UNDERGRADUATE RESEARCH POSTER CONFERENCE

ABSTRACT PROGRAM

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APRIL 21, 2015

JOE CROWLEY STUDENT UNION, BALLROOMS

Sponsored by the Office of Undergraduate and Interdisciplinary Research, Associated Students of the University of Nevada and the University of Nevada Reno
http://environment.unr.edu/undergraduateresearch/

TABLE OF CONTENTS

CONFERENCE SCHEDULE

TUESDAY, APRIL 21

Joe Crowley Student Union Ballroom A entrance

2:00 – 2:45 p.m. **Student sign in and mounting of posters**

Joe Crowley Student Union, Ballrooms

3:00 – 4:30 p.m. **Poster Conference and Reception**
Students will be present to discuss posters and answer questions.
Refreshments and appetizers will be served.

4:30 – 5:00 p.m. **Remove Posters**

PARTICIPATING PROGRAMS

EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH (NSF EPSCoR)

The Nevada System of Higher Education (NSHE) received a Research Infrastructure Improvement (RII) Award from the National Science Foundation's Experimental Program to Stimulate Competitive Research (NSF EPSCoR). The *Solar Energy-Water-Environment Nexus in Nevada* project's mission is to advance knowledge and discovery through research on solar energy generation, its environmental impacts and the associated water issues, and accelerate this research by developing new capabilities in cyberinfrastructure in Nevada. Academic year EPSCoR grant proposals are solicited annually in the fall semester. Successful proposals are funded up to $4,000 for the student and $750 for the faculty mentor.

GENERAL UNDERGRADUATE RESEARCH AWARD (GURA)

The most popular program administered by the Office of Undergraduate and Interdisciplinary Research has been the General Undergraduate Research Awards (GURA). These awards are co-funded by the Office of the Vice President for Research and Innovation and the ASUN, are granted every spring semester and last for one year. All UNR students are eligible and research in any discipline is supported. Students who receive awards are able to pursue extracurricular research projects that they have developed with a faculty mentor. Approximately thirty awards are made annually on a competitive basis. The proposals are due in April with awards up to $1,500 made at the end of the spring term.

HONORS UNDERGRADUATE RESEARCH AWARD (HURA)

The Honors Undergraduate Research Awards (HURA), administered by the Office of Undergraduate and Interdisciplinary Research, is open to all senior Honors students at UNR. The awards are made in the fall of each year, provide research support for both the student and the faculty mentor, and are intended to support costs associated with completing the Honors thesis.

MCNAIR SCHOLARS PROGRAM

The McNair Scholars Program is a federal TRIO program funded at 194 institutions across the United States and Puerto Rico which is designed to prepare undergraduate students for doctoral studies through involvement in research and other scholarly activities. McNair participants are either first-generation college students with financial need, or members of a group that is traditionally underrepresented in graduate education.

NASA SPACE GRANT CONSORTIUM (NVSGC)

Nevada NASA Space Grant Consortium scholarships are competitively awarded to support and reward Nevada students for their achievements in academic endeavors related to science, technology, engineering and mathematics. NVSGC support can assist them in pursuing employment opportunities in industries that rely on a STEM-trained workforce that are relevant to both NASA and Nevada's workforce needs.

PROGRAM SPONSORS

OFFICE OF UNDERGRADUATE AND INTERDISCIPLINARY RESEARCH, UNR

The Office of Undergraduate and Interdisciplinary Research works to foster an atmosphere of discovery and scholarship for all undergraduates, graduate students, and faculty. Interdisciplinary graduate programs and undergraduate research provide unique opportunities for students and faculty to address complex research issues of critical importance to the state of Nevada.

ASSOCIATED STUDENTS OF THE UNIVERSITY OF NEVADA (ASUN)

The Associated Students of the University of Nevada (ASUN) is made up of every undergraduate student at the University of Nevada, Reno. We provide a means for students to voice concerns and address issues at the university, local, state, national, and international levels. We also provide information to students on upcoming events, student events, student services, clubs, and more. We are committed to enhancing our university and enriching students just as we have since our inception in 1898.

For more information on any of the areas of student government, please visit the website at http://www.nevadaASUN.com , call 784-6589, or visit our offices on the 3rd floor of The Joe Crowley Student Union in the Center for Student Engagement.

UNIVERSITY OF NEVADA, RENO

Established in 1864, the University of Nevada, Reno is Nevada's land-grant institution. Within the University, ten colleges offer undergraduate and graduate majors. Graduate-level training and research, including a number of doctoral-level programs, further the University's mission to create scholarly activity. The university is an integral part of the thriving Reno-Sparks area.

ADAPTATION AND PERCEPTUAL NORMS IN GENDER IDENTIFICATION

HAWAH SAFA AHMAD

Program: GURA
Mentor: Michael Webster
Department: Psychology
University of Nevada, Reno

In visual perception, what one individual sees can differ significantly from the interpretation of another. As perceptual dimensions have been supported in color vision to include average value or norm, gender can be considered in a similar light. A norm-based coding model was used to distinguish the role of the gender norm as a psychological neutral when measuring the femininity and masculinity of a stimulus. Most importantly, this study inspects whether the variability of gender norm reflects the neutral response in underlying neural code, or if the gender norm is noise to further gender perceptions. By testing gendered perception using individual gender neutral rating (found on a two-back test ranging from 1 to 100) as their adapt (for 300 sec), the stimuli faces (1-100) were then rated by 1 (very male) to 100 (very female), each shown for 300 msec. By using each subject's personal neutral as their neutral point, we were able to see how gender differs across different observers and within observer's own visual preference. These statistics help to show individual differences within the gender spectrum in determining if the adaptation to the neutral face acts normalizes neural responses to gender. These results suggest close links between gender coding in the brain and gender norms that are variable to individual biases in perception. Most importantly, it was found that further study must occur to properly segregate variables based on self-gender identification versus gender assignment, to better understand the correlation between neutral gender adaptation and gender coding in the brain.

EXPLORING THE POST-ADOPTIVE NEEDS AND SERVICES THAT IMPACT THE RISK OF ADOPTION DISRUPTION AND DISSOLUTION

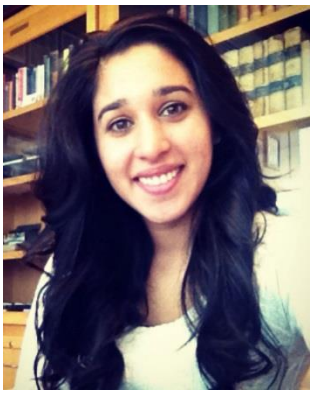
DANICA ANDERSON

Program: HURA
Mentor: Mary Hylton
Department: Social Work
University of Nevada, Reno

Throughout history, adoption has enabled children to experience permanence and stability through an adoptive family. Adoption can be both an exciting and challenging process for the child and adoptive family. Every child and adoptive family has strengths and limitations that can either lead to family stability or instability. Often, adopted children, especially children with special needs, have a traumatic history that may increase the need for treatment or services after adoption. The needs may even exceed the family's capability of addressing them, leading to adoption disruption or dissolution, which sadly ends an adoption. Disruption and dissolution are tragic occurrences that can be prevented by post-adoption services. Post-adoption services are designed to meet family and child needs, enabling them to become more stable as a family. More post-adoption services need to be developed and administered throughout the U.S. to enhance adoptive children and families' lives. To help prevent disruption and dissolution in Washoe County and to provide adoptive families with quality post-adoptive support, family needs were assessed by surveying Washoe County adoptive parents. The research in this study seeks to answer the question: what adoptive services are beneficial, accessible, and

available to adoptive families who have adopted or are in the process of adopting a child through Washoe County? The expected findings of the study are for the majority of adoptive families to report that adoptive needs exist and the families' desire more post-adoptive services in the community. The results will likely show adoptive families who have higher risk factors for disruption will report a higher need for post-adoptive services than adoptive families with lower risk factors. The study is significant because the study gives Washoe County adoptive families a voice to state their concerns on a platform that will be heard by Washoe County policy makers and policy implementers.

DOCOSAHEXAENOIC ACID SUPPLEMENTATION INHIBITS GROWTH AND ENHANCES APOPTOSIS BY ALTERING MYC STATUS IN SUBTYPE-SPECIFIC BREAST CANCER



PALVINDER KAUR BAINS

Program: GURA
Mentors: Michael Mouradian, Ronald Pardini
Department: Biochemistry and Molecular Biology
University of Nevada, Reno

Preliminary *in vitro* and *in vivo* studies have shown that polyunsaturated fatty acids (PUFAs), such as docosahexaenoic acid (DHA; C22:6 n-3) and linoleic acid (LA; C18:2 n-6), can alter the activity and expression levels of proto-oncogenes, including the myelocytomatosis oncogene (Myc). Recent evidence has shown that DHA can modify Myc activity and attenuate cancer cell growth specific to breast cancer subtype. The current study was designed to further characterize the mechanism behind the combinatorial effects of DHA and altered Myc activity, as well as to possibly identify the role of Myc activity in subtype-specific breast cancer. To tease out Myc-dependence, a Myc-specific siRNA knockdown was used on triple-negative, MDA-MB-231, and Luminal B, BT-474, breast cancer cell lines. DHA treatment alone increased apoptosis in both BT-474 and MDA-MB-231. However, knockdown of Myc expression reversed the DHA-induced apoptotic effects in the BT-474 cell line. These data suggest that Myc is required for apoptosis and may be responsible for apoptotic induction in BT-474 cells. In contrast to BT-474, no significant change in apoptosis was observed for MDA-MB-231 cells treated with or without Myc siRNA, suggesting that Myc is not required for DHA-induced apoptosis. While similar results were observed for the MDA-MB-231 cells using a wound-healing assay, where Myc-specific siRNA knockdown did not influence MDA-MB-231 regrowth; experiments for the BT-474 cell line could not be completed, due to the cell line's clonogenic growth behavior. Overall, the results suggest that some of the anti-cancer properties of DHA are mediated by Myc activity and dependent on specific subtypes of breast cancer. This study demonstrates a call for more targeted translational research to study the relationship of combining dietary DHA with other cancer therapies.

EFFECTIVENESS OF CLINICAL ETHICS CONSULTATIONS: A SYSTEMATIC REVIEW

CHRISTOPHER BALDWIN

Program: Faculty sponsored
Mentor: Daniel Cook
Department: Community Health Science
University of Nevada, Reno

Background: Clinical ethics consultation (CECs) is a relatively new, yet integral part of the U.S. healthcare system. CECs typically involve discussions with patients and health care professionals, simultaneously, about ethically fraught clinical situations that are in need of mediation. With the help of an adequately trained ethics consultant,

patients and health care professionals reach a compromise about the most appropriate plan of action to pursue.

Purpose: To conduct a systematic review of the research literature on clinical ethics and palliative care consultations in a variety of clinical settings (i.e. permanent vegetative state (PVS) patients, oncology, intensive care unit (ICU) patients, and others) and to describe any consensus about quality guidelines.

Methods: Inclusion criteria was based on whether the source contained empirical research on assessing the quality of CECs, sources whose scope included how CECs ought to be performed, and CEC's involving PVS and end-of-life decisions. Searches were conducted through the Pubmed and Taylor and Francis databases through 2015 that were published after 1990, looking for studies and articles that assessed quality of CECs in various clinical settings and recommendations on how to properly conduct CECs. There were a total of 53 articles, both scientific and normative, used in the review.

Findings: Initial analyses of the sources regarding recommendations on how clinical ethics consultations ought to be performed were varied and amalgamated. Scientific studies were mostly surveys on the quality of consultations and generally seemed to be in agreement that CEC's are beneficial in clinical decision making for patients.

Discussion: Scientifically, this service is both consistent and beneficial to healthcare. However, there is much disagreement in normative recommendations regarding how one ought to perform a CEC to the best capacity. Thus, there ought to be generally agreed upon standardized norms for performing CECs.

MINDFULNESS AND TRANSPERSONAL PSYCHOLOGY: A NEW APPROACH TO AGING

KAITLYN BARGER

Program: HURA
Mentor: Holly Hazlett-Stevens
Department: Psychology
University of Nevada, Reno

Current psychological research tends to eschew socio-psychological factors of aging and instead focuses on either avoiding aging or discussing social isolation, cognitive decline, and neuro-degenerative diseases such as Alzheimer's Disease and Parkinson's Disease (as well as other dementias and neuro-cognitive changes). A newer trend in psychological and gerontological literature is a hopeful focus on successful aging, which varies in definition but generally emphasizes maintaining physical and cognitive health and being engaged in life. Two subfields of psychology, mindfulness and transpersonal psychology, are potentially informative for the field of successful aging by encouraging various techniques (including meditation, life review, and connecting with spirituality) that increase overall awareness and acceptance, as well as reduce reactivity. Mindfulness, in general, is a way of paying attention purposefully and non-judgmentally, which encourages individuals to live more in the present moment, discouraging rumination on the past and other qualitatively negative features that are not adaptive ways of coping. Acceptance and awareness allow individuals to be more engaged with life and help maintain cognition, two important elements of successful aging. Transpersonal psychology encourages spiritual connection and life review, important elements for older adults to consider in the last season of life. Gerotranscendence, a proposed element of successful aging, encourages individuals to abandon materialistic views and instead consider their role in the universe and the connection between generations. Similarly, transpersonal psychology encourages this broader spiritual connection and focuses on many levels of consciousness; these notions could be a catalyst for gerotranscendence and successful aging in general. A further study of these psychological subfields could aid in informing the knowledge and application of techniques to encourage successful aging. Incorporating these techniques in a rapidly burgeoning aging population could result in a movement away from an emphasis on decline, both in research and practice.

LIFETIMES OF VIBRATIONAL STATES OF XY+ IONS (X=LI, NA; Y=BE, MG)

DUSTY BARNES

Program: GURA, NVSGC
Mentor: Sergey Varganov
Department: Chemistry
University of Nevada, Reno

Ultracold XY+ ions of alkali-alkali earth dimers (X=Li, Na; Y=Be, Mg) show promise for use in ultracold chemistry and quantum computing. The potential energy and dipole moment curves for the ground electronic states of XY+ ions were calculated using the coupled cluster with singles, doubles and iterative triples (CCSDT) method and quadruple-zeta basis set augmented with core functions. To obtain energies and wave functions for the vibrational states, the Schrödinger equation for nuclei was solved numerically with B-spline method. Finally, the transition dipole moments between vibrational states, the Einstein coefficients, and the lifetimes of the vibrational states were calculated. The contributions from spontaneous emission, stimulated emission and absorption induced by black body radiation to the decay rate of vibrational states were analyzed. We compare the lifetimes of vibrational states of the XY+ ions with our earlier results for neutral heteronuclear alkali-alkali dimers. The lifetime of the ground vibrational states in XY+ ions ranges from 3 to 15 seconds, which is considerably lower than the 100 seconds lifetime of these states in isoelectronic neutral alkali-alkali dimers.

SUPPORTING PROVISIONAL AND PROBATIONAL STUDENTS: INCREASING CLASSROOM PARTICIPATION AND RETENTION RATES THROUGH ACTIVE LEARNING

CONSTANCE BARNES, KALLIE DAY, SARAH FRICKE

Program: Faculty sponsored
Mentors: Christina Frederick, Robert King
Department: Psychology
Sierra Nevada College

The current research focuses on provisional and probational students enrolled in Strategies for College Success courses. Nationally, retention within this group is decreasing (Hsieh, Sullivan, Guerra, 2007). We are motivated to strengthen our existing support network for this growing population and to positively impact retention. This research addresses potential issues leading to disenrollment of provisional and probational students. Focus will be placed on bringing awareness to and reducing performance avoidance behaviors (PABs), or, "hiding lack of ability" (Hsieh et al., 2007, p. 2) in classroom settings. PABs are common in populations at academic risk (Hsieh et al., 2007). Active learning techniques are poised to overcome PABs by engaging students in self-caused learning and deeper engagement. Evaluation of potential PABs related to classroom participation allows us to teach students how to shift attribution style from an external to internal locus of control (Hong, Shull, Haefner, 2011). Doing this should increase student confidence in the student-teacher relationship, impact self-efficacy by providing study strategies, address accountability concerns, etc. Concretely, we have begun an observational study to track provisional/probational vs. non-provisional/probational student participation rates and types via an independently constructed Student Participation Rubric. We also propose development of a workshop series for students enrolled in Strategies for College Success courses. These workshops will be designed with the findings of our observational tracking in mind and with focus on the value of active learning, increasing classroom participation rates, and reducing PABs. It is our hypothesis that the presence of a more robust support network will increase academic satisfaction and improve retention in this group of students at academic risk.

PRECIPITATION IN RENO AND LAS VEGAS AND THE EL NINO SOUTHERN OSCILLATION (ENSO)

EMMA BEEBE

Program: Faculty sponsored
Mentor: Kate Berry
Department: Geography
University of Nevada, Reno

This project involves comparing monthly precipitation in Reno and Las Vegas during the period of 1980 to 2010, the most recent period used in calculating climatic norms. Data will be analyzed to discern patterns of precipitation in these cities as they relate to the El Nino Southern Oscillation (ENSO) phenomenon. There are two phases of ENSO, which are characterized by unusually warm oceanic temperatures and high surface air temperatures off the western coast of South America and, alternately, cool ocean temperatures off the Western coast of South America and low surface air temperature. These two Nevada cities will be analyzed and compared because ENSO primarily affects the tropics and subtropics, but teleconnections are possibly due to the global nature of the Walker circulation pattern, which is a model of the airflow over the tropics in the troposphere and is caused by heating differences between the ocean and land. Reno and Las Vegas are geographically distinct from one another, one being in a steppe climate near mountains and the other in a desert, and both are a considerable distance from the ocean. Reno is approximately 175 miles away and Vegas is more than 200 miles from the Pacific Ocean. Additionally, previous research shows that California follows fairly predictable changes in precipitation as a result of El Nino, indicating that it is possible for there to be impacts in mid-latitudes, between 30 and 45 degrees north.

UNDERSTANDING ADAPTIVE RESPONSES OF CATERPILLARS TO PHOTO-TOXIC DEFENSIVE MOLECULES

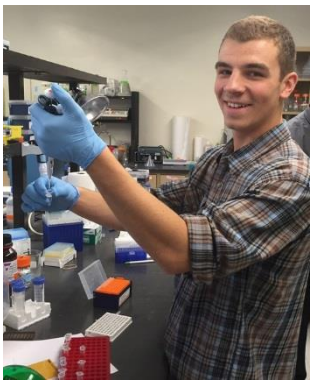
GEMMA BELTRAN

Program: GURA
Mentor: Christopher Jeffrey
Department: Chemistry
University of Nevada, Reno

The chemical arms race between plants and their specialist herbivores is hypothesized to be a driving force of biodiversity. The plant chemistry of the tropical plant, *Piper kelleyi* has recently been identified. These compounds are digestible by specialist caterpillars, yet toxic to generalist caterpillars and are proposed to increase in toxicity with light. My research focused on understanding how these anti-herbivore natural products are metabolically processed by caterpillars. The mechanisms of adaption in specialist caterpillars were identified and the phototoxic compounds on the development and immune responses when fed to naïve caterpillars were experimentally tested. About ten specialist caterpillars were grinded using a vortex, liquid nitrogen, micro centrifuge tubes, and small metal balls. A nuclear magnetic resonance (NMR) reading was made on the grounded caterpillars to depict the compounds present in the caterpillars. Based on the specialist caterpillar extractions, it was determined whether or not they were sequestering the toxic compounds from the *Piper kelleyi* in their body. A Spodoptera Bioassay was done to determine the effects of the *Piper kelleyi* on generalist caterpillars. Caterpillars were randomly selected a diet (control, high concentration of *Piper kelleyi* or low concentration of *Piper kelleyi*), light (Ultra Violet (UV) present or UV Absent), and fate (development or immune Assay) to determine *Piper kelleyi's* impact on caterpillars. The development of the caterpillars were watched and recorded. A caterpillar frass extraction was completed as well. Based on the frass extractions,

caterpillars appear to not be sequestering the chromene and the dimer plant compounds. When leaves of *Piper kelleyi* were fed to the generalist Spodoptera caterpillars, the chromene and the dimer increased development rate and decreased pupa mass of Spodoptera. Additionally, it was seen that high concentrations of these compounds cause high mortality.

CIRCRNAS AS A BIOMARKER FOR AGING



LUCAS BISHOP

Program: Faculty sponsored
Mentor: Pedro Miura
Department: Biology
University of Nevada, Reno

I used RNA-seq methods to see what the correlation was between circRNA accumulation and the chronological age of *Drosophila melanogaster*. circRNAs are an important and mostly unexplored area of study because they cleave differently than regular linear mRNA. This allows us to test their accumulation against that of linear RNA and see how upregulated a certain line of circRNA is. We already know that flies which are aged at a higher temperature do not live as long as those that are aged at a low temperature and that circRNA accumulation has been linked to increasing age (Miura et al. 2014). We can then look at the accumulation of flies at 30C to see if the accumulation of circRNA is higher than that of flies at a lower temperature, or lower biological age. Even though the flies are the same amount of days old, the higher temperature causes them to exhibit circRNA levels of older flies. In my experiment I aged flies at 30C and 18C, respectively, and then performed Trizol extractions to get RNA from heads that I had isolated from flies at different timepoints. What I found was that for certain genes such as ank2, there was a stout increase in accumulation between the two-day and five-day time points, leveling off eventually as the fly's age neared fourteen and twenty days old. This evidence suggests that as a fly is developing, particularly in an environment that causes biological age to increase more rapidly, the amount of circRNA accumulating is rising, making it a likely biomarker to age and aging.

FAILSAFE ALGORITHMS FOR STABILIZATION AND CONTROL OF UAS PLATFORMS

JANELLE BLANKENBURG

Program: NVSGC
Mentor: David Feil-Seifer
Department: Computer Science and Engineering
University of Nevada, Reno

Rapid increase in the use of Unmanned Autonomous Systems (UAS) has caused the safety of these platforms to become a high priority. One main safety issue with UAS platforms is motor failure. Therefore, in order to increase the safety of these platforms in the event of a motor failure, several failsafe algorithms have been developed.

Without a failsafe mechanism, the loss of a motor will cause a platform to fall out of the sky. This can cause serious injury to the people and property in the vicinity of the UAS. Therefore, the failsafe algorithms increase safety of UAS during flight and minimize damage to the surroundings by preventing these types of falls from occurring.

Upon motor failure, the failsafe algorithms will stabilize the UAS platform thereby allowing it to land safely. These algorithms use the reduced attitude of the UAS to control and stabilize it. This reduced attitude can be used to maneuver the platform a short distance and bring it safely to the ground.

These algorithms were developed to work on two different UAS platforms: asymmetrical quadrocopters, and hexacopters. These failsafe algorithms will stabilize the platform in the event that one of its motors fails. In the future, these algorithms will be extended to work in cases in which two and three motor failures have occurred.

THE IMPACTS OF CHEATGRASS (*BROMUS TECTORUM*) ON WESTERN FENCE LIZARD (*SCELOPORUS OCCIDENTALIS*) POPULATIONS IN NEVADA

KRISTINA BOZANICH

Program: HURA
Mentor: Chris Feldman
Department: Biology
University of Nevada, Reno

Cheatgrass (*Bromus tectorum*) is an invasive plant that has the ability to alter Nevada's ecosystems and habitat. Although this invasive plant is recognized as dangerous to native wildlife, little research has been conducted on cheatgrass' impacts in the Great Basin desert. Western Fence lizard (*Sceloporous occidentalis*) populations are important for the local community because of their role in nutrient cycling, insect control, and stability for food chains. This study species helps assess the impact of cheatgrass in the Great Basin desert. It was hypothesized that cheatgrass is negatively impacting Western Fence lizard populations in Nevada by cheatgrass' ability to alter the ground temperatures, plant and insect diversity, and lizard mobility. Study sites were located in Reno, Nevada where areas of cheatgrass and native sagebrush were compared. Results showed that climatic conditions between cheatgrass and non-cheatgrass plots were shown to differ in temperature range. Study sites revealed that areas where cheatgrass dominated, plant and insect diversity and abundance suffered; whereas sagebrush-steppe habitats show healthy diversity and abundance of both plants and insects. Lizard mobility was shown to be reduced the greatest for smaller lizards on cheatgrass trials. Large lizards were not as significantly impacted by cheatgrass. Overall, these findings will help build a better understanding for the need of

FATTY ACIDS AS A POTENTIAL FORAGING CUE IN BUMBLEBEE POLLEN DETECTION

PHILLIP BRESLOW

Program: GURA
Mentor: Anne Leonard
Department: Biology
University of Nevada, Reno

Bee populations, both wild and commercially supplied, are known to be on the decline. A diminishing availability of required nutritional resources may be a major contributing factor. Understanding how bees are able to both detect and remember the locations of these dietary macromolecules will be a valuable contribution to sustainability efforts worldwide. My work focuses on the ability of bumblebees to detect and assess necessary pollen fats, a resource which provides both an incredible source of energy to these long distance foragers, and also may serve as an important chemical cue to the identification of different flower species. Utilizing the Proboscis Extension response technique, I explored the potential of bees to form learned associations between these nutrients and visual stimuli. I found strong evidence to suggest that bees can detect pollen based fatty acids and that the presence of these compounds increases bee learning and perhaps memory, an invaluable skill to bumblebees which rely on memory to re-locate good sources of nutrient. Additionally, I found evidence suggesting that fatty acid consumption may increase bee longevity. My research suggests that pollen fats are a chemical attractant potentially important to pollinator species, knowledge which can greatly aid in sustainability efforts in the future.

ATTENTION, ATTENTION: CONSISTENT SENSORY STIMULATION REDUCES INATTENTIONAL BLINDNESS

SEAN BURKE

Program: Faculty sponsored
Mentor: Christina Frederick
Department: Psychology
Sierra Nevada College

Traditional models of visual search purport a process of automatic visual 'pop-out' for novel objects (Simons & Chabris, 1999). The likelihood of perceiving changes in unattended stimuli is impacted by the focus of attention. The current study examined conditions that may reduce inattentional blindness. An adapted version of Simons (2010) video was augmented with a 3 sec visual (consistent) and 3 sec auditory (inconsistent) disturbance located when novel stimuli (e.g., gorilla, background color change, etc.) appeared. For baseline, data was collected on an unmodified version of the Simons video. 90 participants were selected via convenience sampling and were randomly assigned to the consistent, inconsistent, or baseline condition. Prior to watching the 37 sec video, participants were instructed to track the number of ball passes between teams. Following, participants completed an objective survey including the number of passes counted and latent video content (e.g., presence of gorilla, curtain color change, etc.). The Kruskal-Wallis (Kruskal & Wallis, 1952), showed a difference (p = .047) between sensory conditions. The Nemenyi (1969) multiple comparisons test indicated the accuracy difference existed between visual (consistent) and auditory (inconsistent) conditions. Those who experienced disturbance in the consistent sensory modality showed greater accuracy in identifying latent elements than those experiencing disturbance in inconsistent modalities. A framework for reducing inattentional blindness is provided.

THIS ROBOT STINKS! DIFFERENCES BETWEEN PERCEIVED MISTREATMENT OF ROBOT AND COMPUTER PARTNERS

ZACHARY CARLSON, LOUISE LEMMON

Program: NVSGC
Mentor: David Feil-Seifer
Department: Computer Science and Engineering
University of Nevada, Reno

Robots (and computers) are increasingly being used in scenarios where they interact socially with people. How people react to these agents is telling about the perceived animacy of such agents. Mistreatment of robots (or computers) by co-workers might provoke such telling reactions. The purpose of this study was to discover if people perceived mistreatment directed towards a robot any differently than toward a computer. This will provide some understanding of how people perceive robots in collaborative social settings. We conducted a between-subjects study with 80 participants. Participants worked cooperatively with either a robot or a computer which acted as the "recorder" for the group. A confederate either acted aggressively or neutrally towards the "recorder." We hypothesized that people would not socially accept mistreatment towards an agent that they felt was intelligent and similar to themselves; that participants would perceive the robot as more similar in appearance and emotional capability to themselves than a computer; and would observe more mistreatment. The final results supported our hypothesis; the participants observed mistreatment in the robot, but not the computer. Participants felt significantly more sympathetic towards the robot and also believed that it was much more emotionally capable.

DIETARY ANALYSIS OF A RURAL MAYA COMMUNITY IN THE CAVES BRANCH RIVER VALLEY, BELIZE USING CARBON AND NITROGEN CONCENTRATIONS AND STABLE ISOTOPE VALUES OF DENTAL CALCULUS

EMILY CHAMBERLAIN

Program: GURA
Mentors: Simon Poulson, George Richard Scott
Departments: Anthropology, Geological Sciences and Engineering
University of Nevada, Reno

This research assessed stable carbon (C) and nitrogen (N) concentrations and isotopic values in human dental calculus to understand dietary practices of the Maya from the Caves Branch Rockshelter (CBR) in the Caves Branch River Valley, Belize. CBR is a funerary site of a small rural agricultural community with multiple burial episodes dating from Late Preclassic (300 BCE-30CE) to the Late Terminal Classic (600-900CE) (Wrobel, 2008). Isotopically heavy values of $\delta^{13}C$ were expected due to the traditionally maize-rich diet of the Maya. Calculus samples were obtained from 28 males and females, and analyzed for C and N concentrations and $\delta^{13}C$ and δ^{15} N values using elemental analysis - mass spectrometry, after methods detailed by Scott & Poulson (2012) and Poulson et al. (2013). As suggested by Eerkens et al. (2014), molar C/N concentrations over 12 were omitted for a quality control criterion consistent with an absence of post-depositional alteration. C/N molar ratios obtained from the sample ranged from 8.2-11.9. The mean $\delta^{15}N$ value of +8.5‰, consistent with a diet of plant domesticates supplemented by deer and riverine fish, is similar to collagen isotopic studies from other Maya populations. $\delta^{13}C$ values were isotopically lighter than expected for a maize-rich diet, with a mean value of -15.2‰. Previous collagen $\delta^{13}C$ studies in the Maya region document varied levels of maize consumption during different periods and in different regions. $\delta^{13}C$ values obtained in this study suggest the mortuary sample from CBR may not have switched to a maize-rich diet like other Maya sites.

GETTING CREATIVE: DOES BOREDOM POSITIVELY IMPACT CREATIVITY?

PHILIP CHIESA

Program: Faculty sponsored
Mentor: Christina Frederick
Department: Psychology
Sierra Nevada College

It is commonly believed boredom has negative consequences (e.g., counterproductive work behavior, school dissatisfaction, truancy, etc.) in educational and employment settings (Mann & Robinson, 2009). Recently, however, studies have shown boredom has positive outcomes related to creativity (Mann & Cadman, 2014). The purpose of the current study was to examine the impact of boredom on creativity. Boredom was invoked in varying degrees via three conditions (staring, syllabus, and movie). In the staring condition (n = 30), participants stared at a blank screen for 4 min, then completed Kissler and Frederick's (2014) Creativity Test (CT). In the syllabus condition (n = 30), participants listened to a 4 min audio recording of a model syllabus before completing the CT. In the movie condition (n = 30), participants watched a humorous video for 4 min and then completed the CT. Participants were allotted 4 min to complete the CT. Creativity tests were scored using Kissler and Frederick's (2014) rubric, these scores were sorted by condition, and analyzed. A one-way ANOVA showed no significant difference (p = .611) in creativity scores among conditions. These results do not align with previous research, but this may be the case given the different creative testing methods used in this study relative to

earlier work (Mann & Cadman, 2014). Testing creativity is a subjective process which makes finding consistent results challenging. The difficulty of testing creativity is discussed.

NEURAL CORRELATES OF ILLUSORY CONTOUR FORMATION

CODY CUSHING

Program: GURA
Mentor: Gideon Caplovitz
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University of Nevada, Reno

In order to visually experience the world around us, the human visual system must integrate various sources of information from the retinas. In order to make sense of anything, pieces of visual information must constantly be assembled into the whole objects we experience. Because of this, the human brain makes many inferences when piecing together subjective reality. The neural mechanisms behind these inferences may hold the key to human perception and understanding in general. Here, we use High-Density EEG recordings taken from humans viewing Illusory Contour stimuli to map out in space and time the pathway(s) in the brain that makes these perceptual inferences. When 4 circles are partially occluded by an object with the same coloring as the background, the brain makes the inference that an edge is present in the subjective perception while such an edge is absent in the actual retinal image. It is noteworthy that the stimulus in these cases is equally consistent with the presence of four pacman-like shapes with no illusory contours. Many areas of the brain have been implicated in the processing of these imaginary contours (e.g. V1, V2, V3, V4, V7, V8, and the lateral occipital cortex). The precise role and timing of these involved areas has remained ambiguous however. By applying High-Density EEG we identify the spatial (where in the brain) and temporal (when) characteristics of the neural processes that underlie the formation of these illusory figures.

CHARACTERIZING THE TEMPERATURE OF A LASER COOLED MICROSPHERE

JORDAN DARGERT

Programs: GURA and NSF EPSCoR
Mentor: Andrew Geraci
Department: Physics
University of Nevada, Reno

Dr. Andrew Geraci's research group is exploring the area of short range gravity detection. The method uses lasers to trap and suspend a glass bead while using the bead's motion as a means to detect gravity. The trouble is that the small scales of the forces being detected are on levels currently unfounded. That is where the construction of a lock-in amplifier is key in seeing the motion of the bead. A lock-in is a tool used to read small signals buried in heavy background noise. The lock-in will aid in the characterization of the motion and temperature of the laser cooled sphere.

INVESTIGATION ON THE RELATIONSHIP BETWEEN CONTACT FORCE AND FINGERTIP SKIN BIO-IMPEDANCE TOWARDS A CLOSED-LOOP AND INDIVIDUAL-PERCEPTION CENTERED ELECTROTACTILE RENDERING TECHNIQUE

JESSICA DE SOUZA

Program: Faculty sponsored
Mentor: Yantao Shen
Department: Electrical and Biomedical Engineering
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An electrotactile display, also called an electrocutaneous display, is a surface-electrode tactile device that can produce tactile sensations by appropriately and electronically stimulating multiple skin receptors at fingertip using electrical current passing through the skin barrier. Currently a major research problem of electrotactile is how to control electrical current for producing realistic and comfort tactile sensations. Our research focuses on solving this issue by developing an adaptive and closed-loop electrotactile rendering technique for individuals. The core of our adaptive technique is to real-time sense and identify fingertip skin bio-impedance and then indirectly controls applied electrical current based on the identified individual skin bio-impedance. This research is a preliminary stage of our developing technique. The main goal is to investigate the change in fingertip skin bio-impedance sensing results according to a change in contact force between the fingertip and electrodes. The investigation is meaningful and will greatly help to accurately identify the skin bio-impedance based on its multi-parameters including contact force between electrodes and skin, electrode material and size, electrode-skin interface conditions etc.. To conduct experiments for the investigation, we have developed a custom-built platform consisting of a TI bio-impedance measurement board AFE4300, a high-resolution load cell, a PCB electrode array, and a desktop PC with the DAQ and software interfaces. Extensive experiments have been conducted and all experimental results have been processed and analyzed. The results demonstrate that the values of fingertip skin bio-impedance are significantly affected by the applied voltage frequencies and are changed according to a change in contact force between the fingertip and electrodes in each applied voltage frequency.

SPIN-FORBIDDEN TRANSITIONS BETWEEN ELECTRONIC STATES OF THE ACTIVE SITE OF RUBREDOXIN

GWEN DEPOLO

Program: GURA
Mentor: Sergey Varganov
Department: Chemistry
University of Nevada, Reno

We investigate the spin-forbidden transitions between electronic states of the active site of the protein rubredoxin, which is responsible for electron transfer in biological systems by changing the oxidation state of the iron center in the active site. We study the active site with the iron center in three oxidation states, Fe(II), Fe(III), and Fe(IV), using density functional theory. For each oxidation state, we focused on the three lowest energy electronic states with different spin multiplicities. One-dimensional cross sections of the potential energy surfaces (PES) between the equilibrium geometries of each spin-state were calculated using PBE density functional with def2-TZVP basis set. The PES cross sections lie within a 30 kcal/mol energy window and intersect at some intermediate geometries. The minimum energy crossing point (MECP) geometries for each intersection has been calculated. The spin-orbit coupling was found using Complete Active Space Configuration Interaction (CASCI) with molecular orbitals from ROHF high-spin and CASSCF state-average calculations. The probability of

transition between electronic states with different spin multiplicities has been determined using Landau-Zener theory for a temperature range of 270-370K. The type of molecular orbitals used for the calculation of spin-orbit coupling and for the probability of transition had a noticeable effect on both values.

REAL TIME FLUORESCENCE IMAGING OF NITRIC OXIDE IN MYOMETRIAL CELLS

JEFFREY DOMINGUEZ UMANZOR

Program: GURA
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The myometrium undergoes continuous stretch during gestation to term (37 weeks). Therefore, we hypothesize that a stretch dependent mechanism exists. TREK-1 is a gestationally regulated ion channel that is activated by stretch and hyperpolarizes the cell membrane by releasing potassium ions causing relaxation. Initially we proposed to investigate TREK-1 using a real-time fluorescence spectrometer (PTI Ratiomaster). However, after further investigation it was clear that the technology to measure fluorescence of an outward rectifying potassium channel needed to be developed further before this was possible. As a result, we investigated Nitric Oxide (NO), another proposed mediator of myometrial relaxation using real-time fluorescence spectroscopy. This is interesting because it had yet to be shown that NO actually crosses the cell membrane in myometrial cells. The results of the study demonstrate that NO does in fact cross into the cell which could be quantified using an increase in fluorescence intensity using the membrane permeable dye DAF-FM (4-amino-5-methylamino-2',7'-difluorofluorescein). This work will lead to future investigations probing the molecular mechanisms, perhaps enzymatic, that transfer NO into the cell.

THE IMPACT OF NAME USE ON SELF-ACCOUNTABILITY

AMBER DURK

Program: Faculty sponsored
Mentor: Christina Frederick
Department: Psychology
Sierra Nevada College

In 2009, the Department of Education implemented the Race to the Top program (Spelling, 2013) which offered substantial state funding in exchange for implementing policies making administrators and teachers accountable for student test scores (Murphy & Torff, 2014).This program improved student test scores in both math and science (Spellings, 2013). Graham (2015) also discussed the importance of self-accountability and how positive group environments, students and parents working together, and consistent rubrics might improve student test scores (Graham, 2015). The current study assessed the impact of name usage on self-accountability during a classroom activity. Potential participants completed a familiarity survey to ensure no pre-existing relationship existed with the instructor. 90 undergraduates qualified and were randomly assigned to one of three name usage conditions. In these conditions, name use was manipulated as follows: 1) all group members were addressed by name, 2) half of the group members were addressed by name, or 3) none of the group members were addressed by name. To facilitate accurate name use, the study began with participants creating a name tag and sharing name pronunciation during an ice-breaker activity. Following this ice-breaker, the instructor led the group in constructing individual origami cranes, after which they completed a self-accountability survey (7-point Likert scale). A one-way ANOVA showed no difference ($p = .646$) in self-accountability scores as a function of name use condition. These results indicate addressing college

undergraduates by name does not impact self-accountability. Given this, college teachers should focus on alternate methods of heightening self-accountability.

THE IMPACT OF GOALS ON PRODUCTIVITY

JUVENTINO ESPINOZA

Program: Faculty sponsored
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Pritchard, Jones, Roth, Stuebing & Ekeberg (1988) studied the impact of goals on group productivity. It was shown the presence of a goal positively impacted productivity (Pritchard et al., 1988). The purpose of the current study was to examine the same question, but within individuals. A convenience sample of 90 undergraduates were asked to build a specific Tinkertoy® model under varying sets of goal instructions. Participants were randomly assigned to a condition in which they were (1) provided a goal, (2) created their own goal, or (3) indicated a number significant to them but unrelated to any goal. Prior to building the model, participants were provided a 2 minute model construction demonstration and a printed image of a complete and accurate model to refer back to throughout the task. Participants were allotted 10 minutes to build, disassemble, and rebuild their Tinkertoy® model as many times as possible. The dependent measure of productivity was the number of models successfully completed. Productivity data were sorted by goal condition and analyzed. The Bartlett's Test (Bartlett, 1937) indicated no homogeneity of variance among groups and the Anderson-Darling (Anderson & Darling, 1952) indicated the data were not normally distributed. The Kruskal-Wallis (Kruskal & Wallis, 1952), the non-parametric alternative to a one-way ANOVA, showed no significant difference (p = .105) in productivity among goal conditions. This pattern of results indicates individual goal setting does not impact productivity. While goals set by those in groups do impact productivity, the same is not true for those working individually.

C. *ELEGANS*: THE WORMS OF THE WORLD

CAMILLE FRAYNA

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Not much is known about the surface coat of *C. elegans*, but researchers know that the interaction it has with its environment is important. Also, not much is known about the similarities and differences among multiple strains of this nematode from around the world. Conducting a bordering assay is the first step in comparing these worms of the world. A bordering assay is done on each strain obtained, where positive results indicate the presence of a social strain of nematodes, while negative results is indicative of solitary foraging nematodes. These strains also exhibit clumping, where three or more of the worms are very close to each other; this helps reassure that a positive bordering trait is exhibited. Positive bordering is seen when at least 45 of the 60 worms are within two millimeters of the *E. coli* OP50 lawn. If less than 45 worms are seen within this range, negative bordering is observed. Out of the twenty-two strains of *Caenorhabditis elegans* acquired, only four of them are positive. The strains chosen are representative of the *C. elegan* locations around the world, though many more strains should be tested to ensure the results are accurate and to test strains from locations that have

not yet been observed. This data can help detect if the surface coat has properties that causes it to have the bordering property or if this is solely based on feeding patterns.

THE LOOKING GLASS SELF: THE IMPACT OF EXPLICIT SELF-AWARENESS ON SELF-ESTEEM

SARAH FRICKE

Program: Faculty sponsored
Mentor: Christina Frederick
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The looking glass self (Cooley, 1902) is an individual's self-concept defined, in part, by societal heuristics. Recent studies on theories-of-self examine self-focused attention and self-awareness (SA; Sylvia & Duval, 2001). Silvia and Phillips (2013) showed SA was influenced by presenting individuals with stimuli that both explicitly increase SA (e.g., mirrors) and implicitly increase SA (e.g., priming with one's name). Objective SA theory, originally coined by Duval and Wicklund (1972) and updated by Duval and Silvia (2001), stated SA could occur in the absence of an explicit stimulus (Sylvia & Duval, 2013), but research has not yet been conducted to address this prediction. Toward this end, the current study assessed the impact of increasing explicit SA on self-esteem by administering an adapted version of Rosenberg's Self-Esteem Scale (RSES; Rosenberg, 1965) on reflective (mirrored) or non-reflective (matte) surfaces. 120 undergraduate participants (60 males, 60 females) were selected using convenience sampling and randomly assigned to complete the RSES on one surface. During the study, participant attention was drawn to assigned surface type and participants were asked to provide thoughtful responses to each RSES question. A two-way ANOVA showed no significant difference in RSES scores as a function of surface (p = .348) or gender (p = .271). The reflective surface did not impact self-esteem, thus, this reflective surface also did not influence SA. These results suggest a need to find an alternate way of manipulating SA prior to assessing self-esteem or the possibility that SA does not directly impact self-esteem.

ROLE OF ICC IN TISSUE REMODELING DURING CHRONIC GASTROINTESTINAL PARTIAL OBSTRUCTION INJURY

ROBERT FUCHS

Program: HURA
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Human gastrointestinal (GI) disorders are prevalent and, therefore, of strong interest to smooth muscle biologists. While basic scientists have developed several mouse models that mimic human GI disorders, the understanding of how tissue restructures itself during these various disease states is limited. To address this deficiency, our group adapted a previously-developed chronic intestinal partial obstruction surgery model to damage the jejunum and ileum of mice. We used histology and immunofluorescence to characterize the changes that arise following surgery for up to eight weeks post-injury and found significant involvement of ICC in the injury-response phenotype. Consistent with previous data from our group, we observed marked hypertrophy of the muscle layers following the partial obstruction surgery. Staining for common ICC antigens showed that expression of the secreted factor Thrombospondin 4 (THBS4) increased in the intestinal serosa during two and four weeks post-injury. At eight weeks post-injury, the expression level had decreased relative to the four-week animal but was still highly expressed relative to wild type. Our transcriptome analysis (unpublished) revealed that THBS4 is highly expressed in ICC, so we moved forwards by labeling other common ICC antigens over different

time points. These stains showed significant levels of labeling for ANO1 and KIT, indicating that ICC are involved in mechanical injury response. Taken together, we have improved the understanding of mechanical GI injuries by implicating ICC in injury-response. Future experiments will measure the slow wave activity of smooth muscle tissue over the course of the recovery weeks. We will also examine the expression levels of these proteins using western blotting.

QUANTIFYING GENETIC DIVERSITY AND STRESS HORMONES IN TRANSLOCATED BIGHORN SHEEP

JENNIFER GANSBERG

Program: GURA
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Wildlife managers translocate animals to augment declining wildlife populations and repatriate historic ranges. While translocations have been a successful tool for re-establishing extirpated populations, the movement of individuals among environments can result in a disconnect between the individual's physiology and the abiotic and biotic pressures of its new surroundings. Additionally, the movement of a limited number of individuals can result in decreased genetic variation in the re-established population, potentially resulting in a dampened immune response to pathogens and decreased resistance to disease-related stress. Thus, genetic variation and stress are useful measures when assessing individual and population health. We examined both of these measures in six wild populations of bighorn sheep with different histories of translocation and disease. Despite the successful repopulation of their historic range through translocation efforts, bighorn sheep have continued to face disease-related declines, making the species an ideal subject for both genetic and immune studies. To quantify genetic variation, we extracted DNA from 78 bighorn sheep hair samples. We amplified 22 microsatellite loci and ran samples on an ABI 3730 automated sequencer in the Nevada Genomics Center. We identified alleles using GeneMarker software and verified calls by eye. To quantify stress among populations and individuals, we measured cortisol levels in hair samples as an integrated, chronic measure of general stress-hormone levels. We find that both source and translocated populations maintain similar, moderate levels of genetic variation. Despite the different survival trajectories of these populations, we found no significant trends in cortisol levels among individuals or populations in relation to genetic variation. Future studies coupling detailed morbidity and mortality observations with robust sampling will aid in further delimiting the relationship between genetic diversity, long-term cortisol measures, and population persistence.

AHEAD OF THE STORM: ESTIMATING CHANGES IN PARAMETERS FOR TROPICAL CYCLONE FREQUENCY AND DAMAGE MODELS AND THEIR IMPLICATIONS FOR THE UNITED STATES

EMILY GARY

Programs: HURA, NVSGC
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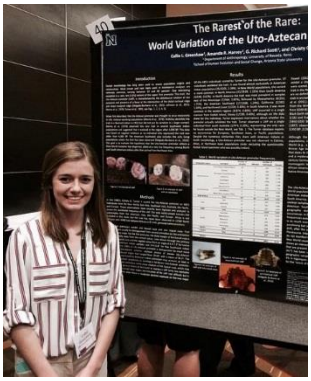
The United Nations reports tropical cyclones have been occurring with increasing strength and frequency as a result of global climate change. Thousands of lives have been lost and billions of dollars in damage incurred as results of these increasingly devastating storms. In order to respond to these extreme storms more effectively, we need to investigate trends in the frequency and likelihood of catastrophic storms within the United States and the associated costs of remediation. Realizing and estimating the future frequency

and size of storms will help with design of safety, response, and warning programs for the human population. This project aims at the feasibility of predictive modeling for future storm occurrences including their size and frequency. The information and models developed in this research will focus on providing quantitative data for response agencies that aid populations affected by the devastating tropical typhoons in the future. By estimating changes in parameters for the models that describe storm behavior in past decades (1990-1983) to recent decades (1984-2014) in the United States, we can better model the frequency and damage associated with these storms. We find that tropical cyclones are four times as frequent in recent decades and damage per storm (adjusted for inflation) has decreased at a 5% significance level. This speaks for the intensity of global climate change and its strong effect on storm likelihood in the United States. The success of damage mitigation is highlighted by decreased adjusted damage per storm.

THE RAREST OF THE RARE: WORLD VARIATION OF UTO-AZTECAN PREMOLARS



CALLIE GREENHAW

Program: Faculty sponsored
Mentors: G. Richard Scott
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Uto-Aztecan premolars are characterized by the distobuccal rotation of the paracone and presence of a fossa at the intersection of the distal occlusal ridge and distal marginal ridge. Initially, the trait was associated with Uto-Aztecan speakers in the American Southwest, but researchers have noted rare appearances in other Amerind groups in North and South America. From data collected by C.G. Turner II, descriptive statistics were calculated for samples throughout the world. Observations were made on 7279 individuals, with 40 individuals expressing the trait. Uto-Aztecan premolars were most common in American Indian populations (38/3633; 1.05%). The trait was also found in single individuals from Kodiak Island, Alaska and Australia. In the Turner database, there were no European, Northeast Asian, Southeast Asian, or Pacific occurrences. In New World populations, Uto-Aztecan premolars were more common in North America (34/2987; 1.14%) than South America (4/646; 0.62%). In North America, the trait was most prevalent in samples east of the Mississippi (7/364; 1.92%), followed by Mesoamerica (4/233; 1.71%), the American Southwest (20/1680; 1.19%), California (2/182; 1.1%), and Northwest Coast (1/228; 0.4%). In South America, it was most frequent in the west (3/374; 0.80%). The trait is not exclusive to Uto-Aztecan speakers as the name implies, but it is not randomly distributed. The trait is concentrated in American Indians. Interestingly, it was not observed in Eskimo-Aleut or Asian populations who otherwise show numerous parallels with American Indian tooth morphology.

HEIGHTENED SELF-AWARENESS INCREASES IMMEDIATE PERCEPTION OF SEXUAL SATISFACTION

MARY HALL

Program: Faculty sponsored
Mentor: Christina Frederick
Department: Psychology
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Sexual satisfaction is positively associated with life quality, self-esteem, and relationship fulfillment (Herbenick, Reece, Sanders, Dodge, Ghassemi, & Fortenberry, 2009). Previous research reveals 83% of Americans believe enjoying sex is vital to their health and well-being, but only 21% report experiencing extremely satisfying sex (Herbenick et al., 2009). This shows a disparity between perceived necessity and achievement. The aim of the current study was to examine whether or not heightened self-awareness influenced

sexual satisfaction as measured by the New Sexual Satisfaction Scale (NSSS; Mark et al., 2014). The NSSS is divided into two subscales (ego- and partner-focused questions). Sixty-four undergraduate participants (32 males and 32 females) were selected via convenience sampling and were randomly assigned to the treatment or control group. For 2 minutes, the treatment group looked at themselves in a mirror during a self-talk exercise and the control group read a magazine article. Participants then completed the NSSS. A two-sample t-test revealed a significant difference ($p < .001$) with the treatment group producing higher NSSS scores than the control. This suggests heightened self-awareness increases immediate perception of one's own sexual satisfaction. In both conditions, a two-way ANOVA showed females scored lower ($p < .001$) in sexual satisfaction than males. A two-sample t-test comparing ego/partner oriented scores yielded no significant difference ($p = .064$), which made distinguishing individuals by this variable impractical. Considering these findings, it is fair to infer self-awareness positively impacts immediate assessments of sexual satisfaction. Further research comparing sexual satisfaction among genders is recommended.

THE POWER OF A FEW WORDS: PROSOCIAL PRIMING DECREASES DISINHIBITED BEHAVIOR ONLINE

TESSA HARTMAN-SORENSEN

Program: Faculty sponsored
Mentor: Christina Frederick
Department: Psychology
Sierra Nevada College

Suler's (2004) online disinhibition effect refers to the deficit of social inhibition commonly present in face-to-face interaction. Online environments, particularly in the context of computer-mediated communication (CMC), foster anti-normative behavior (e.g., Alonzo & Aiken, 2004). The present study examined the impact of prosocial priming on toxic disinhibition with CMC as the medium. 120 undergraduate participants (60 females, 60 males) were selected through convenience sampling and randomly assigned to either the primed or control condition. In the primed condition, an inspirational quote was displayed in the page header of a simulated website containing 18 posts. The control condition displayed identical website content without the inspirational quote. Participants were instructed to provide anonymous comments on 6 posts, with each comment at least 2 sentences in length. Linguistic Inquiry and Word Count software (LIWC; Pennebaker & Francis, 1999) was used to measure the positive vs. negative textual emotion in participant responses. A two-way ANOVA showed a significant ($p < .0001$) reduction in anti-normative behavior (operationalized as negative textual emotion) for primed participants. Although previous research (Aiken & Waller, 2000) suggests male participants demonstrate anti-normative behavior online more often than female participants, the present analysis failed to show an interaction between gender and the presence of a prosocial prime. These results indicate normative CMC may be facilitated by prosocial priming. This study has implications for fostering positive online environments.

UNDERSTANDING HOW VEGETATION MICROCLIMATES INFLUENCE MAXIMUM TEMPERATURE AND MITIGATE STRESSFUL THERMAL CONDITIONS

SONIA HECKLER

Program: Faculty sponsored
Mentor: Tom Albright
Department: Geography
University of Nevada, Reno

Desert-dwelling species must contend with extreme temperature conditions on a regular basis. When environmental temperature rises above an endothermic species' normal body temperature, the individual must expend water to evaporatively cool their body temperature. Small increases in environmental temperature above body temperature, and the time spent at these temperatures can lead to dehydration and even death. In desert systems, dense vegetation in xeririparian corridors may provide important microclimatic refuges for species by minimizing their exposure to extreme conditions. Yet, studies examining ecological impacts of extreme weather and climate change often view temperature from the macroscale, overlooking the important influence of microscale temperature changes. In this study, we quantified the effect of vegetation microsites in moderating high temperature extremes in the Kofa National Wildlife Refuge, located in the hot Sonoran Desert of southwest Arizona. Temperature sensors were placed in riparian areas with dense, moderate and sparse vegetation covers, as well as in non-riparian areas and at ambient reference sites. All temperature sensors were placed in reflective vented radiation shields to minimize the effect of radiative heating on temperature sensors. First, we analyzed the effect of microsites on maximum temperatures. Areas of dense vegetation were approximately 1.5 °C cooler than reference locations during hot conditions. Second, we calculated degree-hours above a 40°C threshold, an approximate normal body temperature of desert birds, to quantify how much microsites reduce exposure to physiologically relevant thermal stress. Dense vegetation at times keeps the temperature below the 40 °C threshold while other times it seems to do little to buffer the temperature extremes. As climate change increases the likelihood of extreme temperature events and influences vegetation cover, understanding how various plant communities influence the survival of species will become increasingly important to understand how to manage ecosystems.

CURRENT DEVELOPMENTS IN ICE SHEET HYDROLOGY

BRANDON HILL

Program: Faculty sponsored
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The goal of this poster is to represent present and new concepts and methodologies in the understanding of ice sheet dynamics. Current developments in the study of the Greenland Ice Sheet and the Scandinavian Ice Sheet, and the attempt at modeling historical ice flows in North America are giving hydrologists a better understanding of ice sheet dynamics as well as the effects of those dynamics on melt water production, drainage and runoff, and the effects of changing atmospheric conditions on ice dynamics. Field observations from stations staged both on the ice sheets and nearby for data collection may provide up-to-date and reliable information on the status and progression of an ice sheet as well as its runoff and melt water. At the same time, the introduction of remote sensing technology, especially from satellite data, has enhanced the ability to detect the changes in atmospheric and oceanic conditions and the changes in the ice sheet size, shape, and velocity and

temperature. The remnants of certain hydrologic fingerprints in former areas of glacial and ice sheet flows may also be more evident as well. As a result, it may be possible to better understand ice sheet dynamics. Gravity-measuring satellite instrumentation coupled with field observations and known ice sheet dynamics may lead to better explanations about why there is no direct correlation between melt water production and runoff production in ice sheets. New approaches may also explain why certain ice flows branching from ice sheets that begin to rush toward the sea halt their advance inexplicably and become stationary.

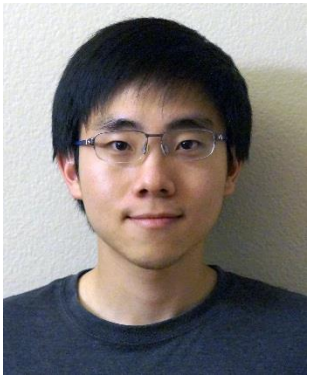
UNDERSTANDING THE EFFECTS OF MERCURY CONCENTRATION LEVELS ON WOOD DUCKS: ARE MALES OR FEMALES MORE SUSCEPTIBLE?

EMAN JABALI

Program: GURA
Mentor: Kelley Stewart
Department: Natural Resources and Environmental Science
University of Nevada, Reno

Contaminants in game species are an established concern because of the accumulation of chemical toxins that might be harmful to both waterfowl and humans. Mercury (Hg) occurs in water and sediments, and levels of contamination in individuals varies based on degree of exposure. We examined mercury levels in feathers of male and female wood ducks (*Aix sponsa*) to evaluate if one sex is more susceptible to contamination than the other. The Carson River in Fallon, Nevada, has been shown previously to have high concentrations of methyl mercury (MeHg) because of the state's mining history. We hypothesized that females would have higher concentrations of mercury in feathers than males because they were nesting and raising clutches along the Carson River. Conversely, males move to other areas during the summer and have more variation in movements away from the Carson River because they were not restricted. Our data demonstrated that females tended to have higher concentrations of mercury in feathers than their male counterparts, however, we postulate that our sample size was not large enough, resulting in a p-value that was not significant. Therefore, assessments of populations within Fallon, Nevada will require continuous examination and monitoring of contamination levels to ensure healthy, viable wood duck populations that will persist into the future.

DECREASING OMEGA-6 TO OMEGA-3 POLYUNSATURATED FATTY ACID DIETARY RATIOS INHIBIT TUMORIGENESIS IN PROSTATE CANCER CELLS IN VITRO



SUNGGU KANG

Program: NSF EPSCoR
Mentor: Ronald Pardini
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Research has shown that diets low in omega-6 polyunsaturated fatty acids (PUFAs), and rich in omega-3 PUFAs display a lower incidence of cancer. Although research scientists have shown that omega-3's inhibit cancer, much of their approach is not a good representation of an actual human diet. Treating cancer cells with omega-3's may inhibit tumor growth, but a human diet consists of a balance of different fats, not just one. To be more physiologically relevant, varying ratios of each fat should be tested together when treating cancer. Studies continually show treatments of omega-3 *or* omega-6, but never together. As a way of replicating a human diet, this project will test varying ratios of omega-6 to omega-3's on prostate cancer to determine which ratio in a human diet will prevent cancer the best.

INTEGRATION OF HIGH-ALTITUDE WEATHER BALLOONING SYSTEMS TO PREDICT LANDING LOCATION

GEORGE KEHAGIAS

Program: GURA
Mentors: Eric Wang, Jeffery LaCombe
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High-altitude weather ballooning is utilized in research to send payloads to near space. After the weather balloon pops, the payloads descend back to Earth under a parachute and must be recovered. The sooner the landing location of the balloon is known the easier the recovery of the payloads becomes. Oftentimes, the balloon lands in places where one must drive off-road as close as possible and then hike to the final landing location. Without knowing where the balloon will land, the mission participants must wait until the balloon lands to begin the recovery process. By knowing the landing location of the balloon sooner, the recovery group could utilize the balloon's time in the air, rather than wasting it.

The focus of this project is to integrate and update current devices that exist to predict the landing location of a weather balloon in flight. This project focuses on hardware integration and renovation of multiple systems that currently exist. The systems that are being integrated include hardware and software to predict the landing location, and hardware to transmit the balloon's current location and predicted landing location. Integrating these systems will allow the recovery team to track the predicted landing location of the balloon during flight.

CHANGING TREE DISTRIBUTIONS ON EDAPHIC MICROSITES OF PEAVINE MOUNTAIN

ELANA KETCHIAN

Program: NVSGC
Mentors: Peter Weisberg, Tom Dilts
Department: Natural Resources and Environmental Science
University of Nevada, Reno

Hydrothermally altered "yellow soils" on Peavine Mountain stand in sharp contrast to adjacent soil types and provide unique habitat for several coniferous tree species that are typically not found on semi-arid, Great Basin sites. These tree species, which include *Pinus ponderosa, Pinus jeffreyi, Pinus lambertiana,* and *Pinus washoensis,* can tolerate altered-andesite soils that are low in plant nutrients and extremely acidic. The goals of this project were to determine how tree occurrence, density, and abundance in the network of altered-andesite patches have changed over a 47-year period (1996-2012), and to quantify the relative importance of landscape configuration, disturbance, and environmental influences on changing tree distributions. We hypothesized minimal alterations to the tree patch network and tested this by accurately tallying trees abundance from high-resolution aerial imagery. We used random forest and CART to model how change in density and abundance are predicted by habitat configuration and habitat quality variables. Habitat configuration variables consisted of Euclidean nearest neighbor and proximity index. Habitat quality variables included area, elevation, slope, and fire frequency. Most patches showed no change (85.5%). Patches that changed in abundance from 1966-2012 were more likely to have gained trees (10.1%) than to have lost trees (4.4%). Loss of trees, mainly around the edges of the large patches, was strongly correlated with fire disturbance. Overall, tree density has increased in the patch network, which could have resulted from renewed establishment after historical tree harvesting during the mining era. The majority of patches had consistent tree occupancy despite frequent fires, indicating that altered-andesite soil patch habitats function as edaphic refugia from disturbance for the coniferous

trees and associated understory species, even as the surrounding sagebrush steppe has changed dramatically and become dominated by exotic plant species.

BE SMART ABOUT WHERE YOU START: GROCERY ENTRANCES IMPACT HEALTHY FOOD SELECTIONS

KIMBERLY KEYZERS

Program: Faculty sponsored
Mentor: Christina Frederick
Department: Psychology
Sierra Nevada College

The prevalence of obesity has doubled since 1990, now affecting 36% of US adults (Harvard, 2014). As obesity becomes an increasing threat to public health, it is crucial to explore potential solutions. Research converges to show priming alters food selection behavior, making food selection priming a potential solution. Wansink and Hanks (2013) showed consumers primed with low calorie food at a buffet selected less food and fewer items than those primed with high calorie food. Correspondingly, Papies et al. (2014) found overweight consumers primed with a healthy recipe card bought fewer unhealthy snacks than those who were not primed. Because food selection typically occurs at grocery stores, the current study evaluated the impact of varying simulated grocery store (SGS) entrance condition (produce vs. convenience) on healthy food selection. Sixty undergraduate participants, selected via convenience sampling, were randomly assigned to enter a SGS through either the produce entrance (PE) or the convenience entrance (CE). Participants shopped the SGS for a hypothetical vacation and completed a shopping list including items, units, and prices. A paired *t*-test revealed more ($p < .001$*) healthy vs. unhealthy items were selected in the PE condition and no difference ($p = .369$) in selection patterns existed in the CE condition. Further, a two-sample *t*-test showed more ($p < .001$*) healthy items were selected in the PE vs. CE condition. Results suggest consumers make healthier food selections when entering a SGS via the PE. This study confirms food selection behavior is a function of grocery store layout.

IN VIVO CLEARANCE AND TISSUE DISTRIBUTION OF PURIFIED *BURKHOLDERIA PSEUDOMALLEI* CAPSULAR POLYSACCHARIDE IN A MURINE MODEL

ADAM KIROSINGH

Program: GURA
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Recently, a rapid lateral flow immunoassay for diagnosis of melioidosis was developed using antibody specific to capsular polysaccharide (CPS) of *Burkholderia pseudomallei*. The tests have been distributed worldwide for clinical testing. However, the in vivo fate and clearance of CPS has never been thoroughly investigated. Here, we injected mice with CPS intravenously and determined CPS concentrations in serum, urine, and major body organs at various intervals. Preliminary results indicate that CPS was eliminated predominantly through urine and not deposited in other tissues. In urine, degradation product of CPS was not found; in contrast, it was detected at a higher molecular weight. How a large molecule like CPS was filtered through glomerulus and formed a larger molecule are still being investigated. However, it is possible that the rod-like shape of CPS with a small diameter allows it flow through glomerulus. The CPS half-life in serum is apparently short, with an initial half-life and secondary half-life of 4.2 hours and 1.3 days, respectively. This suggests that the presence of CPS in serum or urine may reflect acute melioidosis.

MINERALIZATION OF THE NIGHTINGALE TUNGSTEN SKARN DEPOSIT IN STOREY COUNTY NV

TAYLOR KRABIEL

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The unique mineralogy of the abandoned Nightingale mine of Storey County Nevada presents valuable information on a potentially strategic Tungsten deposit. The main unit of interest is a contact metamorphic rock known as Skarn, which hosts the tungsten mineralization. Tungsten was recovered from the mineral scheelite ($CaWO_4$), one of the primary Tungsten ore minerals throughout the world. The Nightingale mine has long been known by both academics and collectors for its unique and museum quality minerals, the primary minerals of interest including scheelite, clinozoisite, garnets, and diopside. A detailed accounting of mineralization in this area was needed in order to set groundwork for further economic and academic research. Minerals were studied and described using several advanced tools: Scanning Electron Microscope (SEM), optical thin sections, X-ray Diffractometer, and Geochemical bulk analysis. Confirmation of known and newly-described minerals was made using these tools. Minerals have been characterized by composition, physical/optical description, occurrence in area, and possible genesis. Additionally the two key host rocks were characterized and classified as Granodiorite and Marble, with additional lenses of Shale. The Tungsten ore was analyzed for element and mineral association by bulk analysis to determine trends within the ore body. This bulk analysis was used to also see if there are any other geochemical trends amongst the minerals of the Skarn.

ALPHA BINAURAL BEATS IMPACT WHEN COMBINED WITH CLASSICAL MUSIC OR MODERN DAY MUSIC

CHELSEA LEE

Program: Faculty sponsored
Mentor: Christina Frederick
Department: Psychology
Sierra Nevada College

Binaural beats are perceived by the brain when two different auditory beats of different frequencies are produced to each ear through stereo headphones. Depending on the frequency of the binaural beat, your brain waves will correspond, potentially creating a certain state of mind. The purpose of this study is to determine if combining an alpha binaural beat of 12Hz to two different kinds of genres, would the binaural beat become more amplified causing a greater effect measured by an EEG. Previous studies suggest binaural beats have a significant impact on brainwaves and the potentials that binaural beats could have on the mind, could be beneficial in many areas. The current study included 60 participants, listening to three different sessions: baseline, exposure, and post readings. After comparing the results of the three sessions, the EEG showed a slight raise in alpha brain waves during the exposure but not enough for a significant difference. There was no significant difference between the two genres although, the EEG did report the minimums showed a much larger range in the exposure groups even though the averages were similar. With no significant difference between the genres, the ability to combine a binaural beat with any type of music allows the beat to be heard with any kind of music for the same effects.

THE ROLE OF SLIT/ROBO SIGNALS IN THE BASEMENT MEMBRANE STRUCTURE

HAERAM LEE

Program: NSF EPSCoR
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Proper neural migration during embryogenesis is necessary for brain development and function, and the basement membrane of the neural tube plays important roles in neuronal migration. The basement membrane is a sheetlike extracellular matrix composed of a network of laminin and decorated with various other protein components. Despite the vast research about spinal motor neurons and its function, little is known about how spinal motor neurons retain their organized pattern inside the ventral neural tube and how the basement membrane affects spinal motor neuron migration and position. We found that motor neurons migrated out of the spinal cord in Robo knockouts. In this project, I will test whether Slit/Robo signals are necessary for normal basement membrane structure and determine the link between abnormal basement membrane structure and mis-migration in the spinal cord. This project will determine the role of floor plate signals in the basement membrane stability necessary for spinal motor neuronal migration.

ELECTROPHYSIOLOGICAL ANALYSIS OF TREK-1 AND TREK-1 SPLICE VARIANTS IN FRESHLY ISOLATED MYOCYTES FROM DIFFERENT PREGNANCY STATES

MICHAEL LEE

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Failure to hinder uterine contractions resulting in the delivery of an underdeveloped (>37 weeks) fetus is the leading cause of newborn mortality worldwide. Though the reason behind the majority of spontaneous preterm labor is unclear, effort has been made to help solve this issue. The stretch activated potassium channel TREK-1 is hypothesized to contribute to uterine quiescence during gestation. TREK-1 is a mechanically-activated, pH-sensitive potassium channel that hyperpolarizes the myocyte membrane when activated. Recently discovered variants of the TREK-1 channel may be expressed in patients that deliver preterm. Expression of wt-TREK-1 and its variants in freshly isolated myocytes from different pregnancy states are likely to recapitulate native TREK-1 currents. This experimental model will be used to test the hypothesis that TREK-1 channel activity is influenced by TREK-1 variant expression, time of delivery, and pregnancy state.

CHARACTERIZING TEMPERATURE PROFILES OF THE ATMOSPHERIC BOUNDARY LAYER DURING EXTREME STAGNATION EVENTS IN RENO

ADDISON LIMING

Program: GURA
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The objective of this scientific research is to study the characteristics of the atmospheric layer closest to the earth's surface, called the atmospheric boundary layer (ABL), during periods of strong atmospheric stability due to wintertime temperature inversions in Reno. It will contribute understanding to the research community about atmospheric mixing during dangerous, extremely stable conditions, and will use novel instrumentation to obtain continuous temperature profiles of the atmosphere up to 150 meters. This information can be used to better assess the risk to human health due to ambient air pollution concentrations in Reno.

MECHANISMS OF PROPAGANDA IN CONTEMPORARY STREET ART

JEANNETTE MARTINEZ

Program: GURA
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University of Nevada, Reno

From the slums of Brazil to the skyscrapers of Manhattan, one will find art in the streets. In this research Street Art is interpreted as art that is created in the streets. This simple definition allows the research to answer the social question of *why* art is created in the streets and how creating art in public spaces is contemporary form of social and political propaganda. The research will elaborate how artwork hosted in a public domain has the power to engage and influence an audience to think differently in a countless current issues. Street Art and propaganda in the past has been an extraneous comparison, but I argue that their unconventional relationship is present. I will thoroughly discuss through analysis of style, artist, and social influence, which will present how pertinent these two topics are to one another. Although Street Art has been historicized as an artistic movement that expands many subcategories, I question why the scholarship of propaganda's role within the Street Art movement and its varying styles has yet to be fully developed. Interviews with street artists in two cities: Reno, Nevada and Los Angeles, California will provide exemplifications of the function propaganda has within the Street Art spectrum and how its role is directly related to regional culture and adds validity to the observation that mechanisms of social and political propaganda are present in contemporary Street Art. How propaganda is used in Street Art further enforces the idea that Street Art possesses power to promote social messages that become influential through the artwork itself and can lead to public action within varying societies.

THE SPANISH CIVIL WAR: EFFECTS OF THE AIRLIFT FROM MOROCCO TO THE IBERIAN PENINSULA

HANNAH MCMAHON

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The Spanish Civil War was a prelude to World War II. Although territorially limited to Spain, ideologically and politically it encompassed Europe and America, embroiling in it the same powers who would declare war in the European theater only five months after the Spanish war ended. In that sense, the Spanish Civil War was sufficiently similar to WWII that, save for a five-month hiatus, WWII can be thought of as having begun, at least ideologically and politically, in Spain on July 17, 1936. The Spanish Civil War (1936-1939) attracted global attention not merely because of its renowned bloodiness and because of Spain's strategic location, but also because of the nature of the conflict itself, which pitted two competing political ideologies, fascism and communism, against each other, at a time when both had begun to exert increasing influence in Europe. While numerous countries lent their support to this or that side in the conflict, two of them played pivotal roles: Germany and Italy. We hypothesize that Hitler and Mussolini's direct aid in the transport of the Spanish Army of Africa across the Strait of Gibraltar to the Iberian Peninsula was the defining event of the war, insofar as the promise of that aid promoted the feasibility of the coup d'etat and insofar as the aid itself led to the longevity of the ensuing conflict and its eventual outcome.

INVESTIGATION OF ACUTE PULMONARY DEFICITS ASSOCIATED WITH BIOMASS FUEL COOKSTOVE EMISSIONS IN RURAL BANGLADESH

DANIELLE MEDGYESI

Programs: GURA, NSF EPSCoR
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The use of solid biomass fuels in cookstoves has been associated with chronic health impacts that disproportionately affect women worldwide. The immediate effects on acute pulmonary function, however, have not been investigated. This study measured the respiratory impact of exposure to biomass fuel emissions for 15 females ages 18-65 in rural Bangladesh. Solid fuel stoves that use wood, litterfall, and cow dung are common in rural Bangladesh and are typically located in a separate room from the main house. Pulmonary function was measured with spirometry before and during cooking to assess changes in respiratory function associated with exposure to cookstove emissions. Specifically, the forced expiratory volume in one second (FEV1), forced vital capacity (FVC), FEV1 over FVC ratio, and peak expiratory flow (PEF) were compared. Cookstove emissions were characterized using continuous measurements of particulate matter (PM2.5) concentrations at a 1 second time resolution. Exposure metrics were calculated from measured PM2.5 concentrations to estimate the acute exposure to cookstove emissions for each study participant. The exposure estimates during cooking include the 3-minute maximum, and 10-minute maximum, adjusted with baseline 10-minute average PM2.5 concentrations. Spirometry measurements, FEV1 and FVC, were adjusted based on gender, height, age, and ethnicity and calculated as a percent of predicted. The study determined a linear regression between baseline adjusted 3-minute maximum and 10-minute maximum PM2.5 concentrations while cooking and FEV1/FVC%, FEV1, FVC, and PEF obtained during cooking exposure. 75% of qualifying subjects showed a decrease in

FEV1/FVC% while cooking. Of those who displayed a decrease in FEV1/FVC% while cooking, an average of 5% decrease was observed. Due to our small sample size, these results were not statistically significant. However, we observed several case studies in which women who were 40 years and older and had been cooking for 25 years or more suffered from severe pulmonary restriction.

ENSEMBLE CODING IN MUSIC PERCEPTION

SOLENA MEDNICOFF

Program: HURA
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Our senses are limited in the amount of information they can represent, and may overcome this bottleneck by encoding a summary or "gist" of the information rather than the specific details of the stimulus. This "ensemble coding" or summary statistics perception has been widely documented for the visual system, and has recently been found to also hold for sound perception. For example, when a sequence of tones is played, observers are poor at remembering the specific tones while good at recognizing the average tone, even when that average was not present in the set. We examined the nature of this ensemble coding for musical tones, in order to explore how ensemble perception operates across different sound sources (different instruments) and whether it depends on the musical experience of the listeners. Participants were undergraduate students with or without formal musical training. They were presented with a series of four notes (spanning 349.23-554.37 Hz) in random order (600 msec per note separated by 400 msec). The notes came from recordings of a piano or flute, and on different trials were all from the same instrument or from both instruments (one playing solely one instrument and the second alternating between the two). A test note from either instrument was presented 600 msec after the sequence, and the listener reported whether it was part of the sequence. Test notes included the four targets plus nine intervening notes at half-step intervals. In preliminary studies, untrained observers confused both the notes and the instruments, consistent with encoding the overall gist of the set. Musicians instead correctly identified the actual notes yet made confusions across the instruments, suggesting that pitch was encoded independently of timbre. These results have implications for understanding how ensemble averaging occurs in music perception and how it is shaped by expertise.

REDUCING STRESS WITH DANCE

KRISTINA MIRANDA

Program: Faculty sponsored
Mentor: Christina Frederick
Department: Psychology
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Over 70% of people in the U.S. report psychological and physical symptoms related to stress (APA, 2014). Given these statistics, research into factors and activities that may reduce stress is imperative. Physical forms of therapy, such as dance movement therapy (DMT), have been shown to decrease stress (Brauninger, 2012). West, Otte, Geher, Johnson and Mohr (2004) examined the impact of African dance on perceived stress. West et al. (2004) employed the perceived stress survey (PSS; Cohen, Kamarck, & Mermelstein, 1983) and found African dance reduced stress similarly to DMT. The current study examined the impact of a recorded instructional dance session on perceived stress. Eighty undergraduate participants were selected via convenience sampling and randomly assigned to either the dance or no dance condition. Participants began their session by

watching a stress inducing video. Following, those in the dance condition completed the steps present in a two minute dance tutorial and those in the no dance condition reflected on the stress inducing video. Participants in both conditions, then, completed the PSS. PSS scores were sorted by dance condition and analyzed. A two sample t-test revealed significantly ($p = .011^*$) lower PSS scores in the dance as compared to the no dance condition. Findings of the current study align with previous research showing that dancing with a recording of instructional dance reduces perceived stress. As undergraduates were the population of focus in the current study, these results indicate college dance programing (e.g., social, exercise, etc.) could provide an outlet for stress reduction.

EFFECTS OF CANOLA MEAL AS A SOURCE OF RUMEN-UNDEGRADED PROTEIN ON RUMINAL FERMENTATION USING A DUAL-FLOW CONTINUOUS-CULTURE SYSTEM

HUGO MONTEIRO

Program: Faculty sponsored
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Because nitrogen (N) is an expensive component of livestock diets and excessive N excretion affects the environment, efficiency of N utilization plays a crucial role on meat and milk production. When ruminants consume proteins, there is a fraction that escapes rumen degradation called rumen-undergraded protein (RUP), and it provides important amino acids to be absorbed in the small intestine. Previous research indicated that there were significant differences in RUP among a commonly used protein source, canola meals (CM), and that these differences could influence the efficiency of N utilization in ruminants. Therefore, the objective of this study was to evaluate the effects of feeding CM with different RUP content on ruminal fermentation, nutrient digestion, and N metabolism using a dual-flow continuous-culture system. Diets were randomly assigned to six fermenters in a replicated 3x3 latin square with 3, 10-d experimental periods consisting of 7-d for adaptation and 3-d for sample collection. Treatments were: solvent soybean-meal (SBM); low-RUP CM (LCM); and high-RUP CM (HCM). Fermenters were fed 72 g/d, divided in 4 feedings. Diets were prepared as three concentrate mixes that were combined with orchardgrass hay and wheat straw. Liquid and solid flow rates were adjusted to 11 and 5.5%/h, respectively. Samples were collected for digestibility, ruminal fermentation, and microbial growth. Statistical analyses were performed using SAS. Orthogonal contrasts were used to compare effects of different protein sources (SBM vs. LCM + HCM), and (LCM vs. HCM). Nutrient digestion, N metabolism, total volatile fatty acid (VFA) concentration, molar proportion of acetate, propionate, butyrate, and isobutyrate, were not affected by treatments. However, molar proportions of valerate and isovalerate, as well as total branched chain VFA (BCVFA) were lower for CM diets. Therefore, these results indicate that CM may improve N efficiency, since valerate, isovalerate, and BCVFA are associated with protein degradation.

THE EFFECT OF LOCAL CONDITIONS ON ACTIVITY LEVELS ASSOCIATED WITH EXTINCTION RISK IN DESERT REPTILES

JOSH MYERS

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Climate change is associated local extinctions in reptiles, especially lizards. This occurs when increased midday temperatures restrict the hours of lizard activity during the breeding season (hr). As lizards become unable to meet energy demands during the shortened activity period, local extirpation risk increases. However, this risk is not necessarily uniform across all populations within a species. To better understand how local conditions influence activity and local extinction risk, microclimate temperature data collected with iButton temperature loggers was used to estimate hr across 8 populations of *Uta stansburiana* (side-blotched lizard) in Palm Springs, CA. Hr estimates were correlated with elevation, human disturbance, and ground cover to determine how variation in the environment related to activity period length. Field trials were also conducted to test the accuracy of iButton temperature loggers as operative temperature models for lizards on different substrates. Correlations between lizard body temperature and iButton temperature (after both equilibrate to ambient temperature) ranged from $R^2 = 0.84$ to 0.90. The majority of iButton temperature readings (+/- 2 SE) fell between 1.86 to 2.36 °C of lizard body temperatures. However, measurements of lizard body temperature from field-captured individuals were not correlated with the temperatures of their substrates. The ability of lizards to move quickly across unsuitably hot substrate may play an important role in reducing susceptibility to local extinctions. Lizards can continue to forage during high-temperature periods by reducing their exposure to temperatures above the preferred body temperature.

DYNAMIC TESTING OF ROPE AND ANCHOR SAFETY SYSTEMS

AMANDA NELSON

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This project focused on testing ropes and personal safety equipment using a more realistic manner which could improve current safety guidelines. Rope and safety equipment systems have many uses ranging from search and rescue efforts to recreational climbing. Most current safety guidelines for these systems are based off of data gathered using the traditional testing setup where one end of the rope and anchor safety system is fixed while weights are applied to the other end in order to determine the load in the rope during a fall. The main goal of this project was to implement a more realistic test setup for rope and safety systems where both ends remain free throughout the test so that the system can move and dissipate additional energy. To create baseline data simulating the traditional setup and to calibrate the load cells, this project reviewed previously published results regarding the behavior of daisy chain personal anchor systems under dynamic loading using the traditional setup. By using video cameras in conjunction with portable load cells placed in series with safety system, it was possible to accurately measure the loads that the system experienced during a fall. Following the hardware verification, non-traditional tests were performed with rock climbing ropes where both ends remain free. The load cells were placed in series with the rope ends to observe the change in the load

values as compared to the values collected from tests performed with the traditional fixed end tests. All of the tests performed in this project were completed and compared to determine if the system's reactions under more realistic conditions where both ends of the system were free to move varied from its reactions when tested using the traditional setup.

SWIPE LEFT: ONLINE DATING PROFILE PICTURES DO NOT IMPACT NARCISSISM

ERICA NELSON

Program: Faculty sponsored
Mentor: Christina Frederick
Department: Psychology
Sierra Nevada College

As dating websites and mobile applications grow in popularity, they change the way we view and meet people (Smith & Duggan, 2013). Those who use social networking sites for online dating control their own self-presentation (e.g., profile picture). Campbell (2014) stated narcissists are drawn to situations that reflect positively on them and online dating can provide this stage. The current study examined narcissism in an online dating scenario. Kapidzic (2013) found the motivator behind profile picture selection on social networking sites (e.g., Facebook) was narcissism, however, narcissism with respect to profile picture variations has yet to be studied. Ninety undergraduates were selected via convenience sampling and were randomly assigned to one of three simulated online dating conditions. Participants personalized an online dating questionnaire including no picture, a profile picture, or a landscape picture. Following this profile phase, participants completed the Narcissistic Personality Inventory (NPI; Raskin & Hall, 1979). A Bartlett's test (Bartlett, 1937) did not indicate homogeneity of variance and the Anderson-Darling (Anderson & Darling, 1952) did not indicate the data were normally distributed. Given these patterns, the non-parametric alternative to the two-way ANOVA, the Kruskal-Wallis (Kruskal & Wallis, 1952), was used to test for differences in NPI scores between picture conditions. No significant difference (p = .257) in NPI scores existed between conditions. Based on these findings, it is reasonable to conclude personalizing an online dating profile with variable picture types does not impact narcissism. It is suggested further research into online dating examine variables such as self-esteem.

INTERPRETING SEDIMENTARY GEOLOGICAL STRUCTURES IN THE SOUTHERN CENTRAL ANDES: TOWARDS ASSESSING PAST AND CURRENT CLIMATE EFFECTS ON ARID REGIONS WORLDWIDE

NATASHA NETO

Program: Faculty sponsored
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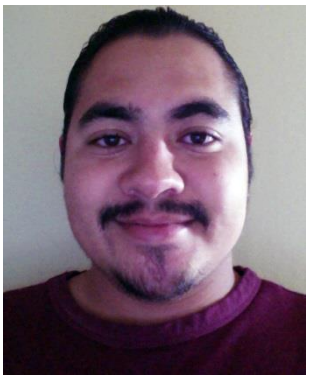
The Southern Central Andes has a landscape conducive to studying, and gaining, a better understanding of natural weather and temperature variations through geologic history. This area has an excellent record of variability for the last 10,000 years. By examining this specific area of the globe, we can then extrapolate this information, and use it to predict similar outcomes, of other regions that are geologically similar. One of those regions being the state of Nevada. Nevada shares similar characteristics, and therefore can be considered as part of this study.

Holocene climate variations (the last 10,000 years), in Southern Central Andes, have had an effect on debris flow activity. This is indicated in the preliminary results of this ongoing project. By developing geologic chronologies (a timeline of climactic and weather events preserved in the environment), we can focus on how and why these

sequences of debris flow deposits indicate extreme weather differentiation.
This project is still in the process of collecting new information, to better analyze and predict the ongoing effects climate has on this region, and by extension, specifically Nevada. By partnering with Universities and scientific institutions, in the United States and outside of this country, we can access richer and more in depth data to support varying hypothesis, in the subject of climate change. This can aid in our reality of the rising strength of summer and winter storms, increases in wildfire, and changes of slope instabilities in the Eastern Sierras of Nevada. We can address these problems resourcefully by continuing these studies.

TWO-DIMENSIONAL NANOPOROUS POLYMER FOR PROTEIN RECOGNITION



PABLO OCHOA

Program: NSF EPSCoR
Mentor: Benjamin King
Department: Chemistry
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This project's underlying goal is to enhance our previously synthesized twodimensional nanoporous polymer (2DNP) by giving it a protein recognition property. The basic approach in bestowing protein recognition abilities upon the 2DNP is to synthesize monomers with appended protein recognition units followed by the light induced polymerization of the monomers via a water and air interface. The recognition units that will be installed are biotin molecules that are able to bind and therefore tag the presence of avidin protein molecules within the vicinity of the 2DNP. Successful attachment of biotin units to the polymer would only be the beginning of the broad range of chemistry that can be done to further enhance the 2DNP's recognition capabilities. We can in theory tune the 2DNP's protein specificity by conjugating varying recognition units that will permit it to bind molecules to which the appended units have an affinity for. This will essentially allow the 2DNP to serve as a membrane and filter out specific molecules within its surrounding. The possible applications of such 2DNPs are exponential and can range from sensing the presence and/or concentration of a target protein in a patient's blood to filters that can recognize specific molecules within the water supply.

THE REGULATION OF CALCIUM-ACTIVATED CHLORIDE CHANNELS (CACCS) BY PHOSPHORYLATION IN HUMAN EMBRYONIC KIDNEY (HEK) CELLS

VENEA OMANDAC

Program: HURA
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Ion channels spanning the cell membrane are important in the excitation of vascular smooth muscle cells (VSMCs). Ca2+-activated chloride channels (CaCC) are influenced by the dynamic change in intracellular Ca2+ concentration that elicits a change in action potential, but not much is known about their regulation. Phosphorylation has been previously associated with the regulation of CaCCs in VSMCs. Ca^{2+}/calmodulin-dependent kinase II (CaMKII), CaN, and protein phosphatase 1/protein phosphatase 2A PP1/PP2A have been hypothesized to play a major role in the regulation of the channel through phosphorylation. The effects of phosphorylation in regulating the activity of these ion channels in Human Embryonic Kidney 293 (HEK 293) cells transfected with TMEM16A/ANO1 were tested using the Whole-cell Patch Clamp technique. It is now known that TMEM16A/ANO1 is the gene that encodes these channels, thus cells transfected with DNA will present classic CaCC conductance. CaCCs have been associated with pulmonary hypertension which could be attributed to artery

blockage, damage, or narrowing. Further understanding of the regulation of CaCCs, highly present in pulmonary artery smooth muscle, could lead to finding a better therapeutic target for this and other cardiovascular diseases.

THE RIGHTS-BEARING CHILD: LATE-TWENTIETH CENTURY U.S. INTERVENTION IN CENTRAL AMERICA, U.S. IMMIGRATION POLICY, AND INTERACTIONS BETWEEN THE STATE AND MIGRANT YOUTH

IVÓN PADILLA-RODRIGUEZ

Program: HURA
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In the late 1970s, Central American migration to the United States began to increase dramatically in response to the civil wars and violence countries like Nicaragua, El Salvador, and Guatemala experienced. These events, which were fueled by United States intervention, pushed thousands of Central Americans—including children and their families—to leave their homes in search of refuge in the north. Consequently, refugee policy in the United States and international human rights law began to change and develop quickly to address the migratory status quo of the time. Such policies have profoundly impacted the experiences of child migrants and the complex legal and humanitarian dilemmas that result from their continued migration. This study will explore the impact U.S. military intervention had on Central American immigration between 1970 and 1990, particularly that of young children. Moreover, it will examine how (1) immigration of Central American youth shaped U.S. immigration policies, (2) states responded to their presence, and (3) youth interacted with the U.S. immigration system through a child-centered theoretical approach to migration scholarship. This project will pay special attention to the impact of the United States' involvement in the Contra War of Nicaragua, the civil war and death squads in El Salvador, and the United States-supported coup and "scorched-earth" campaigns in Guatemala on the migration of children, specifically; the domestic and international immigration and refugee policies of the

A SYSTEMATIC EXAMINATION OF INTRINSIC CYANO GROUP FLUOROPHORES

JACOB PANKEY

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Currently it is difficult to model crowded biomolecules. Being able to model these biomolecules can lead to improving the delivery in hard to reach places in the body. The energy curve of a peptide is expected to change based on the distance between the two different functional groups. A correlation between the different energy peaks in the curve and its distance can be measured but has not yet. We systematically examined various nitrile embedded protein systems to examine the changes between the Fluroesence spectrums and Absorption spectrums to observe these energy peaks. The following peptide systems were examined: 2-cyanophenylalanine:tryptophan; 2-cyanophenylalanine:proline:tryptophan; and 2-cyanophenylalanine:proline:proline:proline:proline:proline:tryptophan. Each system was prepared in a solution of water. We also examined the spectra of a 2-cyanophenylalanine solution and a tryptophan solution. It was observed that the spectra of systems with more proline in between 2-cyanophenylalanine and tryptophan had spectra more like the independent solutions overlaid on top of one another. This is consistent with "Forster Resonance Energy Transfer" theory which concludes that a system of two connected fluorophore sat a significant

distance will act like fluorophores at infinite distance. In this case infinite distance is the two independent solutions of the 2-cyanophenylalanine fluorophore and the tryptophan fluorophore.

LONG-TERM MEMORY AFTER VISUAL ADAPTATION

CANDACE PEACOCK

Program: GURA
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Adaptation describes the modulation of neural responses after exposure to relevant environmental stimuli. These adaptation responses have measurable behavioral consequences, as well. For example, living in the desert adapts vision to better discriminate between similar shades of brown whereas living in the jungle would allow better discrimination to similar shades of green. Adaptation is a fast-acting and common mechanism and as such, we asked whether adaptation could enhance long-term memory for visual stimuli. Here, we report the results of two experiments investigating whether visual adaptation at encoding predictably changes long-term memory representations by improving them. In Experiment 1, participants adapted to a blurry image or to no image and then encoded a series of visual scenes at one specific blur level. At retrieval, participants viewed the same scenes with different blur levels and reported whether the probe image was more or less blurry than at encoding. Although we predicted a general 'sharpening' of representations for the blur-adapted condition, we did not see evidence of a blur-adaptation benefit. In Experiment 2, participants adapted to a strongly masculine (or feminine) faces before encoding a series of masculine (or feminine) faces. At retrieval they reported whether the probe face was more or less masculine (or feminine) than at encoding. Here, we found evidence of adaptation. Faces were reported to be more feminine in the masculine-adapted condition. Also in the other condition faces were reported to be more masculine in the feminine-adapted condition. These data indicate that it is possible for encoding-related adaptation to subtly influence memory in predictable ways.

ENHANCED SLEEP IS AN EVOLUTIONARILY ADAPTIVE RESPONSE TO STARVATION STRESS

JOSUE REGALADO

Program: GURA
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Department: Biology
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Animals modulate sleep in accordance to environmental factors, such as nutrient deprivation, in order to maximize fitness. For example, suppression of sleep in response to starvation can lead to increased food foraging behavior[6]. In contrast, increased total sleep time can be advantageous during times of food scarcity to conserve energy[3]. Although a connection between sleep and metabolism is known, the evolutionary underpinnings remain unclear. The fruit fly displays highly conserved characteristics of sleep, making it a powerful model for investigating the interactions between sleep and metabolic processes[5]. We've utilized experimental evolution to generate flies with enhanced resistance to starvation or desiccation, allowing us to examine the evolutionary and functional relationship between these traits. After independently selecting over 60 generations for starvation resistance (SR) or desiccation resistance (DR), the SR flies survive up to 18 days in the absence of food, while the DR flies survive up to 4 days in the absence of water[4,7]. Previous studies have correlated SR and DR with energy stores, such as triglyceride or glycogen content, and have demonstrated changes in sleep or activity in SR flies[1,2]. However, it is still unclear whether these studies represent generalized

adaptations to stress, or selective adaptations to prolong survival in response to nutrient deprivation. Here we provide evidence for context-dependent evolution of metabolic and behavioral adaptions in response to nutrient deprivation, and we introduce a framework for understanding the evolutionary basis for interactions between food availability and sleep.

AMINO ACID PREFERENCES IN BUMBLEBEES

BRANDY REYNOLDS

Program: GURA
Mentor: Anne Leonard
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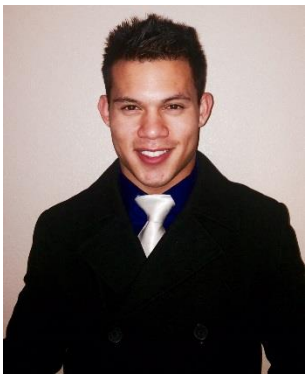
Bumblebees (*Bombus impatiens*) forage for nectar and pollen alike, however, little is known as to whether bees sense the nutritive value of different pollens. Pollen is a major source of protein for bumblebees, as they feed it to larvae and use it to make eggs. In comparison to honeybees (*Apis meliifera*), bumblebees collect pollen from more diverse plant species and return to the colony with pollen loads higher in essential amino acids. Whether or not a bumblebee can detect these amino acids through taste and/or smell and choose pollen on this basis is unknown. I asked whether bumblebees have the ability to taste/smell the difference between different amino acid solutions, specifically Glycine, Threonine, Proline, and Phenylalanine. In honeybees, research has shown that these amino acids may play an important role in nutrition, but little is known as to the importance in bumblebees. In a series of feeding choice assays, I tested these amino acids at different concentrations as well to determine if there was an effect on bumblebee preference at high or low concentrations. This study lays the groundwork for understanding what role gustation plays in the recent North American bumblebee declines. These declines affect pollination of agricultural crops and native plant species. Thus, understanding bumblebee nutrition is important to keep their species thriving and consequently our species as well. This research will shed light on a basic aspect of bumblebee nutrition and assess whether their preferences for different quality pollens potentially contribute to their current decline.

A MECHANISTIC STUDY OF TRANSGENERATIONAL EPIGENETIC INHERITANCE, UTILIZING A NOVEL MOUSE MODEL



CONNOR RIORDAN

Program: GURA
Mentor: Wei Yan
Department: Physiology and Cell Biology
University of Nevada, Reno

Epigenetics is the study of heritable changes in gene expression that occur independent of changes to the genetic code. Epigenetics hold promise as a fledgling field, for its apparent involvement in many disease states. However, very little is known of the molecular mechanisms that account for the epigenetic phenotypes. There is amounting evidence that epigenetic changes can be transgenerationally inherited, but the molecular mechanisms that mediate these changes remains poorly understood. In this project, attempted to unravel the molecular mechanisms underlying an epigenetically mediated phenotype in order to further the understanding of the field. We had previously isolated a unique model system to study transgenerational epigenetics. The insertion of a copGFP marker into the c-Kit to induce a premature stop codon resulted in an increase in a naturally occurring white tail tip phenotype. This white tail tip normally occurs in ~30% of wild-type mice. With one copy of this copGFP-c-Kit allele, this was elevated to ~70% of the population. Interestingly, this

allele induced an epigenetic paramutation in its wild-type counterpart, as offspring derived from cop-GFP-c-Kit heterozygote mating all demonstrated ~70% white tail tips. Furthermore, this phenotype was stably inherited for over four generations, suggestive of a stable epigenetic inheritance. Our study lead to the assumption other molecular mechanisms may be responsible for the results, and future studies will be able to provide further understanding in regards to trangenerational epigenetics.

SLEEP LOSS EVOLVED IN PARALLEL TO METABOLIC PROCESSES IN MEXICAN CAVEFISH

BEATRIZ ROBINSON

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It is proposed that food supply is one of multiple factors underlying evolutionary changes in need for sleep, and that animals develop a reduced need for sleep in nutrient-depleted environments. Across phyla, starvation results in disruption of normal sleeping patterns, suggesting that animals implement sleep suppression as a mechanism to increase locomotor behavior and allow for increased time to search for food. However, the relationship between sleep plasticity and metabolic processes remains poorly understood. The Mexican cavefish, *Astyanax mexicanus,* is a model system allowing for analysis of this sleep-metabolism interaction. *A. mexicanus* consists of cave-dwelling cavefish and its ancestral-type surface-dwelling surface fish. Cavefish have been trapped in environments with sparse-food and perpetual darkness for ~1-2 million years, and evolved numerous traits including reduced sleep and elevated energy stores. By using wild-type surface-fish and cavefish, as well as backcross generated from surface-cave hybrids to parental cavefish, we investigate the dietary and metabolic contribution to the reduced sleep behavior found in cavefish larvae. In addition to comparing effects of a high-calorie diet on surface-fish and cavefish, correlation analyses of basal triglyceride levels and sleep in a backcross generation reveals that sleep loss is independent of energy stores. Our findings support the parallel evolution of sleep and metabolic processes in the cavefish.

NANOPOROUS MEMBRANES TEMPLATED THROUGH DISCOTIC LIQUID CRYSTALS

HARRISON ROOT

Program: GURA
Mentor: Benjamin King
Department: Chemistry
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We synthesized a nanoporous membrane through the polymerization of a boronic ester containing discotic liquid crystal monomer which incorporates either an acrylate or methacrylate polymerizable end group. The polymer is synthesized from commercially available starting material in four steps with a high yield. Removal of the aromatic cores from the polymer by washing with acidic methanol leaves a membrane with free boronic acids within the pores, called the apo-polymer, the monomer is shown to organize in a columner hexagonal mesophase. By utilizing discotic liquid crystals, we ensure that the pores are both are aligned homeotropically, and are of approximately the same diameter: two characteristics which are crucial to the function of the final membrane. The acrylate polymer and the apo-polymer have been fully synthesized and characterized through techniques such as polarized optical microscopy, powder x-ray diffraction, and atomic force microscopy; whereas, the methacrylate has only recently been synthesized and polymerizations are in progress. All characterization techniques show that long range order templated by the monomer's mesophase is

maintained through the synthesis to the final polymer. The preliminary N2 permeability of the acrylate polymer was found to be 5.2 x 10^{-8} $s^{-1}cm^{-1}pa^{-1}$. Further gas flow and solute retention studies of both polymers will test both polymer's viability as a functional membrane. The next goal is to use TEM imaging to take high quality images of the methacrylate polymer and apo-polymer. This will give us pictures of the pore morphology and long range order of the membrane. The methacrylate polymer and apo-polymer will be characterized via the same methods as the acrylate polymer.

THE EFFECTS OF OCTOPAMINE ENANTIOMERS ON GUSTATORY RESPONSIVENESS AND LEARNING AND MEMORY IN BUMBLEBEES

AMANDA SCAMPINI

Program: GURA
Mentor: Anne Leonard
Department: Biology
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In insects neurotransmitters such as Octopamine have been extensively studied for their effects on cognition. In previous research Octopamine has been primarily used as a racemic mixture, since this is the only form of Octopamine that is available commercially. Yet, Octopamine is found in nature in the form of two different enantiomers. Through collaboration with the Chemistry Department we will have access to the individual enantiomers and the ability to examine their separate effects. In honeybees, the racemic mixture has shown to increase learning and memory, in part by enhancing responsiveness to sucrose rewards. However, recent experiments using the (-) Enantiomer show it may contribute to accelerated death rates in other insects. I asked whether a racemic mixture of Octopamine also influences bumblebees *(Bombus impatiens)* Gustatory Responsiveness, and plan to explore whether this effect relates to the + or – Enantiomer. Octopamine's positive effect on foraging and learning and memory could provide enhanced pollination for plants that express this enantiomer in nectar. If either Octopamine enantiomer occurs in nectar, understanding how each affects Gustatory Responsiveness, learning and memory, as well as death rates in bumblebees will give us a better understanding of the chemical ecology of this molecule that is found in both plants and insects.

INHIBITION OF ATP SYNTHESIS IN MDA-MB-231 AND BT-474 CELL LINES VIA MITOCHONDRIALLY-TARGETED ANTIOXIDANT SYNERGISM WITH DOCOSAHEXANOIC ACID

ANDY SHAO

Program: GURA
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Department: Biochemistry and Molecular Biology
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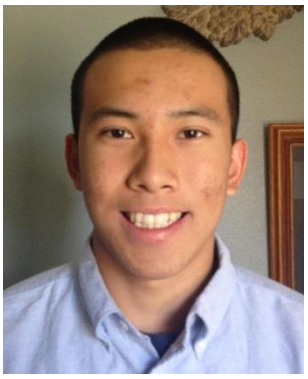
In our current project, we are looking at the possibility of synergism between mitochondrially-targeted drugs (Mito-T and Mito-Q) and Docosahexanoic Acid (DHA) in inhibiting ATP generation in breast cancer. From previous research, it has been shown that mitochondrially-targeted drugs and the glycolytically-targeted drug 2-deoxyglucose have been synergistic in inhibiting ATP generation and tumor growth in breast cancer. For our studies, we will be using the MDA-MB-231 adenocarcinoma, a glycolitically active cell line and BT-474 ductal carcinoma, with a mitochondrially active phenotype. Currently, we are performing ATP assays to determine an IC-50 for ATP inhibition for Mito-Q and Mito-T. Once determined, we will use the IC-50 as a benchmark for establishing concentration ranges for DHA + Mito-Q and DHA+ Mito-T ATP assays.

CIRCULAR RNA ACCUMULATION IN DROSOPHILA IS MODULATED BY BIOLOGICAL AGE



KEVIN SO

Program: NSF EPSCoR
Mentor: Pedro Miura
Department: Biology
University of Nevada, Reno

Circular RNAs (circRNAs) are a newly appreciated class of noncoding RNAs. They are expressed in all walks of life, from *C. elegans* to humans, yet their functions remain poorly understood. In the fruit fly, *Drosophila melanogaster*, most circRNAs are generated from back-splicing events of exons from known protein coding genes. Previous research suggests that some circRNAs can act as microRNA sponges in the brain. Neural-related circRNAs were found to accumulate in the central nervous system of adult Drosophila and their abundance increased during normal aging. Aging can be influenced by environmental factors in flies, such as modulating temperature, restricting caloric intake, and increasing oxidative stress. We hypothesized that such alterations in lifespan would alter circRNA expression during aging. We subjected wild type flies to various environmental conditions and monitored circRNA accumulation by quantitative RT-PCR analysis of dissected heads. Interestingly, conditions that increase longevity of *D. melanogaster* were found to slow down the accumulation of circRNAs from *ank2*, *mew, scro*, and *cpx* genes. Thus, circRNA accumulation in the central nervous system is influenced by biological age. Future work will test whether the accumulation of these circRNAs in the brain have a positive or negative influence on lifespan.

BEFORE THE FALL: EDEN AND THE APOCALYPSE IN THE POST WEST

REENA SPANSAIL

Program: HURA
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The Judeo-Christian stories of the Garden of Eden and the apocalypse have permeated western culture for centuries. However, is there a place for them in the contemporary American West? The current trend in Western studies has been to subvert or disregard mythic metanarratives, but these narratives are still present in popular media and literature. This project is an interdisciplinary attempt to define the evolution of these myths within the Western landscape, and the effects of that evolution on individual regional Western identity formation. This topic is explored by braiding together literary analysis, creative writing, and visual art.

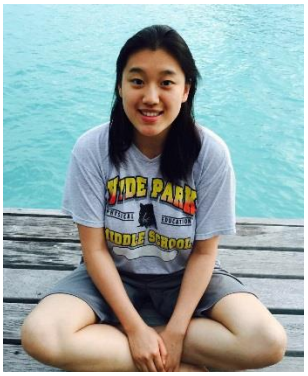
ACTIVE INSULIN ANALOGS THAT DO NOT REQUIRE REFRIGERATION

REBA SURI

Program: HURA
Mentor: Yiftah Tal Gan
Department: Chemistry
University of Nevada, Reno

Due primarily to hydrophobic interactions between nonpolar amino acid residues, molecules of insulin tend to interact with each other and undergo fibrillation to form linear aggregates when partially unfolded. Formation of these insulin fibrils significantly decreases insulin stability and activity, and has complicated insulin's role in the therapy of diabetes. This study will investigate techniques to create bioactive insulin analogs that are not susceptible to fibrillation, a temperature sensitive process, and thus do not require refrigeration. Solid phase peptide synthesis techniques and the incorporation of backbone modified amino acids into peptide sequences will be used to design synthetic insulin analogs.

GENOME-WIDE REGULATION OF SPLICING BY THE NEURONAL RNA-BINDING PROTEIN ELAV



JIA JIE (JENNIFER) TANG

Program: Faculty sponsored
Mentor: Pedro Miura
Department: Biology
University of Nevada, Reno

Elav is a neuronal binding protein that mediates various posttranscriptional regulatory events such as alternative splicing, and elongating the 3' UTR of transcripts. It is essential for the development of the nervous system. Flies lacking Elav die during early neural development. Interestingly, we have preliminary data suggesting Elav enhances splicing of intronic sequences of mRNA specifically in the *Drosophila* nervous system. In order to examine the effects of ELAV on intron retention, we overexpressed ELAV cell culture lines (S2 cells) derived from the *Drosophila* nervous system and performed next generation sequencing on the RNA. When examining these data we found 600 events of reduced intron expression, across the entire genome of *Drosophila*. In this project, we plan on examining Elav's effect on intron retention events in *Drosophila*, specifically in three genes, MTCAP, Prosalpha 7, and Poe. Since computational analyses show a reduced expression of intron with the overexpression of Elav, we will quantitatively test these expressions through quantitative PCR and *in situ* hybridization. Moreover, introns and exons of these regions will be subcloned into an expression vector for transfection experiments. With more understanding of the mechanism of Elav regulation we can gain a better understanding of human Elav proteins such as HuD, HuC, and HuR, which also regulates posttranscriptional events.

INFLUENCE ON VITAMIN E CONTENT IN LETTUCE VARIETIES GROWN UNDER LED LIGHTING

MIGUEL TORRES JR.

Programs: GURA, NVSGC
Mentor: Stanley Omaye
Department: Agriculture, Nutrition, and Veterinary Sciences
University of Nevada, Reno

In the last ten years, energy and water conservation have been at the forefront of STEM research in arid regions thanks to concerns of drought in the North American Southwest and the US being only second to China in energy consumption (US DOE, 2006, US EIA, 2014). In fact, a recent study by NASA has predicted that there is as high as an 80% chance of a mega-drought due to occur specifically in the US Pacific Southwest and Central Plains (Cook, 2015). The increasing water consumption burdens in traditional agriculture have increased the use of hydroponics in commercial production of goods indoors. This transition to the use of hydroponic in conventional agricultural production has driven immediate interests for region adaptability considering that current research estimates that traditional large-scale farming is ruining the environment; consequently, not enough arable land will remain by 2050 to feed the estimated ten billion people on Earth (Despommier, 2009).

The combination of these factors warrant further exploration of conventional indoor agricultural production and its feasibility in developing methods of production which offer interdisciplinary solutions. The objective of this project is to contrast the supplemental effects of contemporary High Pressure Sodium (HPS) lights used for indoor agriculture and Light Emitting Diodes (LEDs) to natural sunlight alone on Tocopherol (Vitamin E) content among three lettuce (*Lactuca sativa*) varieties. Spectrophotometric techniques (at 530 nm) will used to quantitatively compare Vitamin E content among three varieties with the use of standards developed in lab consistent with current literature. Results from this study have shown that both LED and HPS have a significantly higher influence on Vitamin E content than sunlight alone. LEDs outperformed the HPS group significantly in two varieties (Black Seeded & Red Romaine Lettuce) and the contrary was true in the third variety (Butterhead Lettuce).

MECHANICAL MANIPULATION OF ATOMIC SPIN

JOSE VALENCIA

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Department: Physics
University of Nevada, Reno

Magnetic micro-cantilevers can be used to probe and manipulate atomic spins. This cantilever approach is proficient for single-atomic interaction since it grants nanometer spatial resolution and single-spin sensitivity for manipulation, ultimately enabling new approaches in neutral-atom quantum computation, quantum simulation, or precision sensing. We describe our experiment that manipulates the spin of trapped, cold Rb atoms by using a magnetic micro-cantilever. So when the cantilever is driven, the magnetic component of the cantilever interacts with the atomic spin and causes a spin flip.

mTOR PATHWAY RESPONSE TO MECHANICAL STRETCH IN PREGNANT HUMAN MYOMETRIUM

KYLE VON SCHIMMELMANN

Program: GURA
Mentors: Heather Burkin, Craig Ulrich
Department: Pharmacology
University of Nevada, Reno

During pregnancy the myometrium must expand up to twenty times its original size to accommodate the developing fetus, placenta, and amniotic fluid. The importance of mechanical strain as a signal to the pregnant myometrium has been well documented and is known to regulate myometrial gene expression, cell growth, and contractility (Wu et al., 2008). Cellular responses to nutrient supply, growth factors, energy availability, and stress are mediated by the mTOR (mammalian target of rapamycin) signaling pathway. The mTOR pathway is also a key regulator of smooth muscle contractility and differentiation (Martin et al., 2004) and birth timing (Hirota et al., 2011). Two separate mouse models for preterm delivery displayed an increased endometrial mTOR activation and when treated with a single dose of mTOR inhibitor rapamycin preterm delivery was prevented (Hirota et al., 2011). An inflammatory model for preterm birth also displayed an increased mTOR activation which indicates that increased mTOR signaling could be a common convergent pathway in preterm labor (Hirota et al., 2011).

In our preliminary biaxial stretch experiments we tested cultured Pregnant Human Uterine Smooth Muscle Cells stretched for 0, 10, 20, 30, and 40 minutes. The results indicated a statistically significant increase in mTOR phosphorylation at 20 minutes of biaxial stretch and then tapered off thereafter. We will next verify our cell culture model using freshly isolated smooth muscle tissue strips from disparate pregnancy conditions in order to determine if they can be replicated in tissues. We are testing the hypothesis that mTOR activation occurs in response to mechanical stretch in pregnant human myometrial tissue by performing mechanical stretch experiments on pregnant human myometrial samples.

USING REFRACTION MICROTREMOR (REMI) AND HIGH RESOLUTION REFLECTION/REFRACTION SURVEYS TO DETECT QUATERNARY EXTENSIONAL FAULTS AT THE UNIVERSITY OF NEVADA, RENO CAMPUS

JAKE WARD

Program: Faculty sponsored
Mentor: John Louie
Department: Geophysics
University of Nevada, Reno

Previous Refraction Microtremor (ReMi) and high resolution Reflection/Refraction surveys have traced a hazardous, North-South trending fault through Reno, Nevada, as far North as the Truckee River (Clark, 2005; J.B. Scott et al., 2004). During the spring of 2015, a survey of the presumed continuation of this fault zone, on the University of Nevada, Reno campus, will be conducted. ReMi technology (Louie, 2001) uses multichannel refraction arrays to measure Rayleigh wave energy propagating through shallow, subsurface layers generated by urban “noise” to calculate volume-averaged shear-wave velocities at 30-m depths (Vs30). The wave velocities are dependent on material properties, as higher frequency waves will measure at shallower depths and lower frequency waves will measure at deeper depths. The actual detection and physical characterization of a fault is beyond the limits of the ReMi technique. However, discontinuities in the Vs30’s of different subsurface

materials on opposite sides of the proposed fault zone may allow for its detection. Reflection/Refraction techniques record the travel times of excited P-wave energy in subsurface layers. As the wave energy interacts with transitioning subsurface mediums and their different physical properties, they are reflected and sensed by a multichannel array of high frequency geophones. The Reflection/Refraction technique will be able to image the subsurface structure of the proposed fault. Using low frequency range data from the ReMi surveys, slower moving energy will be filtered from the surveys for improved quality.

BUMBLEBEE VENOM: THE NATURAL PRODUCT WITH LITTLE RECOGNITION

SIMON WHITE

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University of Nevada, Reno

Within the animal kingdom, there are a wide variety of defensive mechanisms used. One of the most common mechanisms among animals is venom. Venom changes in potency from one organism to another, and animals react to different venoms in a variety of ways. Honeybee venom has been studied extensively and is being used in the medical field as a new and unique approach to treat diseases such as cancer, AIDS, and HIV. Most of the studies on bee venom have been on the honeybee, *Apis mellifera;* however, there are over 4,000 species of bees in North America, with each venom potentially varying across species. Bumblebees (genus *Bombus*) have venom that is similar to that of honeybees, but it contains a compound called bombolitin, which is unique to its venom. The lack of studies on multiple bee species raises many questions about the composition, potency, and usefulness of bumblebee venom. With the collaboration of the Chemistry department and the Biochemistry department, I plan to explore these topics by specifically investigating what components make up worker bee venom, if queen bumblebee venom has the same composition as the workers', and how bumblebee venom interacts with various artificial membranes of different compositions. These questions will create the foundation to further the research in comparing various species of bees both ecologically and chemically through venom analysis.

HYDROTHERMAL CARBONIZATION (HTC) OF COW MANURE: CARBON AND NITROGEN DISTRIBUTION IN HTC PRODUCTS

KEENAN WILLIAMS-CONRAD

Program: Faculty sponsored
Mentor: Charles Coronella
Department: Chemical Engineering
University of Nevada, Reno

Approximately 160 million tons of dry manure is produced annually in the United States. Since manure is rich in nutrients, e.g., nitrogen and phosphorus, land application of the manure to fertilize soil was a common method for managing dairy manure in the US. That practice has changed considerably with time. In fact, many agricultural fields that have received long-term manure applications are facing high risks of runoff and leaching of manure-derived components such as nitrogen and phosphorus, such that water quality of streams and lakes are threatened. This has resulted in more strict environmental regulations towards the management of dairy manure. Therefore, developing environmentally friendly treatments for manure would help to alleviate manure waste management problems.

Hydrothermal carbonization (HTC) is a thermochemical pretreatment process, where wet waste biomass (like manure) is treated with hot compressed subcritical water (200-260 oC) for 5 min-8 h. Biomass in subcritical water undergo various reactions namely hydrolysis, decarboxylation, dehydration, aromatization, and condensation-polymerization to produce solid carbon-rich hydrophobic hydrochar. The treated biomass will be pelletized to allow for testing. Pelletization increases the ability for the treated biomass to be stored and it facilitates in more efficient use of the fuel.

The main goal of this study is to perform HTC on cow manure at various reaction conditions (temperature 180-260 °C and time 5-30 min). The carbon and nitrogen distributions among the HTC products will be explored for better understanding of the product quality as fuel or fertilizer. Hydrochar fuel properties as well as corresponding slagging and fouling indices will be evaluated.

PYROCHLORE STRUCTURED BISMUTH TITANATE WITH CO2+ IONS FOR SIMULTANEOUS VISIBLE LIGHT POLLUTANT DEGRADATION AND CLEAN FUEL PRODUCTION

KEENAN WILLIAMS-CONRAD

Program: GURA
Mentor: Ravi Subramanian
Department: Chemical Engineering
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Exploration of the usefulness of synthesizing Co^{2+} ions into an ecofriendly visible light active pyrochlore-structured photocatalyst bismuth titanate (BTO) to produce clean fuel, hydrogen gas, through photocatalysis is presented. The improvement to this photocatalyst is made by the addition of Co^{2+} ions into the photocatalyst BTO to make a composite. These ions are depositing on the surface of the photocatalyst greatly changing the characteristics of the BTO. The ions advance BTO's conductivity, by improving the band gap through an impurity band, and induce a red shift upon the catalyst causing a raise in the photocatalyst's responsiveness to visible light from solar energy.

The composite Co-BTO has demonstrated that the addition of the Co^{2+} ions has greatly improved the effectiveness of the photocatalyst in generating hydrogen, thus the composite Co-BTO is being used in tests to produce hydrogen, from a class of water based eco-toxin pollutant degradation. The hydrogen generation is performed in a slurry reactor under UV-visible illumination. This composite is synthesized by a wet chemical approach and is characterized by scanning electron microscopy, spectroscopy, and XRD analysis. Samples of varying levels of Co^{2+} in the BTO have been synthesized and experimented with so as to find that the 4% Co-BTO composition shows the greatest improvement in producing the most hydrogen from methanol degradation.

STRETCH INDUCED INTEGRIN ACTIVITY IS INVOLVED IN MITOGEN ACTIVATED PROTEIN KINASE ACTIVITY IN HUMAN UTERINE SMOOTH MUSCLE CELLS

JENNY WONG

Program: GURA
Mentors: Heather Burkin, Craig Ulrich
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Preterm labor is defined as the onset of labor prior to the 37th week of pregnancy. Preterm birth can lead to developmental issues or mortality in infants. To better understand the conditions that contribute to labor, it is essential to examine the molecular signaling pathways that induce contraction in the myometrium. Cell membranes contain integral proteins that conduct external signals across the plasma membrane. In particular, integrin proteins are transmembrane receptors that transduce mechanical signals, such as stretch, to elicit internal cellular responses by formation of focal adhesions and downstream signaling events through activation of focal adhesion kinase (FAK)[1]. Mitogen activated protein kinase 1 and 3 (ERK1/2) are involved in a downstream protein phosphorylation and signaling activities directly related to stretch (unpublished data). Integrins α3, α5, α7, and β1 are all upregulated during pregnancy[2].

Our research focused on the relationship between stretch induced integrin activity and downstream ERK1/2 responses by investigating the role of β1 integrin. To accomplish this, telomerized, pregnant, human uterine smooth muscle cells (HTRT) were transfected using three, unique (short hairpin RNA) shRNA sequences targeted to the β1 integrin mRNA. To determine effectiveness of the knockdown, transfected cells were cultured with doxycycline media and harvested for mass spectrometry analysis. Once an effective knockdown cell line is created, it will be used to observe the effects of β1 integrin knockdown on ERK1/2 signaling during stretch activation.

A DOPAMINE-MODULATED NEURAL CIRCUIT REGULATING TASTE MEMORY

KURTRESHA WORDEN

Program: GURA
Mentors: Pavel Masek, Alex Keene
Department: Biology
University of Nevada, Reno

Gustatory memories allow animals to modulate feeding behavior in accordance with past experience and avoid the consumption of potentially harmful food. We have developed a single-fly gustatory learning assay to functionally interrogate the neural circuitry encoding taste memories. Here, we screen a collection of Split-GAL4 lines that label small populations of neurons associated with the fly memory center – the mushroom bodies (MB). Genetic silencing of PPL1 dopamine neurons disrupts conditioned, but not naïve feeding behavior, suggesting these neurons are selectively involved in the conditioned taste response. We identify two PPL1 subpopulations that innervate the MB α lobe and are essential for aversive taste memory. Thermogenetic activation of these dopamine neurons during training induces memory, indicating these neurons are sufficient for the reinforcing properties of bitter tastant to the MBs. Silencing of the intrinsic MB neurons, or the output neurons from the α lobe, disrupts taste conditioning. Thermogenetic manipulation of these output neurons alters naïve feeding response, suggesting that dopamine neurons modulate the threshold of response to appetitive tastants. Taken together, these findings detail a neural mechanism underlying the formation of taste memory and provide a functional model for dopamine-dependent plasticity in *Drosophila*.

DISPARITIES IN INFANT MORTALITY RATES AMONG RACES IN NEVADA

BRANDON WOUDHUYSEN

Program: HURA
Mentors: Anna Panorska, Tomasz Kozubowski
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Infant death is a troubling event that is ongoing all over the world. Even in the most developed countries, such as the United States of America, there is a significant rate of infant mortality, with 24,000 infant deaths in the U.S. in 2011. This study displays the inconsistencies in infant mortality rates among different races in Nevada in years 2011-2013. The data in this study were analyzed using logistic regression models. The data was the birth and infant death data set from the Nevada Department of Public and Behavioral Health. The models tested for variables which affect the rates of infant mortality. The results were compared to national findings as posted by the CDC for infant death in years 2011 to 2013. Infant mortality rates for Nevada are found to be approximately 4.6 deaths per 1,000 infants. However, the infant mortality rate for Blacks was 7.9 compared to 4.0 among Whites, 4.5 for Hispanics, and 2.4 for Asian/Pacific Islanders. Thus, this study found that race contributes to disparities in infant mortality rates.

OPTIMIZED CONDITIONS FOR COMPRESSION OF A FUSION FUEL

ESTEBAN WRIGHT

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Mentors: Radu Presura, Paul Neill
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The search for alternative energy sources has driven a demand for the development and discovery of a means to sustain a thermonuclear fusion reaction. Such a reaction is capable of generating high energy yields, has minimal environmental impact, and the fuel is abundant. To sustain fusion reactions, very high pressures are required, which can be achieved by compressing the fuel. I present two computational models of an infinitely thin cylindrical shell that is compressed onto argon gas via a magnetic pressure. This pressure is generated by a 1MA surface current driven by the Nevada Terawatt Facility's (NTF) 2TW Zebra pulse generator. The first model is a snow plow approximation where the gas' mass is added to the shell's mass as the implosion proceeds. The second is an adiabatic approximation where the gas pressure slows the implosion of the shell. Both models measure the shell's radius, velocity, and acceleration as functions of time, with the adiabatic model also measuring the gas and magnetic pressures on the shell. The snow plow model assumes that the density of the gas in the shell does not increase as the shell collapses, and the temperature remains constant. The adiabatic model assumes constant mass of the shell, and is a closer description of reality as it accounts for the change in the gas pressure. The snow plow and adiabatic models differ in their results for the radius, with the adiabatic model predicting the shell to implode and expand past the initial radius of 6mm and linear mass density of 3.82x10-6 kg/m. These models were coded in python and checked against gas puff measurements using image analysis to plot the radius of the gas puff versus time. The gas puff measurements were gathered by Erik S. Mckee, which closely approximates the model presented here.

EFFECTS OF ORAL LANGUAGE ON WRITING

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Many studies found that school-age children with language impairment have difficulty telling fictional stories. There is a small collection of research that demonstrates the effect of language impairment on writing. This small body of research used different elicitation methods, ranging from using three separate pictures, oral prompts, or written prompts to elicit stories. It is unclear how the method of elicitation yielded the quality or quantity of narrative and expository essays. Our pilot study evaluated the impact of oral language ability when telling and writing fictional narratives and expository stories of children in grades second through fourth. Two norm-referenced tests were administered to identify children as having a specific language impairment or typically developing. Twin narrative and expository story starters were created to elicit oral and written language samples. The presentation of the oral and written elicitation methods and narrative and expository story starters were counterbalanced. These results have the potential to influence oral and written story instruction for children with specific language impairment.

OPTIMIZATION OF ARTIFICIAL TWO-DIMENSIONAL POLYMER SYNTHESIS AND SUBSEQUENT CRYSTAL-TO-CRYSTAL POLYMERIZATIONS

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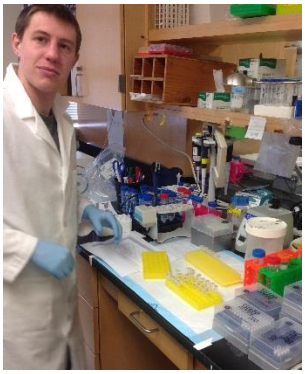
The synthetic procedures of the two-dimensional polymer (2DP), fantrip, are described presently. Artificial 2DPs have potential for use in nanoporous membranes and a multitude of other filtration applications. In order to explore co-crystallizations and photoirradiations of various combinations of monomer units, we examine alternative synthetic routes that yield hundreds of milligrams of 2DP monomers. These explored routes also show potential to produce gram scale yields, which will allow unhindered exploration of 2DP characteristics. In this poster, we describe the use of H_2O_2 in the cheletropic elimination reaction that produces the fantrip monomer. We also discuss our intent and progress of exploring co-crystallizations and photoirradiations of the fantrip monomer along with various other monomers.

MOLECULAR MECHANISMS BY WHICH A GRAPE SEED PROCYANIDIN EXTRACT MODULATES GLUCOSE HOMEOSTASIS



TAYLOR YANCEY

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Type 2 Diabetes, a prevalent health condition, resulted in 5.1 million deaths in 2013. Blood sugar levels, which will be referred to as glucose levels, are tightly regulated in order to maintain metabolic homeostasis. The hormone insulin, which is involved in many metabolic control signals, lowers blood glucose levels via molecular mechanisms that have been well studied. A grape seed procyanidin extract (GSPE) has been shown to lower glucose levels, however, the precise molecular mechanisms underlying this effect still remain unknown. One of the suggested ways by which GSPE regulates glucose homeostasis is by acting like an "insulinomimetic". Since GSPE acts in a similar way to insulin, insulin's effects will be compared and contrasted with the effects of GSPE. Another way that GSPE regulates blood glucose levels is through direct signaling on the glucose transporter-4 within insulin-sensitive tissues. Metabolic signaling via energy levels with respect to Adenosine monophosphate-activated Protein Kinase (AMPK) will also be explored. The physiological effects of unregulated blood glucose and the detrimental health consequences will be discussed along with the current and future remedies in the field of medicine. This study of literature aims to determine the role that grape seed procyanidin extract plays in the regulation of glucose homeostasis.

IDENTIFICATION OF NEGATIVE REGULATORS OF ROOT DEVELOPMENT IN ARABIDOPSIS USING ACTIVATION TAGGING

BO YI

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Activation tagging will be used to isolate root phenotypes to help understand and characterize specific genes that determine overall root function and structure. This was be done by conducting mass screenings of randomly generated activation tagged Arabidopsis seeds which was be placed on a rapid growth medium and candidates that are phenotypically distinct was be matured until they are able to produce seed. Genomic sequences of potential candidates were analyzed to reveal which genes the activation tags are enhancing, giving insight as to the importance and function of those genes within a plant's root development. Final candidates were then tested for heritability and effects of conditionality on the genes of interest.

THE EFFECTS OF INSTRUCTION ON SECOND LANGUAGE SPANISH PRONUNCIATION

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This study investigates the effects of traditional explicit instruction and music activities on the acquisition of second languages (L2) pronunciation of Spanish pronunciation, specifically accentuation and diphthong formation, by native English speakers who are learning Spanish. These data were collected in a span of one semester from an upper level undergraduate course focusing on Spanish phonetics and phonology. The oral data was collected near the start of the semester and near the end of the semester. The participants were native English learners of Spanish in their third year of university Spanish language instruction. The treatment method consisted of in class transcriptions, repeating correct pronunciation, hearing incorrect pronunciation, hearing and recording correct pronunciation, and music activities (the music activities consist of having the students listen to and record themselves singing Spanish songs). The second language learners will be tested to see how much improvement they make over the semester on accentuation and the creation of diphthongs within and between words. Results show that a majority of the students were able to make significant improvements in their ability to correctly accentuate words and form diphthongs within and between words, indicating that native English L2 learners of Spanish can be taught these aspects of Spanish pronunciation.

WHY UNDERGRADUATE RESEARCH?

Develop Skills to Conduct Research:
The job market is continuously evolving and the rate of change is fast because of the rapid development of new technologies. The job market is also highly competitive as employers try to be efficient and do more with less. An adaptable work force gives employers an edge and hence the ability to adapt is a requirement and no longer a luxury. Furthermore, effective communication skills are now essential in nearly all fields of practice. Undergraduate research teaches students the process of developing creative ideas, formulating and executing research and presenting the outcome. The skills learned through undergraduate research enable the college graduate to develop and adapt to new ideas and pursue them in a systematic way. The ability to communicate, both in written and verbal form, enhances the overall effectiveness of the individual and helps to make her/him a success.

Develop and Produce New Knowledge:
One of the major roles of universities is to create and investigate new ideas. Undergraduate students can be an important part of teams that that often involve graduate students and research associates, all operating under the guidance of a faculty mentor. Because of their fresh and unbiased look at new ideas, undergraduate students often strengthen the research team and can positively affect the direction of research.

To Motivate Talented Students and Recruit Them to Graduate School:
Many highly capable students do not pursue graduate degrees, frequently because of a lack of understanding about the possibilities that graduate education offer both during school and following graduation. The perception that graduate education is hard, costly and not rewarding is commonly overcome by becoming involved in research as an undergraduate student. The satisfaction that comes from solving a problem or attempting a creative endeavor that has not previously been attempted can create a new perspective and potentially encourage students to attend graduate school.

Improve a Sense of Community and Group Dynamic:
The exposure of many students to the university setting is often limited to attending classes and occasionally meeting with an advisor. Undergraduate research provides a mechanism for students to interact more closely and frequently with faculty mentors and other researchers on campus. The improved sense of belonging and accomplishment enriches the educational experience of the student and provides opportunities to explore potential career paths.

Visit our website for upcoming solicitations and more information:
http://environment.unr.edu/undergraduateresearch/

Photograph by Scott Hinton