RA levels fluctuate in a cyclic manner, but it is unknown whether Leydig cell function also cycles.

Method/Hypotheses:

We hypothesized that Leydig cells display cyclic changes in gene expression. To investigate this, we utilized a novel transgenic mouse line that enabled the isolation of RNA specifically from Leydig cells at different points during sperm development and performed microarray analyses. This experimental design allowed for the examination of gene expression events within Leydig cells across a complete RA cycle within the testis.

Results/Implications:

We identified 2,687 genes that were enriched by more than 1.5-fold within Leydig cells when compared to total testis RNA isolations. From this list, 36 genes were found to display cyclic expression profiles, with a statistically significant 2-fold change when compared by ANOVA, matching the progression of spermatogenesis. Interestingly, this list included the steroidogenesis gene *Cyp21a1* and the cholesterol metabolism gene *Cyp7a1*, both associated with androgen production. This study has, for the first time, mapped Leydig cell gene expression across spermatogenesis and inferred that Leydig cell function may be cyclic. Suggesting that the cyclic Leydig cell gene expression may be contributing to the regulation of spermatogenesis.

Board Placement: 53

Medical and Life Sciences

Abstract Submissions

Name: Kim Lam Chiok

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Abstract Title: Overexpression of catalytically inactive KsgA in Salmonella Enteritidis impairs in vitro growth fitness and infection of macrophages

Dimethyl adenosine transferase (KsgA) is a universally conserved, but non-essential ribosomal biogenesis factor that provides adequate packing interactions in the small (30S) ribosomal subunit for optimal maturation, assembly and function of the ribosomal complex. Deficiency of KsgA appears to have disparate effects on growth of different bacteria; however its role in bacterial pathogenesis is poorly understood. The aim of this study was to elucidate the role of KsgA in molecular pathogenesis of Salmonella Enteritidis (SE).

We used overexpression of catalytically inactive KsgA (KsgA-E66A), which lacks dimethyltransferase ability and remains strongly attached to 30S, as a model to evaluate the role of KsgA in pathogenesis of SE in vitro. In vitro pathogenesis was assessed through: i) growth fitness at avian and mammalian body temperatures in nutrient rich and high osmolality conditions, ii) invasion of human enteric cells (caco-2), and iii) invasion and intra-macrophage survival in human (THP-1) and avian (HD-11) macrophages.

Over-expression of E66A in both wild-type and KsgA deficient SE resulted in (i) changes in colony morphology characterized by small, opaque colonies with wrinkled dry surface and irregular borders with significantly impaired growth fitness in both nutrient rich and high osmolarity conditions, and (ii) significant reduction in invasion of human enteric cells as well as impaired intra-macrophage survival in human and avian macrophages. Electron microscopy revealed that overexpression of E66A results in impaired outer membrane integrity indicating potential defects in membrane biogenesis. KsgA is a feasible target to develop new antimicrobials or immunoprophylactics for control of Salmonella.

Board Placement: 73

Medical and Life Sciences

Abstract Submissions

Name: Mert Colpan

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Abstract Title: Localization of Leiomodin Binding Site on Tropomyosin Suggests a Molecular Basis for Cardiomyopathy-Associated Mutation K15N in Tropomyosin.

Principal Topic

Contraction in cardiac muscle cells results from the sliding of the overlapping thick and thin filaments in sarcomeres. The correct organization and length of the thin filaments are of crucial importance for proper function of cardiac muscle. Three proteins, striated muscle α -tropomyosin, (Tpm1.1), leiomodin-2 (Lmod2) and tropomodulin-1 (Tmod1), are known to interact at the slow-growing end of thin filaments and regulate their length in cardiac muscle.

Method/Hypotheses

The development of some dilated cardiomyopathies (DCM) correlates with the presence of mutations in Tpm1.1, which still lack molecular explanations. Establishing details of molecular interactions between Tpm1.1, Lmod2 and Tmod1 may shed light on molecular mechanisms behind the development of these cardiomyopathies.

We used nuclear magnetic resonance spectroscopy to localize the binding interface between Tpm1.1 and Lmod2. We found that 21 N-terminal residues of Tpm1.1 are involved in interactions with residues 7-41 of Lmod2. The K15N mutation in Tpm1.1, known to be associated with familial DCM, is located within the newly identified Lmod2 binding site of Tpm1.1. We studied the effect of this mutation on binding Lmod2 and Tmod1 using circular dichroism spectroscopy.

Results/Implications

The K15N mutation reduced binding affinity of Tpm1.1 for both Lmod2 and Tmod1. Our results demonstrate a molecular rationale for the development of K15N-associated familial DCM. K15N mutation in Tpm1.1 may reduce the localization of Lmod2 and Tmod1 to the pointed end of thin filaments due to the decreased binding affinity for Tpm1.1. This may lead to formation of thin filaments with improper lengths and result in cardiomyopathies.

Board Placement: 218

Medical and Life Sciences

Abstract Submissions

Name: Sara Dumit

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Abstract Title: Modeling Pu decorporation therapy following occupational exposure.

Principal Topic

High levels of exposure to actinides can cause severe health effects. Individuals with significant internal contamination typically undergo treatment with chelating agents to accelerate urinary excretion and thus decrease radiation dose to sensitive tissues. The US Transuranium and Uranium Registries (USTUR) studies actinide biokinetics and tissue dosimetry by following up occupationally exposed workers. These studies are fundamental to improving the reliability of, and confidence in, radiation dose and risk assessment methods.

Method/Hypotheses

By linking radiation exposure history, bioassay results, and medical data with post-mortem measurements of actinides in the human body, we aim to develop and parameterize a biokinetic model for plutonium decorporation therapy. USTUR Case 0785 was selected for this study. This individual was exposed to plutonium via inhalation and wounds due to an explosion at his workplace, and underwent chelation treatment. Worksite personnel estimated his systemic deposition at 7,400Bq. Bioassay and tissue analysis data from this case were evaluated using IMBA Professional Plus® and SAAMII® software packages. The proposed model will be tested for various exposure scenarios.

Results/Implications

The Pu-239 whole-body activity at the time of death, estimated from tissue radiochemical analysis, was 2,777Bq. Of these, 69.7% was deposited in the skeleton, 21.7% in the liver, and 6.5% in the respiratory tract. The results confirmed that internal deposition of plutonium was caused by inhalation and wound intake, and provided additional information on material solubility type. This information will be used for modeling decorporation therapy. The results of this project are important to further optimization of actinides decorporation treatment.

Board Placement: 2

Medical and Life Sciences

Abstract Submissions

Name: Jacob Elder

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Abstract Title: SALMONELLA PATHOGENICITY ISLAND 13 CONTRIBUTES TO PATHOGENESIS IN MICE BUT NOT IN CHICKENS

Principal Topic

Salmonella enterica serovar Enteritidis (S. Enteritidis) is a human and animal pathogen that causes gastroenteritis characterized by inflammatory diarrhea and occasionally an invasive systemic infection. Salmonella pathogenicity islands (SPIs) are horizontally acquired genomic segments known to contribute to Salmonella pathogenesis. The objective of the current study was to determine the contribution of SPI -13 and -14 to S. Enteritidis pathogenesis.

Method/Hypotheses

We deleted SPI-13 (Δ SPI-13) and SPI-14 (Δ SPI-14) from the genome of a S. Enteritidis strain isolated from a patient during an egg-associated outbreak. A strain with both islands deleted (Δ SPI-13/14) was also generated for mouse infection experiments. The kinetics of infection of the wild-type (WT) parent and the mutants were compared in orally inoculated chickens and mice. The degree of intestinal inflammation and the survival within avian and murine macrophages were also determined.

Results/Implications

The deletion of the SPI-13 resulted in impaired infection kinetics of S. Enteritidis in mice which was characterized by significantly lower ($P < 0.05$) colonization of the ceca, liver and spleen, impaired ability to induce intestinal inflammation and reduced survival within murine macrophages. These phenotypes were only observed with Δ SPI-13 and Δ SPI-13/14, not Δ SPI-14. There were no significant differences in the infection kinetics between WT and the tested mutants in chickens and the survival within avian macrophages remained unaltered. The results of this study show that SPI-13 contributes to the pathogenesis of S. Enteritidis in mice but not in chickens and raises the possibility that SPI-13 may play a role in pathogenesis and the host adaptation/restriction of Salmonella serovars.

Board Placement: 57

Medical and Life Sciences

Abstract Submissions

Name: Rachel Hegedus

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Abstract Title: Predicting Low Dose Aspirin Responsiveness of Healthy Dogs In vivo Using In Vitro Assessment of Platelet Aggregometry

Principal Topic:

Aspirin is a cyclooxygenase enzyme inhibitor that prevents the synthesis of prostaglandins involved in blood clotting. At low doses aspirin is used to inhibit platelet function and ultimately clot formation. Some human patients appear non-responsive to these antiplatelet effects, termed “aspirin resistance.” This phenomenon has been identified in dogs. Accurately predicting aspirin response could prevent inappropriate drug therapy and help prevent devastating thrombus formation in otherwise treatable diseases.

Hypothesis:

Aspirin responsive dogs will demonstrate 50% inhibition of platelet aggregation (EC50) at a minimum of one aspirin incubation concentration in vitro. Complete inhibition of aggregation in all dogs will occur at levels comparable to high dose aspirin. In vivo low dose aspirin administration will produce an EC50 at concentrations comparable to the in vitro aspirin concentration.

Methods:

Twenty client-owned healthy dogs were utilized. Whole blood was incubated with six escalating concentrations of aspirin and aggregation was measured using a Multiplate® analyzer. The same dogs received a single dose of 1 mg/kg aspirin orally and aggregation was assessed at baseline, 20 minutes, 40 minutes, and 3 hours after administration.

Results/Implications:

Calculation of an in vitro EC50 allowed dogs to be separated into four different response groups. Sixteen were aspirin responders, 2 variable responders, 1 poor responder, and 1 non-responder. In vivo aspirin dosing did not cause measureable inhibition of aggregation after one dose. This study suggests individual variation in aspirin response does exist in dogs. Further research looking at higher oral doses and plasma salicylic acid concentrations is warranted.

Board Placement: 221

Medical and Life Sciences

Abstract Submissions

Name: Tegan Horan

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Abstract Title: The kids are (not) alright: multigenerational estrogen exposure disrupts meiosis and reproductive tract morphology in male mice

Principal Topic

There is growing concern about the long-term effects of environmental contaminants on reproductive health. Existing data from clinical and experimental studies indicate a link between exposure to endocrine disrupting chemicals (EDCs) and declining male fertility. Recently, our laboratory found that brief estrogenic exposures coinciding with the establishment of the male germ stem cell population permanently decreases meiotic recombination in all descendant spermatocytes.

Method/Hypotheses

Because genetic and epigenetic changes to the germ cell can be passed from parent to offspring, we hypothesize that estrogen-induced dysregulation of meiotic recombination is heritable. Moreover, we suspect that subsequent developmental exposure in successive generations may exacerbate the effect. Using outbred mice, we have devised multi- and transgenerational exposure paradigms in which three successive generations (F0-F2) of males are treated with either ethinyl estradiol or placebo.

Results/Implications

Our results indicate transgenerational inheritance of an ancestral exposure effect in unexposed grandsons in all estrogen-exposed lineages. Additionally, one family shows an additive effect of multigenerational exposure in F1 and F2 estrogen-exposed sons. In most families, meiotic recombination rate negatively correlates with the accumulation of estrogenic insults across generations. Moreover, multiple exposures across subsequent generations increased the incidence of meiotic errors that would result in spermatocyte elimination. These data provide insight into the link between reduced sperm counts and developmental estrogenic exposures. Unexpectedly, we observed defects in reproductive tract morphogenesis, particularly the vas deferens, associated with multiple exposures. Overall, this study demonstrates that continual exposure to EDCs in mammals poses serious threats to male reproduction and fertility.

Board Placement: 174

Medical and Life Sciences

Abstract Submissions

Name: Kimberly Lackey

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Abstract Title: Microbiome of milk produced by women living in a leprosy-endemic region of the Central African Republic

Principal Topic Human milk contains myriad bacteria, and understanding human milk microbiome (HMM) variability is likely important to optimizing global infant health. Our long-term objective is to determine if variation in the HMM protects against and/or promotes infectious disease during infancy.

Methods/Hypotheses The goals of this study were to document the HMM in a leprosy-endemic region of the Central African Republic (CAR), and determine if *Mycobacterium leprae*, the causative agent of leprosy, is present in milk produced by uninfected women living in this region. DNA was extracted from milk (n = 47), and the V1-V3 region of the microbial 16S gene amplified and sequenced. Milk was also analyzed for presence of *M. leprae* using a newly developed sample preparation protocol and qRT-PCR assay. Our main hypotheses were that the CAR milk has a different microbial membership than milk previously collected in the US, and *M. leprae* would be present in some of the milk collected in the CAR.

Results/Implications The most abundant genera in CAR milk were *Streptococcus*, *Staphylococcus*, *Veillonella*, *Corynebacterium*, and *Rhodococcus*; some genera (e.g., *Corynebacterium*, *Rhodococcus*, and *Hafnia*) were more abundant ($P < 0.05$) in CAR than US milk. *Mycobacterium* species were present in 16 of the CAR samples, but none contained *M. leprae*. Whether *M. leprae* is present in milk produced by leprosy-infected women remains unknown. To our knowledge, this is the first comprehensive report of the HMM in any African population, and the first to use molecular methods to investigate *M. leprae* in human milk.

Board Placement: 88

Medical and Life Sciences

Abstract Submissions

Name: Shuxiang Liu

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Abstract Title: Isothermal inactivation of Salmonella and Enterococcus faecium in dates impacted by water activity variation at elevated temperature

Temperature and water activity (a_w) are known factors highly affecting the thermal inactivation of Salmonella in low-moisture foods; however, the influence of a_w at elevated temperatures on thermal resistance of Salmonella and its surrogate Enterococcus faecium in dates is not yet available.

The objectives are (1) to compare thermal resistance of Salmonella Enteritidis PT30 (S. PT30) and E. faecium on date surfaces, and (2) to understand the relationship between temperature-induced changes in a_w and thermal resistance of Salmonella.

Dates were inoculated with E. faecium or S. PT30 and equilibrated to different a_w , 25°C (0.30, 0.45) to establish 8.5 ± 0.2 CFU per 2×2cm cubes. The samples were vacuum-sealed in thin plastic bags, heated isothermally at 75, 80 and 85°C, then cooled and enumerated to obtain D values. Equilibrium water sorption isotherms (moisture content vs. a_w) for dates at 20 to 80°C were generated using a vapor sorption analyzer and a thermal cell with relative humidity sensor.

E. faecium showed equal or higher thermal resistance than S. PT30 at all a_w levels (e.g. at $a_w, 25^\circ\text{C} = 0.45 \pm 0.02$, 80°C, DE. faecium = 4.22 ± 0.72 min, DS. PT30 = 2.60 ± 0.42 min). A flat isotherm curve was observed for dates before $a_w, 25^\circ\text{C} = 0.5$, indicating constant moisture content and same a_w at elevated temperatures. It may explain the same D values with different initial a_w (e.g. For, E. faecium, $D_{85^\circ\text{C}, a_w, 25^\circ\text{C} = 0.30} = 1.64 \pm 0.86$ min, and $D_{85^\circ\text{C}, a_w, 25^\circ\text{C} = 0.45} = 1.60 \pm 0.80$ min).

Improved understanding of the relationship between temperature-induced changes in a_w of dates and the thermal resistance of Salmonella and E. faecium is critically important in designing and validating thermal processing for ensuring dates' safety.

Board Placement: 91

Medical and Life Sciences

Abstract Submissions

Name: Alexis Mickelson

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Abstract Title: EFFECT OF HYPERTROPHIC CARDIOMYOPATHY MUTATION, A28V IN CARDIAC TROPONIN T, IS DIFFERENTLY MODULATED BY PHOSPHORYLATION AND MYOSIN HEAVY CHAIN ISOFORMS

Principal Topic

Hypertrophic cardiomyopathy (HCM) is a disease that leads to sudden cardiac death in humans. How HCM-related mutations lead to disease is poorly understood because of lack of: 1) suitable animal models and; 2) understanding of how phosphorylation of contractile proteins affects mutation-mediated effects. A commonly-used mouse model expresses the faster α -myosin heavy chain (MHC) isoform because it supports faster heart rates. Humans express the slower β -MHC isoform because it supports slow heart rates. A point to note is that the kinetic property of a MHC isoform affects the functional outcome of other contractile proteins.

Method/Hypotheses

We hypothesized that the mutation-mediated effect is differentially modulated by α -/ β -MHC isoforms and that such effects are further altered by phosphorylation of contractile proteins. We studied the human A28V mutation in cardiac TnT (TnT) by reconstituting the mouse analog, TnTA30V, into fibers from normal mouse (α -MHC) and genetically-modified mouse (β -MHC) hearts. We used a mutation (TnTT203E) to mimic the effect of phosphorylation in TnT; TnTT203E+A30V was reconstituted into fibers containing either α - or β -MHC. Calcium-activated force was measured to assess cardiac contractile function.

Results/Implications

TnTA30V decreased force with α -MHC, whereas TnTA30V increased force with β -MHC. There was a severe decrease in maximal force production by TnTT203E+A30V in both α - and β -MHC fibers. As predicted, the effect of TnTA30V on contractile force was divergently modified by different MHC isoforms. Thus, the effects mediated by species-specific protein and phosphorylation effects should be considered when translating findings from a rodent model to a human heart disease.

Board Placement: 170

Medical and Life Sciences

Abstract Submissions

Name: Kellie O'Rourke

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Abstract Title: Vitamin A and its impact on cell cycle kinetics within the mouse testis

Principle Topic

Infertility is a devastating problem that effects 10-15 percent of all couples and half of these cases occur due to male infertility. Sperm development consists of three different phases supported by Sertoli cells: 1) mitotic division of spermatogonia, 2) meiosis, and 3) cell re-shaping and vitamin A, in its active form of retinoic acid (RA), is thought to be important for all three steps. However, very little is known about the individual spermatogonial populations between differentiation and the onset of meiosis.

Methods/Hypotheses

The objective of this study was to further investigate the effects of manipulating RA levels on: 1) spermatogonial differentiation, 2) the progression the differentiating spermatogonia through the cell cycle, and 3) Sertoli cell number. I am hypothesizing that manipulating RA levels will not have an effect on the cell cycle kinetics of the differentiating spermatogonial populations during the onset of spermatogenesis. This was achieved by chemically altering RA levels in vivo in mice and assessing spermatogonial and Sertoli cell cycle progression at various time points during recovery.

Results/Implications

In the absence of RA, male germ cells were found to exit the cell cycle but reenter within 16 hours following RA exposure and Sertoli cell number increased in response to RA. Interestingly, we found that the timing of DNA replication could be precisely mapped during spermatogonial differentiation following manipulation of RA in the juvenile testis. As a result, this study, for the first time, has generated a method for the study of individual types of differentiating spermatogonial populations.

Board Placement: 180

Medical and Life Sciences

Abstract Submissions

Name: Sherif Reda

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Abstract Title: EFFECT OF L71F MUTATION IN CARDIAC TROPONIN T IS DEPENDENT ON MYOSIN HEAVY CHAIN ISOFORM

Principal Topic

Human cardiomyopathy is a heritable disease where mutated contractile proteins lead to sudden cardiac death in humans. To understand how mutated proteins lead to pathology, mutations are engineered into rodents to mimic human heart disease. A major limitation with rodents is that their hearts express a faster myosin heavy chain (α -MHC) that aids faster heart rates, while humans express a slower MHC (β -MHC) that supports slower heart rates. Thus, studies must be carried out against both MHC backgrounds in order to accurately model the human disease mechanism.

Methods/Hypotheses

Because the functional outcome of a contractile protein depends on the kinetic property of MHC isoform, we hypothesized that the effects brought about by a mutation in a contractile protein would manifest differently in α -MHC vs. β -MHC fibers. We investigated the L71F mutation in cardiac troponin T (TnTL71F) that is linked to sudden cardiac death in humans. We reconstituted TnTL71F in muscle fibers from: 1) rat hearts expressing normal α -MHC and 2) rat hearts expressing β -MHC. Reconstituted muscle fibers were bathed in different calcium concentrations and the corresponding contractile force output was measured.

Results/Implications

TnTL71F reduced force output to a greater extent in α -MHC fibers (29%) than in β -MHC fibers (11%). Sensitivity of muscle fibers to calcium was reduced to a greater extent in α -MHC fibers than in β -MHC fibers. Our results demonstrate how the effects brought about by cardiomyopathy mutations vary when studied against different MHC backgrounds; thus caution must be taken when extrapolating findings from rodent studies to the human heart level.

Board Placement: 201

Medical and Life Sciences

Abstract Submissions

Name: Briemann Satterfield

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Abstract Title: Catechol-O-Methyltransferase (COMT) Genotype Affects Dynamic Decision Making during Sleep Deprivation

Principal Topic:

Dynamic decision making requiring flexible updating of decision-relevant information is profoundly degraded by sleep deprivation. The neurotransmitter dopamine is important in neural pathways involved in cognitive stability and flexibility relevant to dynamic decision making. Dopamine is degraded by the COMT enzyme. COMT activity is influenced by a genetic polymorphism (Val158Met). Individuals with the Val/Val genotype have increased cognitive flexibility at the cost of cognitive stability. We investigated whether dynamic decision making during sleep deprivation is affected by COMT genotype.

Methods:

Twenty healthy adults (ages 26.5 ± 4.8 ; 9 females) participated in a laboratory sleep deprivation experiment. There were 5 Val/Val, 11 Val/Met, and 4 Met/Met genotypes. Subjects performed a go/no-go task in which they learned the correct stimulus-response relationships from feedback. Halfway through the task, the stimulus-response relationships were reversed unexpectedly, which subjects discovered from feedback. This task was administered at baseline and after 30 hours awake. Performance was quantified by discriminability between go and no-go stimuli before and after stimulus-response reversal.

Results/Implications:

At baseline, pre- and post-reversal task performance was worst in the Met/Met genotype and best in the Val/Met genotype ($F=5.45$; $p=0.009$). After sleep deprivation pre- and post-reversal task performance was worst in the Val/Val Genotype (tending toward significance, $F=2.98$, $p=0.065$). Greater cognitive flexibility (associated with the Val allele) facilitated baseline task performance, but greater cognitive stability (associated with the Met allele) helped to maintain task-relevant information during sleep deprivation. The Val/Val genotype had a relative disadvantage when dynamic decision making was challenged by sleep deprivation.

Board Placement: 154

Medical and Life Sciences

Abstract Submissions

Name: Amy Sparrow

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Abstract Title: Sleep and Performance in Truck Drivers: Comparison of Early Starters versus Night Drivers in a Naturalistic Field Study

Principal Topic

The biological (circadian) clock promotes wakefulness during the day and sleep during the night. This may pose a problem for individuals required to work at night. We investigated this issue in a naturalistic field study of truck drivers working at night. We compared sleep and performance in drivers starting their workday in the early morning (00:00–04:00) versus the early evening (17:00–20:00).

Method/Hypotheses

Twenty-one truck drivers (ages 27–65) were each measured during two work weeks. Sleep/wake patterns were recorded continuously through wrist activity monitoring. Performance was measured with a 3-minute psychomotor vigilance test (PVT) administered immediately before, about midway, and immediately after each work day. Measurements were compared between early morning starters and early evening starters using mixed-effects ANOVA.

Results/Implications

Although early morning starters slept primarily during the early night and early evening starters slept primarily during the early day ($F=31.8$, $p < 0.001$) on the PVT increased across the work day in both groups ($F=4.1$, $p=0.018$), with no significant difference between the groups ($F=0.5$, $p=0.59$). Thus, in this naturalistic sample of truck drivers, work days with early morning (00:00–04:00) and early evening (17:00–20:00) start times led to equivalent levels of sleep insufficiency and performance degradation. These results suggests that nighttime work schedules put truck drivers at risk regardless of whether they start their work day early or late on their biological clock.

Board Placement: 189

Medical and Life Sciences

Abstract Submissions

Name: My-Thanh Vo

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Abstract Title: MALE GERM CELLS WITHIN THE JUVENILE AND ADULT TESTIS ARE EPIGENETICALLY DISTINCT.

Principal Topic.

Over the last few decades, sperm counts have been steadily declining, impeding male fertility, yet the underlying cause of this major health concern is unclear. Male germ cells are unique because they express a substantial number of variants of the general DNA binding proteins, known as histones, yet the biological significance of these variants is still unknown. In the present study, we aimed to address this knowledge gap by analyzing histone changes associated with the differentiation of male germ cells.

Method/Hypothesis.

We hypothesized that there is an epigenetic switch which distinguishes the histone variants present during the first round (juvenile) from that of subsequent rounds (adult) of male germ cell development. We utilized a unique mouse model, RNA sequencing analysis, and protein localization to examine gene expression and histone variant differences between patches of testes enriched for undifferentiated and differentiating male germ cells.

Results/Implications.

RNA-sequencing analyses identified several histone variants that were enriched in patches of tubule containing mostly undifferentiated germ cells. Of particular interest were the variants Th2a and Th2b, as these were found to only be present within the undifferentiated male germ cells in the juvenile testis and not in the adult. These findings are in contrast to previous studies which demonstrated that Th2b and Th2a were found only in adult differentiating cells. Our data is in support of an epigenetic switch occurring following the differentiation of male germ cells in the juvenile testis. These studies provide us with important biological information regarding the epigenetic regulation of mammalian spermatogenesis.

Board Placement: 60

Social Sciences

Abstract Submissions

Name: Arig Aboulenein

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Abstract Title: The manipulation of memory-formation strategies to improve risky decision-making

The Iowa Gambling Task (IGT) is a risky decision-making task that involves repeatedly choosing from four decks of cards that yield gains and losses to determine which decks produce the best outcomes. It was originally developed to diagnose poor decision-making in brain-damaged individuals. Because of its success in this capacity, it has also become a general-purpose measure of decision-making. Research indicates that IGT performance also depends on memory processes. This study examined the role of memory storage in IGT performance by manipulating the memories formed during the task.

Participants performed an IGT version that involved initial observation of choices made by a brain-damaged individual, then making their own choices based on their observations and learning. Different groups of participants were instructed to remember outcomes by using a strategy of: their own choosing (controls); calculating running averages of outcomes (gist); or memorizing each outcome (rote). Participants also completed a task assessing recall of outcomes and their associated decks. Dependent measures included their deck choices and outcome-recall performance. We hypothesized that while rote participants would have the best outcome-recall performance, gist participants would have the most accurate conceptualizations of each deck, and would therefore make the best choices.

Participants using either gist or rote memory strategies performed better than controls on the IGT, though a rote strategy produced the best recall of outcomes. This indicates decision-making can be facilitated by multiple forms of knowledge representations. Manipulating the focus of learned information may be a valuable aid for individuals with deficient decision-making.

Board Placement: 146

Social Sciences

Abstract Submissions

Name: Yikang Bai

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Abstract Title: The Effects of Parental Educational Expectations on the Use of Shadow Education: The Case of SAT Preparation

Principal Topic

Shadow education, which refers to supplementary educational activities outside formal schooling (Stevenson and Baker 1992), has become more prevalent in North America in recent years (Bray 2006). Princeton Review, a major test preparation service provider, earned \$110.4 million in 2009 (Buchmann, Condrón, and Roscigno 2010a). The magnitude of shadow education has attracted great scholarly attention since shadow education has important implications for educational inequality and social stratification (Bray 2006). Prior research focused on exploring the influence of family's socioeconomic status and racial/ethnic differences in the use of SAT preparation, the most prominent form of shadow education for U.S. high school students.

Parental educational expectations are often reflected in parents' achievement-supporting behaviors, mediating factors through which educational expectations indirectly affect children's educational achievement (Seginer 1983; Thompson, Alexander, and Entwisle 1998). Therefore, whether or not parents provide shadow education for their children could reflect different levels of educational expectations. This study extends previous research by focusing on studying the relationship between parents' educational expectations and students' adoption of SAT preparation strategies.

Method/Hypotheses

I hypothesize that 1) parents' educational expectations are positively associated with students' use of SAT test preparation net of controls. 2) Students' educational expectations are positively associated with their use of SAT test preparation. 3) Students' educational expectations partially mediate the effect of parents' educational expectations on the use of SAT test preparation. Using nationally representative data of U.S. high school students from the Education Longitudinal Study, I employ logistic regression to carry out three-step analyses. First, I analyze the effects of parental educational expectations on the likelihood of using each of the six forms of test preparation. Second, I analyze the effects of parental educational expectations on students' participation/non-participation in any type of test preparation. Third, excluding students who did not participate in shadow education, I analyze the effects of parental educational expectations on participation in one or two forms of shadow education, compared to participation in three or more forms of shadow education.

Results/Implications

Findings support my hypothesis that parents' educational expectations are positively associated with students' participation in shadow education. Results also support my second and third hypotheses. The findings suggest that shadow education could be an important mechanism through which parental educational expectations positively affect children's educational achievement.

Board Placement: 222

Social Sciences

Abstract Submissions

Name: Ekaterina Burduli

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Abstract Title: Cross-Cultural Invariance of the Birth Satisfaction Scale-Revised (BSS-R): Comparing Birth Satisfaction levels between US and UK mothers

Principal Topic

Recent healthcare advances around the world have placed an emphasis on providing exceptional health care service that in turn leads to greater patient satisfaction. In order to provide care of the highest quality and improve maternal health outcomes, it is essential to assess women's satisfaction with birth. Because satisfaction is the one of the most widely reported outcome measures of quality of care, an evaluation of maternal birth satisfaction can be considered a direct measure of maternal care quality.

Method/Hypotheses

This research sought to compare levels of birth satisfaction as well as test the measurement invariance of the Birth Satisfaction Scale-Revised (BSS-R): a quantitative measure examining women's satisfaction with labor experiences and outcomes across US and UK mothers. Using Confirmatory Factor Analysis (CFA), data from 409 mothers (181 US mothers; 228 UK mothers) were used to examine birth satisfaction across US and UK samples. It was hypothesized that US mothers would be significantly less satisfied with their birth experience.

Results/Implications

US mothers had significantly lower birth satisfaction levels on the three BSS-R subscales. This research demonstrates that the BSS-R is a robust tool that can be used by midwives, obstetricians and maternity care experts to reliably measure women's birth satisfaction within and across the US and UK. In order to improve maternal health outcomes, meet national and international health goals, and apply these findings to changes in maternal health policy, this study reflects on the reasons behind lower birth satisfaction rates in the US.

Board Placement: 104

Social Sciences

Abstract Submissions

Name: Nicole Cameron

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Abstract Title: African American Women's Perception of Health and Body Image: A Culture-Centered Approach

Principal Topic

Obesity has become a worldwide “hot button issue” in terms of public health and body image. African American women, in particular, have been targeted by health interventions since they are found to be at more risk of being overweight. However, many African American women have resisted the obesity label, instead arguing that dominant measures of health represent white norms. This study uses the social construction of reality theory to illuminate ways in which African American women make use of and resist discourses about obesity, body image and health.

Method/Hypotheses

The researchers investigated how African American women constructed their vision of health and in what ways does this vision interact with the dominant markers of health and beauty. Using the culture-centered approach, the data for this study was collected by interviewing 15 African American women from diverse backgrounds. The authors qualitatively analyzed the interview transcripts and organized the findings into themes, paying particular attention to dialectic tensions, discursive practices, and potential spaces for empowerment and social change.

Results/Implications

Findings suggest that these African American women were ambivalent in their acceptance of dominant markers of health and that they critiqued the supposed healthiness of the thin ideal. Some participants also reported that their critiques of the thin ideal were passively or actively communicated to them by medical professionals themselves. Finally, our participants identified socioeconomic status, schooling and motherhood as important barriers to health. These results point to the importance of culture, dialectic tensions and contested discourses. Simultaneously, they present opportunities for social change.

Board Placement: 120

Social Sciences

Abstract Submissions

Name: Caitlynn Carr

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Abstract Title: Machismo and Internalized Distress among Indigenous K'iche' Women in Rural Guatemala

This ethnographic study examines how patriarchal machismo ideology affects emic conceptualizations of mental health and well-being among indigenous K'iche' women in Chocoma, Guatemala. I hypothesize that machismo norms and practices have correlative female norms that are internalized; these norms lead to depression and anxiety among women, manifested in nervios (nerves), susto (soul loss), dolor de corazon (heart pain) and dolor de cabeza (head pain). Machismo practices include domestic violence, alcoholism, promiscuity, prohibiting women from working or leaving the house, and control of household income. The relationship between machismo norms and practices and emic conceptualizations of well-being were examined during a three-month period (May 20 to August 18, 2015). Semi-structured, qualitative interviews with 25 women ages 18 to 65 were conducted in Spanish. Participant-observation, household surveys, key informant interviews and tests of Western and indigenous psychometric models of distress and quality of life were also conducted. The results of this study indicate a connection between gendered models associated with machismo ideology and nervios (nerves), susto (soul loss), dolor de corazon (heart pain) and dolor de cabeza (head pain) among women, and prescription medications and tranquilizers were commonly used to treat these syndromes. The results of this study add to existing cross-cultural literature on mental health and the effect of gender ideology on women's mental and physical health. Results may be useful to social work and mental health practitioners, family studies professionals, and sociologists working with Hispanic women in Latin America and in the United States.

Board Placement: 7

Social Sciences

Abstract Submissions

Name: Nicholas Davey

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Abstract Title: Culture, Stigma, and Help-Seeking: Examination across Five Countries/Regions

The underutilization of mental health services is pervasive (<15%) despite tremendous demand (40%, W.H.O., 2008). Stigma is the most cited explanation for why individuals avoid seeking professional help (Corrigan, 2004). Most research on stigma and help-seeking has been done in the US (Vogel et al., 2006) and lacks systematically incorporated cultural constructs. The current study addresses this gap by investigating the two culturally-bound interpersonal constructs of face (Hwang & Han, 2010) and relational self-construal, (Cross, Bacon, & Morris, 2000), and exploring their relations with stigma and help-seeking in a cross-cultural context.

1441 participants across 5 countries (Hong Kong, Romania, Taiwan, Turkey, US) completed measures of Loss-of-Face Scale (Zane, 1991), Relational-Interdependent Self-Construal (Cross et al., 2000), Self-Stigma of Seeking Help (Vogel et al., 2006), Attitudes Toward Seeking Professional Psychological Help-Short Form (Fisher & Farina, 1995), and Intention to Seek Counseling Inventory (Cash et al., 1975). Using Preacher and Hayes (2008)'s procedure, loss-of-face indirectly predicted help-seeking attitudes and intentions via the mediation of self-stigma of seeking help across the Hong Kong, Taiwanese, and Turkish samples (indirect effects = $-.01 \sim -.06$, $p < .05$), but not in the Romanian and US samples. Although the concepts of loss-of-face and relational self-construal were positively correlated in four samples (Hong Kong, Taiwan, Turkey, and US; $r_s = .19 \sim .34$, $p < .01$), there was almost no indirect effect of relational-interdependent self-construal on help-seeking attitudes or intentions via self-stigma as the mediator. This suggests that face is an important interpersonal dynamic to consider when studying stigma and help-seeking.

Board Placement: 157

Social Sciences

Abstract Submissions

Name: Natalie de Clare

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Abstract Title: Meta-norm influence in the sanctioning of negative treatment towards transsexual women and its impact on social cognitive functioning of victims.

Transgender classification has been a social and psychological preoccupation for decades. Many social science disciplines consider all non-normative (i.e non-binary) gender identities to be transgender. This study differentiates transsexual women from transgender women in order to analyze specific gender based pathologizing and its impact on the cognitive functioning of the afflicted person. This article presents a definition of transsexual women through a procedural analysis of the classification of transsexualism in over 20 studies and textbooks on the subject. The meta-analytical review has uncovered a consistent symptomatology in what defines a transsexual woman which significantly differentiates them from the larger transgender ascribed social group. I will then investigate the influence of meta-norms involved in the decision to engage in the sanctioning process once sanctioning opportunity has been presented thus, one can use meta-norm adherence, the group cohesive level, and internalized values as predictors to sanctioning behaviors including those behaviors of violence towards transsexual women.

This allows us to analyze the impact negative sanctioning has on this esoteric social minority and its cognitive behavioral consequences on the victims in the context of social anxiety and anti-social tendencies. This research will add to the limited data on meta-norm influences in negative behaviors as well as crimes committed against transsexual women instead of amalgamating transsexual specific crimes of bias with crimes against gays, lesbians, and bisexuals. This may lead to better transsexual training programs for the criminal justice system, our educational complex and greater societal acceptance.

Board Placement: 193

Social Sciences

Abstract Submissions

Name: Rebecca Donaway

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Abstract Title: Is sharing really discussion? An examination of predictors of political discussion online and in person.

Political communication researchers and deliberative democracy theorists have devoted a great amount of research to understanding the processes by which political discussion occurs among interpersonal groups. However, as people increasingly discuss politics online, a place less-bounded by social norms and where anonymity often leads to incivility, it is important to ask whether or not the political discussions taking place online are following similar processes or are affected by similar factors. Using 2014 Qualtrics survey data of American adults gathered near the mid-term election, this research proposes and tests a PROCESS model (Hayes, 2012) to determine how partisan news media use, partisan news trust, and active information processing work together to predict sharing political news online or participating in political discussion face-to-face. The model positions active information processing (Kahlor, 2006) as a mediator of the relationship between partisan news media use and either sharing news online or discussing it interpersonally, with partisan media trust acting as a moderator of the path from news use to active processing. The results find the conditional indirect effects of the complete models are different: those with lower levels of trust are less likely to discuss information interpersonally but will share the information online. These results seem to suggest that individuals need to feel more confident about the content they discuss to do so in face-to-face environments. These results have important implications, not just for communication researchers but consumers of online news and those discussing politics in Internet spaces.

Board Placement: 181

Social Sciences

Abstract Submissions

Name: Davi Kallman

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Abstract Title: SEEING UNCERTAINTY: INVESTIGATING THE ROLE OF VISABILITY AND BIAS IN THE PROCESSING OF DISABILITY

Principal Topic

Social interactions with individuals with disabilities can be novel and uncertain for many social, psychological, and biological reasons, especially when the disability is overtly visible. This study uses the Limited Capacity Model of Motivated Mediated Message Processing (LC4MP) to examine whether explicit and implicit biases, as individual differences, could play a role in the attentional processing of disability. Understanding how the visibility of disability alters attentional processing via increased uncertainty is crucial to understanding the formation of disability prejudice and stigma.

Method/Hypotheses

This study sought to understand several questions pertaining to how the level of visibility in disability interacts with implicit and explicit biases to influence attentional processing over time. Several measures were used to address our questions, such as the Implicit Association Test (IAT), Attitudes to Disabled Persons (ATDP), and dynamic heart rate (indicator of attention). Participants (N=100) viewed 15 still images of individuals that varied in display of their disabilities (low, moderate, high visibility). Heart rate was collected for five seconds during exposure.

Results/Implications

Our data support that uncertainty plays a role in the attentional processing of disability and that individual differences moderate this processing. Individuals with both weak implicit biases and negative explicit biases paid the most attention, potentially because they were looking for threat in uncertainty and those with strong implicit biases and positive explicit biases actually exhibit acceleration to uncertainty. This may prove problematic for stigma reduction because individuals who have unconscious biases while indicating socially desirable explicit attitudes may be less likely affected by stigma reduction interventions.

Board Placement: 159

Social Sciences

Abstract Submissions

Name: Sarah Morton

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Abstract Title: UNDERSTANDING GENDERED RISK-TAKING IN THE ACADEMIC DUAL-HIRING PROCESS IN STEM AND NON-STEM DISCIPLINES

Principal Topic

I examine factors that impact risk-taking (i.e. revealing dual-career status) in the academic dual-hiring process, which is a special hiring process for partnered faculty seeking positions at the same university. I use risk theory and literature on gendered risk-taking, hiring negotiations, and experiences in academia for my theoretical framework. This research is important because although academic dual-hiring is often controversial, revealing dual-career status is a necessary step to taking advantage of dual-hiring policies, which help recruit and retain women and minorities in academic STEM positions.

Method/Hypotheses

I use survey data to explore how gender and the following factors affect risk-taking in academic dual-hiring: 1) membership in STEM, 2) the gender composition of one's discipline, and 3) relative career importance. I hypothesize that men, members in a STEM discipline, individuals in fields dominated by men, and those who consider their careers primary or equal in their relationship will be most likely to take risks. I use two dichotomous measures of risk taking: choosing to reveal dual-career status (n=168) and revealing dual-career status before or after a job offer is made (n=136).

Results/Implications

I find women are significantly less likely to take either risk than men, and that academics in fields dominated by men and who consider their careers to be primary or equal are significantly more likely to reveal dual-career status than academics in fields dominated by women or who consider their careers secondary. This research will add to the negotiations literature and help inform academic dual-hiring policies.

Board Placement: 89

Social Sciences

Abstract Submissions

Name: Adrienne Muldrow

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Abstract Title: FOOD CATEGORIZATION: THE INTERACTIVE EFFECT OF FOOD CUES, HEALTH CLAIMS AND HEALTH HALOS

Principal Topic/Implication/Hypotheses

Individuals make 200 food decisions every day (Wansink & Sobal, 2007). However, individual interpretations about healthfulness, especially in ambiguously healthy food categories, can be largely inaccurate. In particular, categorizing food as healthier than it is can lead individuals to unknowingly consume more calories and exacerbate the obesity epidemic plaguing two-thirds of Americans.

Food creates appetitive responses. Unfortunately, these heuristic, appetitive responses may override more systematic decision making necessary for accurate comprehension. Health halo products, an appetitive but ambiguously healthy food product category, may increase individual appetitive responses and thus represent a food category most likely to instigate erroneous interpretations. In addition to appetitiveness, various forms of labeling have an effect on food decisions (Koenigstorfer and Baumgartner, in press). Therefore, our study uses the heuristic-systematic model to generate hypotheses to investigate whether food cues and labeling accentuate accurate health categorizations—a goal of health communication.

Method

In our experiment, 124 individuals were exposed to counterbalanced health halo product images that varied by visibility of food cues, type of health claims (i.e., labeling), and objective healthiness across 3 different health halo food products. Participants then evaluated each of the 24 products by completing two latency categorization tasks: one for comprehensiveness and another for appetitiveness.

Results

Results were analyzed using a repeated-measures ANOVA concluding that individuals are susceptible to health halos, and that congruency of among cues, product and health claims produce disparate results. Generally, individuals use visual food cues are used to help make determinations when incongruence exists between products and claims.

Board Placement: 147

Social Sciences

Abstract Submissions

Name: Samuel Rhodes

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Abstract Title: Young Guns: Investigating Negative Television Advertisements in Attorney General Elections

Principal Topic

In recent years, the office of state attorney general has become an increasingly attractive target of trade groups and wealthy individuals seeking favorable action from a powerful, state-wide regulatory office. The increased use of attack ads may be leading to more competitive elections. Campaign research shows that competitive elections tend to display an increase in negative advertisements. Political Science literature often views competitive elections as healthy for democracies, which can bring races to the forefront of a diverse media environment.

Method/Hypotheses

Hypothesis: Are attorney general races experiencing similar rates of negative television advertisements as observed in high-profile presidential, gubernatorial and congressional contests?

To explore whether high rates of negativity (and therefore increased competition) are appearing in attorney general races, a content analysis (N = 241) of all 2010 candidate television advertisements were run.

Results/Implications

In political science, the focus of most literature on this topic is directed towards presidential contests, which limits the generalizability of the findings. The hypothesis was confirmed, showing that attorney general races appear to be just as competitive as more prominent races. The results yield additional data, showing that Republican challengers are more likely to go negative when compared to their Democratic and Independent counterparts, while incumbents are no more likely to run negative campaigns.

Board Placement: 173

Social Sciences

Abstract Submissions

Name: Samantha Riedy

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Abstract Title: Investigating the Effect of Age on Cognitive Speed and Vulnerability to Cognitive Impairment from Sleep Loss in Healthy Young Adults

Principal Topic: Cognitive speed varies across the lifespan, and the impact of sleep loss on cognition also varies across the lifespan. However, healthy young adults are assumed to have stable characteristics of cognitive speed and sleep/wake regulation. We tested this assumption by investigating response time distributions on a psychomotor vigilance test (PVT) administered at baseline and after sleep deprivation in healthy subjects spanning a 22–37 age range.

Method/Hypotheses: 88 healthy adults participated in in-laboratory experiments that involved 36 hours of total sleep deprivation. The subject sample was distributed over five age categories: 22 (16 subjects), 23–24 (20 subjects), 25–27 (16 subjects), 28–32 (19 subjects), 33–37 (17 subjects). During the sleep deprivation period, a 10-minute PVT was administered at 2-hour intervals. During the PVT, subjects responded as quickly as possible to a stimulus that appeared randomly every 2–10 seconds. The cumulative probability distributions of the response times during well-rested baseline (1–12 hours awake) and during sleep deprivation (25–36 hours awake) were analyzed using repeated-measures ANOVA.

Results/Implications: At well-rested baseline, there was no effect of age ($F=1.07$, $p=0.38$) and no age by response time interaction ($F=0.23$, $p>0.99$). After sleep deprivation, there was a significant effect of age category ($F=5.22$, $p<0.99$). These findings are consistent with relative stability in cognitive speed and sleep/wake regulation across the 22–37 age range.

Board Placement: 103

Social Sciences

Abstract Submissions

Name: Elena Skornyakov

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Abstract Title: The Biological Clock's Wake Maintenance Zone Protects Late Afternoon Performance during Extended Wakefulness Following Simulated Night Shifts

Principal Topic: Night shift workers face circadian misalignment – being awake when the biological clock generates pressure to sleep – which leads to performance impairment. Additional impairment ensues when wakefulness is continued into the day. However, when wakefulness is further extended into the late afternoon, there is relative improvement of performance due to the biological clock providing a so-called “wake maintenance zone.” We conducted a laboratory study of simulated night shifts followed by extended wakefulness to investigate the magnitude of performance improvement in the wake maintenance zone.

Method/Hypotheses: Thirteen healthy adults (ages 22–34; 4 females) were assigned to either a simulated day shift condition involving four days of daytime wakefulness (06:00–22:00; 7 subjects) or a simulated night shift condition involving four days of nighttime wakefulness (18:00–10:00; 6 subjects). On the fourth day, wakefulness was extended to 24 hours. Throughout the 24 hours, performance was measured every 2 hours using a psychomotor vigilance test (PVT).

Results/Implications: Subjects in the simulated day shift condition showed optimal PVT performance during the first 16 hours of 24-hour wakefulness; then performance deteriorated progressively. Subjects in the simulated night shift condition showed gradual deterioration of PVT performance through the first 16 hours of 24-hour wakefulness; then performance improved again. This improvement was much greater than predicted by a state-of-the-art biomathematical model ($t=-2.33$, $p=0.023$), revealing that the effect of the wake maintenance zone is stronger than expected and suggesting a need to improve current understanding of the interaction between sleep/wake regulation and the biological clock.

Board Placement: 13

Social Sciences

Abstract Submissions

Name: Narayan Kripa Sundararajan

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Abstract Title: Using conditional reasoning and critical thinking dispositions to mitigate the seductive details effect.

Often teachers include interesting information to engage students in their lecture. However if this information is irrelevant to learning, it may hamper learning. Such unnecessary information causing detrimental effects are called seductive details. Although dominant research literature has established this negative effect, there is limited research on how to negate the detrimental effect.

To this effect, this experimental study investigates the relationship between conditional reasoning, critical thinking dispositions, and learning performance of Chinese undergraduates in the presence of seductive details. Regression analyses conducted with data collected in this study suggest that student learning performance improves when they are disposed to think critically or when they engage in conditional reasoning. Moreover, a mediation analysis supports the idea that critical thinking dispositions of students encourage their ability to engage in conditional reasoning which in turn improves learning performance in the presence of seductive details.

The study contributes to instructional multimedia research by addressing individual difference constructs unrelated to students' prior knowledge. Also, the findings of this study illustrate the importance of developing conditional reasoning skills and critical thinking dispositions in students. These findings are relevant since it is possible that developing these skills may help encounter seductive details in multiple contexts. This suggests that instructors, parents and students can work on developing skills and dispositions to counteract detrimental effects of seductive details.

Board Placement: 151

Social Sciences

Abstract Submissions

Name: Ashley Vaughan

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Abstract Title: Service-Learning and Student Grades

Collegiate service learning has spread throughout universities and colleges in the United States for its promises to provide students with unique and rewarding academic and civic learning outcomes while also helping local communities. A variety of descriptive definitions and suggested “best practices” for service learning in higher education have come about as a result. Reviews of the literature have offered little empirical support for these prescribed practices, but evidence suggests that varying implementations impact the degree to which desired outcomes are obtained. This study aimed to begin an investigation into one of these suggestions—that is, highly structured service experiences that align directly with course content—to better understand its effect on students’ grades. The authors conducted a within-subjects ANOVA to compare the means of students’ targeted exam scores—those that directly matched the experiences of the service placement—with their general exam scores—those that were not a direct match. Unlike prescribed practice, a significant difference was observed between the two scores ($F = 18.616$, $p < .001$) with students ($n = 146$) having scored lower on their targeted exam scores ($M = 74.47$, $SD = 14.94$) than on their general exam scores ($M = 80.55$, $SD = 10.23$). In light of this new evidence, combined with the extensive resources that are dedicated to implementing “best practices” in service learning, the authors recommend that all of these prescribed practices undergo further empirical investigation. Such investigation will allow universities to make better-informed decisions about the allocation of resources for service learning and it will help practitioners better understand the ways in which their implementation of service learning might impact students’ learning.

Board Placement: 87

Social Sciences

Abstract Submissions

Name: Cristina Wilson

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Abstract Title: HIGH TRAIT ANXIETY INDIVIDUALS IMPROVE DECISION MAKING OVER TIME, DESPITE INCREASED SUSCEPTIBILITY TO BIAS

Principal Topic

High trait anxiety is associated with vulnerability to biases when making decisions with uncertain outcomes, i.e., risky decisions. Trait anxious individuals' exhibit increased susceptibility to bias, making them more prone to sub-optimal choices. Little is known about how decision bias can be reduced in trait anxious individuals. The present study examined how experience with decision outcomes reduces framing bias in risky decision making, and whether people high in trait anxiety may benefit from experience with decision outcomes.

Method/Hypotheses

Participants completed a decision making task in which repeated choices were made between a sure option (gain or loss), and a risky gamble option. In this task, framing bias appears as a preference for the gamble over the sure loss and preference for the sure gain over the gamble. Advantageous decision making in the task requires overcoming framing bias through the experience of decision outcomes. The dependent measures of interest were the proportion of gambles in the gain and loss frame (indicative of framing bias), and the proportion of advantageous choices (indicative of overcoming framing bias).

Results/Implications

Results showed that high trait anxiety individuals were more susceptible to framing bias, but improved advantageous choices at the same rate as low trait anxiety individuals. This indicates trait anxious persons are capable of reducing bias through the experience of choice outcomes, thereby optimizing their decision making over time.

Board Placement: 54

Social Sciences

Abstract Submissions

Name: Hong Zhang

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Abstract Title: Career Decisions and Workplace Experiences of Academic Dual Career Couples: Gender and Relationship-Career Dynamics

Women and men make career decisions in a social context shaped by gender stereotypes that suggest women should forego their career needs in support of their husbands'. Our research focuses on academic couples seeking employment in the same or nearby academic institutions. Specifically, we investigate how gender stereotypes influence whether they would have refused their job offer or left their university if their partner had not found appropriate employment, their post-hire working experiences, and institutional attachment.

We predict that women dual-career academics will have higher chances of declining a job offer or leaving a job if their male partners could not find suitable work. We also hypothesize that women will report more negative work experiences and have lower institutional attachment than their male counterparts.

We draw on unique survey data from faculty at seven U.S. institutions and find that female dual-career academics who consider their career primary to their partner's career have a higher odds of rejecting a job offer and leaving the university if their male partner could not find appropriate employment than men who consider their careers as primary, particularly when their partners work in STEM disciplines. Also women have higher odds of reporting negative working experiences and lower institutional attachment than their male counterparts. Our findings suggest that gender stereotypes still play a role in career decisions and work experiences of dual-career couples. We conclude by discussing policy challenges for academic institutions as they try to gender diversify their faculty.

Board Placement: 229

Visual Arts and Design

Abstract Submissions

Name: Rana Alblowi

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Abstract Title: Investigating School Uniform Design of Adolescent Girls in Saudi Arabia

Many countries worldwide are using school uniforms resulting in higher marketplace demand for girls' uniforms with visual appeal yet functional performance. Manufacturers and retailers should provide school uniforms that address the full spectrum of girls' needs and create different designs that can help this growing of school uniforms market segment.

The objective of for this research is to determine school girls' perspectives on school uniform designs and design a school uniform design that incorporates outcomes from the analysis of wearers' needs suitable to Saudi Arabian culture.

The Functional Expressive Aesthetic (FEA) Consumer Needs Model provides a framework for analyzing and developing school uniform that focuses on the functional, expressive, and aesthetic needs in a garment design. In this study, will determine the most appropriate combination of the FEA elements to help the researcher develop a uniform that meets the needs of Saudi Arabian female adolescents. Finding balance among functional, expressive and aesthetics needs is critical to successful outcomes.

A critical functional concern in Saudi Arabia is Vitamin D deficiency concern that has also become a global problem; one million people suffer from vitamin D deficiency around the world. Saudi lifestyle encourages people to move from their home to any place by car. It is important to encourage people in health knowledge by providing healthier choices and facilitating healthy lifestyles Therefore, clothes with fashionable and attractive designs may help to reduce the problem of vitamin D deficiency.

Board Placement: 169

Visual Arts and Design

Abstract Submissions

Name: Shephanie Chahan

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Abstract Title: Future Traveler Expectations: Integrating Well-being Sustainability, and Technology to Elevate Hotel Design

Hotel designs driven by human-centered, sustainable design are limited in hospitality today. The intent of this work is to develop a new framework for hotel design that integrates well-being, sustainability, and technology. The WELL Building Standard and the Living Building Challenge are metrics that will be analyzed for their applicability to hotel design.

To understand the existing field, hotels that excel in well-being, sustainability, or technology have been selected for case studies. A literature review has revealed that the construction and inhabitation of built environments have a major impact on one's personal well-being and the environment. It is also supported by literature that using technology as a means to measure or promote positive impacts on well-being and the environment can be effective.

The results of this research indicate that there are gaps in existing hotel design that do not address well-being and sustainability. New technologies can be used as a tool to address these gaps and enable greater design equality by increasing efficiency, effectiveness, and utilizing real-time data for further development. This topic area is relevant due to the growing demands of travelers. The expectations of travelers will change as technology advances and information on well-being and one's environmental impact becomes available to the public. Additionally, this research is timely due to the relatively recent publication of the WELL Building Standard in October 2014. A design project will apply this new framework to test if it can successfully address the gaps in existing hotel design.

Board Placement: 94

Visual Arts and Design

Abstract Submissions

Name: Kalina Ebling

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Abstract Title: Society for Creative Anachronism: Social Identity and Dress by Kalina Ebling and Carol Salusso

The Society for Creative Anachronism (SCA) is a global learning group that focuses on teaching pre-17th century European history and culture through reenactment. Group members choose a time period and culture on which to base their persona on. Using their persona, these members focus on learning about their time period and culture. Often they are able to learn new skills relevant to their persona with the help of preexisting members through an informal apprenticeship system.

One of the main focuses of a person's persona is dress and accessories that make up their SCA style. A persona's SCA style contextualizes their reference culture and time period. There are also other visual cues that show who they are loyal to or what their social rank is.

The purpose of this research is to 1) discover how dress within the Society for Creative Anachronism (SCA) is used to display social status and identity within the group, 2) to analyze how this level of nonverbal communication influences the current social structure, 3) and to analyze the social interactions between members in order to discover how their social interactions are affected by dress both in and out of character.

Social identity theory and material culture theory combine as the theoretical framework for this research. Data will be collected via survey using snowball sampling and interviews which will be conducted with local members. Conclusions will be based off of the gathered data and used to deepen understanding of the visualization process behind SCA performance attire.

Board Placement: 166

Visual Arts and Design

Abstract Submissions

Name: Leah Engelhardt

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Abstract Title: Dynamic Wine Rack: Using Digital Design and Fabrication

Architects don't just design buildings. Over the years architecture has broadened to include anything from designing buildings to even furniture design. While one may think working at a smaller human scale would be easier, this isn't quite true. Mies van der Rohe, a well-known architect, once said: "A chair is a very difficult object. A skyscraper is almost easier." Just like a chair, the wine rack held many challenges and limitations. This project was an exercise in problem solving using digital design and fabrication.

The storage of wine becomes a task in which one needs to consider not only function but form. Inspiration for this project stemmed from a 2D picture. The original design was not a wine rack, nor had it been built before, but we were inspired by the dynamic undulating shape. It offered many various ways to hold the wine bottle. Using Rhino, a 3D digital modeling tool for designers, we were able to recreate a similar lattice shape. There are four layers joined together, each cut out of MDF sheets using a CNC router.

The placement of the bottles is determined by the user which creates an interactive experience. The project explores and pushes the boundary of a traditional wine rack. Our piece becomes more than just a place to store wine. The wine rack itself becomes a piece of art.

Board Placement: 160

Visual Arts and Design

Abstract Submissions

Name: Breda Fitzgerald

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Abstract Title: Postpartum Women's Body Satisfaction and Appearance Management Behaviors

Introduction

The postpartum experience is a time of major change in a woman's life. Once a woman has delivered her baby, she is thrust into a radically different routine fraught with new challenges to her physical body, identity, body satisfaction and lifestyle. This transition period could be aided by improving women's body satisfaction through appearance management behaviors. The purpose of this study is to examine the role of appearance management behaviors, specifically apparel choices, on postpartum women's body satisfaction and transition to motherhood.

Method

This mixed methodology study is currently in progress. A survey was developed to measure body image, body satisfaction, fashion involvement, and included short-answer questions on postpartum apparel preferences and uses. Once the survey has closed, a small sample of interviews will be conducted to add interpretation depth to the survey findings.

Findings

Data collection is proceeding with 60% of goal (60 subjects) met at this point. Results for the current sample indicate that postpartum women are least satisfied with their stomachs, followed by weight and muscle tone. Women report spending little time on their physical appearance; the majority of participants' blouse and pant size have gone up one size. The majority of participants used apparel to conceal their stomachs and to emphasize their chest and legs. Data collection will be completed by March 2016. We hope to contribute to the understanding of the postpartum experience and how apparel can be used to aid in body satisfaction and the transition to motherhood.

Board Placement: 228

Visual Arts and Design

Abstract Submissions

Name: Antonio Norsworthy

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Abstract Title: Algorithmic Scripting for Floor-Area-Ratio Envelope Visualization

Algorithmic Scripting for Floor-Area-Ratio Envelope Visualization

Principal Topic

Visual scripting applications for architectural design, such as Grasshopper and Dynamo, are gaining popularity in use among designers. Each are integrated with non-visual scripting components that most users will likely never utilize. It remains unclear if machine-language design scripting will continue as the purview of a select few hybrid architect-programmers. This project seeks to understand the niche scripting methods may soon fill within the discipline, and considers a method to integrate Python scripting in preliminary conceptual envelope massing early in a new, empirically based architectural design process.

Method/Hypotheses

This project is proposed as a scripting algorithm which generates visual feedback in response to induced design constraints such as site boundary, Floor-Area-Ratio (FAR), and maximum height. With minimal user input the final script explicates the visualization of a range of variable responses to preliminary constraints. Specific metrics for building height, per-level floor areas, quantity of floors, per-level floor elevations, building base area, total building floor area, percent of site coverage, observed (actual) FAR, and model prediction error (MPE), are analyzed and discussed with respect to their relevance to the user.

Results/Implications

Plans for ongoing development and integration with real-time graphical information system (GIS) data, migration to Python, and a streamlined user interface (UI) are proposed as a standalone software package.

Board Placement: 198

Visual Arts and Design

Abstract Submissions

Name: Holly Sowles

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Abstract Title: Collaborative Approaches to Sustainable Built Environments: Jordan

Jordan is an open economy with an active trade with limited natural resources. The country has not implemented comprehensive short-term and long-term environmental goals (World Bank 2010). Resulting in socio-economic and environmental crisis from inefficient, and mismanaged energy and natural resources. This is significant as Jordan enters the world's economy, which is an "environmentally conscious market." To effectively address these issues, a viable strategy for the design and construction of a sustainable infrastructure must be adopted.

This research identified processes to transform cities to models that are "environmentally-friendly," the importance is to re-conceptualize platforms and systems of existing cities and their infrastructures (Lehmann 2011). The process requires an interdisciplinary coverage, including architecture, urban design and planning, transport planning, economy, ecology, and other related fields (Lehmann 2011). Several case studies were analyzed to synthesize the applicable model for the focused regional contexts as well as demonstrate successful evidence of sustainability.

The next step outline opportunities and strategies in the emergence of green development by outlining policies in collaboration with the Jordan Green Building Council. Expected outcomes include; incorporating sustainable principals of green infrastructure through capacity building as a pathway to primary drivers resulting in long-term sustainability for Jordan's social well-being, economic health and a purposeful environmental agenda.

Lehmann, Steffen. Transforming the City for Sustainability: The Principles of Green Urbanism. *Journal of Green Building* 6.1 (2011): 105.

World Bank, 2010. Achieving Sustainable Development in Jordan: Country Environmental Analysis (CEA). Rep. Washington, D.C.: World Bank, 2010.

Board Placement: 127

Visual Arts and Design

Abstract Submissions

Name: Astrid Vidalon

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Abstract Title: Collection Inspired by the Indigenous Textile Art of Peru

Craft production, which includes handmade textiles, is an excellent mean of sustainable economic development for populations in poverty. Handmade textiles production is a deeply grounded tradition in Peruvian societies over the last 8,000 years. Textiles remain the principal expression of ethnic identity in Peru; textiles are recognized as among the most revered and treasured world traditions.

One of the great challenges today's Peruvian fashion industry faces is to preserve their traditional textile knowledge base without losing competitiveness in the international markets. Hence, the purpose of this study is to create a women's apparel collection incorporating Peruvian traditional textiles and an educational exhibition.

Steps in the research methodology included: 1) interview Meche Correa, an award winning designer, whose work is driven by her passion for Peruvian diverse culture; 2) conduct a visual analysis of ensembles that incorporates Peruvian ethnic attributes; 3) design five ensembles incorporating traditional textiles from Peru and upcoming trends for Spring/Summer 2017; and 4) create an educational exhibition of the collection that includes contextualizing the cultural aspects of the textiles. Steps 1-3 are in ongoing execution.

The expected result of this project is to create a successful apparel collection that incorporates Peruvian ethnic attributes in contemporary ensembles. The exhibition of the collection will bring awareness of the textile richness of Peru and that fashion design can be a conduit for sustainable development for populations in poverty. The exhibition will also be an engaging, meaningful experience for participants.

Board Placement: 134

Visual Arts and Design

Abstract Submissions

Name: Devon Wood

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Abstract Title: Bacterial Cellulose Fabric: the future of the textile industry?

Purpose

The purpose of this study was to investigate the possibility of BC nonwoven as textile for consumer products. Plant cellulose materials are good choices for consumer textile products. The environmental impacts of growing the plants and manufacturing cellulose into textiles are a concern. Bacterial cellulose (BC) is intriguing since it's porous nonwoven web structure facilitates chemical modifications. It is biodegradable, biocompatible, fast to produce, and three-dimensionally moldable.

Method/Hypotheses

Symbiotic culture of bacteria and yeast (SCOBY) containing acetobacteria, vinegar, cane sugar, and tea were used to prepare the aqueous bath. Oven fermentation at 23°C included variations in 1) sugar concentration (10% and 20% by weight), 2) tea type (black, green, and red), 3) fermentation duration (1, 2, 3, and 4 weeks) and 4) dye types (turmeric, saffron, and beet natural dyes; and red, orange, yellow, green, blue, and violet artificial dyes.) Fabrics were dried at ambient conditions (21±1°C and 30±2% RH) for at least 4 days before testing.

Results/ Implications

BC fabrics were producible with all three tea types and sugar concentrations. Fermentation duration increased fabric thickness and decreased transparency. Higher sugar concentration grew the fabric faster and thicker. Natural dyes and the blue artificial dye supported fabric growth; artificial dyes inhibited fabric growth. Relative to most nonwoven consumer fabrics, BC fabric tensile strength and elongation were higher; tearing strength and stiffness were similar and weight heavier due to the high water content.

Board Placement: 138

Visual Arts and Design

Abstract Submissions

Name: Dongming Zhao

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Abstract Title: Infusing Chinese Identity into Apparel Design

1. Goal and Inspiration: The overall goal is designing visual styles that show a strong, distinctive Chinese identity recognized and valued by the audience as part of Chinese identity. This evening gowns design was visualized as worn by Chinese movie stars on the red carpet at the Cannes International Film Festival.

1.1. Contribute to Chinese Identity: Cultural atavism phenomenon reflects reversion to ancestral type. Cultural atavism in fashion design occurs when the fashion design reflects traditional elements or taste (Hayek, 1978). Wearing Chinese traditional costumes or clothing with Chinese traditional elements exhibits this national identity.

1.2. Celebrate Chinese art and culture using Flying Apsaras: Buddhism is the first major religion in China. Mogao grottoes murals in Dunhuang of China are the largest, most famous Buddhist grotto art. Flying Apsaras are very beautiful prolific images in Mogao grottoes murals very popular in China and a beloved part of art in people's lives. To create Chinese style clothing that can contribute to Chinese identity, the aesthetics of Flying Apsaras was incorporated into a special occasion apparel design

2. Process and Techniques Draping was the patternmaking approach used to execute the designs. The design was prototyped by draping on a dress form, fitted and refined on a fit model, and then completed in velvet highlighted by Flying Apsaras satin ribbons.

3. References

Hayek, F.A. (1978). The Atavism of Social Justice. New Studies in Philosophy, Politics, Economics and the History of Ideas. Unpublished doctoral dissertation. Chicago: University of Chicago Press.

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