Mohaves and the Colorado River

Carol C. Aguas, Anthropology

Mentors: Phillip J. Wilke
Scott Fedick
Department of Anthropology

This paper will discuss the relationship between the Mohave Indians and the Colorado River. Archaeological, documentary, and ethnographic sources pertaining to the Mohave Indians of Arizona and California are used to establish the relationship. The Mohaves occupied an area of approximately 140 miles along the Colorado River from 15 miles north of the present day Davis Dam to Blythe in the south. The Mohaves liked to travel, however they lived within ten miles of the Colorado River on both the east and west sides. The Mohaves are different from most other California Indians in that they are agriculturists. The Mohaves gathered wild plants, hunted animals, and were familiar with the water sources in the area; however, the Colorado River was a large part of the Mohaves existence in the area. The Colorado River provided an expedient travel route, fertile soil for planting, fish, river plants and fresh water. The types of shelter, as well as, the sparse clothing the Mohave wore are also attributed to the relationship with the Colorado River. The Mohave valued their territory and were more than happy to defend the land, nonetheless, they sometimes let others farm in the area. The damming of the Colorado River was a devastating development to the Mohaves way of life and led them into the two reservations in the area.

Predictors of Acculturative Stress?: Acculturation, Bicultural Identity Integration, and Self-Construal

Ashley Arellano, Biological Sciences
Sokcheab Ching, Psychology
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Mentors: Angela Minh-Tu Nguyen
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Department of Psychology

Acculturative stress is the stress related to the acculturation process, or the process by which individuals adapt two cultures (Berry, 2003). There are five domains of acculturative stress: language, discrimination, intercultural relations, isolation, and work (Benet-Martínez & Haritatos, 2005). The purpose of this study was to examine the relative power of acculturation, Bicultural Identity Integration (BII), and self-construal to predict individual domains of acculturative stress. Using data from 93 Vietnamese American undergraduate students, we conducted regression analyses to explore significant correlations among acculturation, BII, self-construal, and specific domains of acculturative stress. We found that a harmony dimension of BII coupled with an independent self-construal predicted less acculturative stress in the intercultural relations domain. In the work domain, a Vietnamese cultural orientation and an interdependent self-construal predicted greater acculturative stress, whereas BII harmony predicted less acculturative stress. Implications and future directions are also discussed. This study contributes to the understanding of stressors for acculturating individuals, who comprise a significant proportion of the U.S. population.
Nike’s Triumph: The Transfiguration of Nike in Greek Art

Jane Arney, Art History
Mentor: Conrad Rudolph
Department of Art History

Victory was an important concept to the ancient Greeks and the winged goddess Nike was depicted as its personification from the archaic period through the Hellenistic era in a variety of media. How did Nike’s image develop over time and how do those changes relate to the evolution of Greek culture? This paper examines several extant art works with Nike as the subject, including the Nike of Delos, the Nike of Paionios, Nike akroteria, the Nike of Kallimachos, the Nike temple parapet frieze and the Nike of Samothrace. Through this analysis of the works within their historic context it is clear that the images of the goddess Nike are accurate reflections of the social pressures on Greek art.

A NeuroIS Based Approach to Examining Ease of Use and Usefulness in Online Transactions

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Ease of use is the measure of the accessibility and application of transaction tools available to the consumer as an incentive to acquiring an item for all levels of decision-making throughout a transaction process. Usefulness examines the level of the consumer or user’s applicability of available transaction tools in a transaction process. In the past few years, Neuroscience and Information Systems (IS) research have delved into the theory of Usefulness and Ease of Use of web tools in online transactions for the purpose of enhancing our understanding of IS and online consumer behavior. Our study of these two theories is based on NeuroIS, which is the application of cognitive neuroscience theories and functional neuroimaging tools to inform IS research. In this experiment, subjects are given questions related to an online transaction while their brain is constantly scanned in volumes of twenty images per second. The neuroimaging tool used in our scans is the functional Magnetic Resonance Imaging (fMRI). The subjects’ neural responses are recorded. The results are analyzed using statistical parametric mapping (SPM) to specifically correlate the areas of the brain associated with the individual’s perception of Ease of use and Usefulness of a website design. By this method, we are able to eliminate certain elements of traditional IS studies.

Laboratory Modeling of the Air Quality Impact of the Distributed Power Generation

Christian Bartolome, Mechanical Engineering
Mentor: Marko Princevac
Department of Mechanical Engineering

Power grid failures are a major concern for the southern Californian businesses. To be able to continue with normal operations during potential blackouts many institutions, including restaurants, schools, hotels and hospitals, are equipped with small power generators known as the distributed power generators (DG) as opposed to large centralized power plants. This solves the problem of power dependency, however, it may create localized air quality problems. Since DGs are by rule situated in urban environments, the exhaust from DGs may be harmful to the public in close range, unlike typical large power plants that are positioned intentionally far away from urban areas. To investigate the potential health impact of DGs, the exhaust plume dispersion was modeled in a water channel. A range of buoyancy effects, ambiental wind speeds, exhaust strengths, and simplified arrays of buildings were considered. It was found that the mean wind speed and buoyancy have the major influence on the plume rise. Denser urban arrays are causing wider plume spread and lower concentrations near the ground. Laboratory experiments with flow
visualizations for characteristic cases will be presented.

**Media Exposure and Physical Illness in Children**

Chandra Char, Psychology  
*Mentor*: Rebekah Richert  
Department of Psychology

Technology is constantly evolving and is becoming a major part of the lives of children. A very active area of research in Child Development addresses media exposure in early childhood. Recent statistics have suggested that 4- to 6-year old children are exposed to an average of 2 hours of screen media a day (Comstock & Scharrer, 2007). This study explores time diaries of 40 children between the ages of 4 and 6. Each participant and a parent are given seven daily logs, stickers, a parent instruction sheet, an activity survey, and a permission form. The participants are asked to record the number of hours that they participate in various media and non-media activities (i.e. playing video games, watching TV). The responses to the time diaries and the surveys will be assessed for correlations between media use and various health outcomes.

**Dissecting SUMO Interactions within the JAK/STAT Pathway using Protein Engineering**

Adam Cheng, Chemical Engineering  
*Mentor*: Jiayu Liao  
Department of Bioengineering

Post-translational modification of proteins can give new functions to a protein, or it can destroy one, as exhibited by ubiquitination. SUMOylation is a post-translational modification that occurs in all eukaryotes and is involved in processes such as signal transduction and transcription. Small ubiquitin-like modifiers, or SUMO, are involved in the JAK/STAT (signal transducer and activator of transcription) signal transduction pathway, which is activated by the cytokine interferon to produce antiviral immune response. STAT is regulated by PIAS (Protein Inhibitors of Activated STATs), which acts as a ligase for SUMO to STAT. Once SUMO is ligated to STAT, transcription activity is repressed, but SUMO can be cleaved from STAT by SENP (sentrin-specific protease). Excessive stimulation of this pathway due to a flood of cytokines may result in death, especially during pandemic flu breakouts, so understanding this pathway will benefit human health. To analyze the regulation of this pathway, specific important sites on SUMO will be mutated. The 63rd and 94th amino acids were mutated to alanine, and the 62nd, 93rd, and 95th amino acids were mutated to a stop codon. Using recent methods developed for unnatural amino acids, these mutants will be transfected into eukaryotic cells along with SENP, where the alanine mutated SUMOs will hopefully show loss of SENP-SUMO interaction, while TAG mutated SUMOs may show SENP-SUMO cross linked complexes. These findings will allow for knowledge of specific interactions between each of the variants of STAT, SUMO, SENP and PIAS in order to elucidate the complex interaction network of this system.

**Computational Prediction of Association Free Energies for the C3d-CR2 Complex and Comparison to Experimental Data**

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Chris A. Kieslich, Bioengineering  
*Mentor*: Dimitrios Morikis  
Department of Bioengineering

The complement system functions to clear pathogenic threats from the body and is part of the innate immune system. The association between complement protein C3d and B or T cell-receptor CR2 (complement receptor 2) represents a crucial link between innate and adaptive immunities. The goal of this study is to computationally predict association abilities of C3d and CR2 mutants by theoretically calculating electrostatic free energies of association with and without solvation effects. We demonstrate that incorporation of solvation effects is necessary to accurately predict previously published experimental data for the...
association abilities (relative to the parent proteins) of specific C3d and CR2 mutants. We show that a proportional relationship exists between the predicted solvation free energy differences and the experimental data. Additionally, an inversely proportional relationship is demonstrated between the calculated solvation free energy differences and previously calculated ionization free energy differences. Our results yield new insights into the physicochemical properties underlying C3d-CR2 association. Moreover, our results can also be extended to any complex with excessively charged components. We will also discuss the inclusion of non-polar contributions to the free energies of association. This is a basic study, aimed toward understanding the theoretical basis of immune system regulation at the molecular level, which can be the groundwork for the design of regulators with tailored properties and biotechnology products in general.

**Spatiotemporal Dynamics of the Growth of Pollen Tubes**

Albert Cruz, Electrical Engineering  
*Mentor: Bir Bhanu*  
Department of Electrical Engineering

Most current studies of pollen tubes are done by analyzing the limited amount of data by hand. As a result, pollen tube growth patterns are still not thoroughly understood. It is known that the protein, ROP1, activates the downstream target, RIC4. RIC4 oscillates and controls the growth of the pollen tube through influence of the filamentous actin. However, the displacement of the pollen tube and frequency of ROP1 oscillation have not been quantified. Labeling the pollen tube with the green fluorescent protein (GFP) allows relationships between pollen tube growth and enzyme activity to be observed in video sequences. Our research develops computer vision algorithms to analyze laser microscopy videos of pollen tubes with GFP labeled RIC4. Specifically, we develop: (1) a forward wave front region growing algorithm to address non-rigid movement (2) an algorithm for oscillation analysis that quantifies ROP1 activity according to GFP intensity. Four videos of pollen tubes, consisting of 491, are used to verify the oscillating model of the tube growth by: (a) Relating changes in the direction of growth to concentrations of RIC4 in the direction of travel, (b) Performing frequency domain analysis of RIC4 localization and finding a consistent signal, and (c) Verifying that RIC4 localization leads pollen tube growth. Our research shows the spatiotemporal relationship of ROP1 and pollen tube growth. These methods can be applied to analyze laser microscopy videos of mutations or other data that are fluorescently tagged in any spectrum.

**Executive Control and Cognitive Reflection**

Amy Dell, Psychology  
*Mentor: Dale Barr*  
Department of Psychology

The cognitive reflection test (CRT) measures an individual’s ability to override an impulsive response and think more deliberatively about questions in order to arrive at correct answers. CRT performance has been found to be positively correlated with measures of patience, more profitable risk-taking decisions, as well as standardized test scores, but there has been little research into cognitive implications of CRT. The current study examined the hypothesis that CRT performance is predictive of executive and attentional control. Executive control was measured using Operation Span (OSPAN) and Antisaccade tasks. Attentional control was measured using the Attentional Control Scale (ACS). The original three item CRT was expanded to sixteen items in order to explore whether different correlations exist between distinct categories of questions and executive control, therefore enabling a more predictive CRT to be created. Correlations between CRT and OSPAN, AntiSaccade, and ACS are discussed. Results suggest that CRT may be indicative of working memory and cognitive measures.
Detecting the extent of heterogeneity in samples produced using the CAPAD technique.

Alexander Dupuy, Mechanical Engineering  
*Mentor:* Javier Garay  
Department of Mechanical Engineering

Current Activated Pressure Assisted Densification (CAPAD) is a novel sintering technique that is quickly becoming popular. The CAPAD technique involves applying an electrical current and a load to heat and compress respectively, a powder sample into a solid. This technique has been proven to be very efficient at sintering materials that have previously been difficult to sinter. Stress and thermal gradients that appear during the CAPAD process create materials that are non-uniform, which could limit the applications of the CAPAD technique. The purpose of this project is to examine the extent and the cause of these heterogeneities. Copper samples created at a variety of temperatures will be used to evaluate the gradients that the CAPAD technique produces. The role of temperature and stress gradients on grain size, density, and hardness will be presented.

Nietzsche on Perspectivism and Objective Morality

Bryan Frost, Biology  
*Mentor:* Pierre Keller  
Department of Philosophy

The purpose of this paper is to provide an analysis of Nietzsche’s account of perspectivism. By perspectivism, I mean the idea that all thoughts and idea formation takes place from a self interested medium, a perspective. I give an account of how Nietzsche thinks all forms of truth are relative to the viewpoint of the individual. I look at Nietzsche’s appeal to common sense realism, meaning how man should understand the world as it appears. I want to show that Nietzsche's account of the way man relates to the world is superior to other traditional approaches because of its reverence for human intuition, despite being based on a sophisticated syllogism. I then look at the conclusions that can be drawn for morality with this common sense realist view in mind. Nietzsche’s moral arguments and prescriptions for overcoming nihilism are discussed to describe man’s resulting moral obligations and how this commitment is related to action. Finally, I intend to show that Nietzsche’s recommendation is to abandon all forms of traditional morality as mere antiquated customs and instead create meaning for ones’ self by endorsing their own values. I conclude that in the absence of universal truth, there are still personal moral principles that have merit in guiding man's way through life.

Triptych on Paintings by Carl Heinrich Bloch

Lawrence Frost, Music  
*Mentors:*  
Byron Adams  
Tim Labor  
Department of Music

The tradition of painting a subject in three panels as part of an altarpiece predates the Renaissance. Triptych on Paintings by Carl Heinrich Bloch is a composition in three movements for chamber orchestra with this tradition in mind. The paintings of Carl Bloch are rich in their visual stimulation and portray more than simply the scenes depicted. This is especially true of his paintings involving the life and times of Jesus Christ. The purpose of Triptych is to evoke more of the story behind the paintings The Annunciation and Manger Scene, Gethsemane, and Come Unto Me.

Laser – Assisted Cryosurgery

Felipe Godinez, Mechanical Engineering  
*Mentors:* Guillermo Aguilar  
Lorenzo Martinez  
Department of Mechanical Engineering

Cryosurgery is an alternative treatment for certain types of cancers, in particular prostate cancer. There are, however, some shortcomings to this method that preclude its widespread use. For instance, in many cases, it is not fully possible to destroy the target tissue (prostate)
without causing collateral damage to the urethral and/or rectum wall. To overcome this problem, current cryosurgical procedures rely on warm water flow through the urethral canal to provide the necessary heat to prevent the urethra wall from freezing. However, this method is limited and ineffective. Cryosurgery assisted by laser heating may provide the heat necessary to maintain the wall temperature above the damage threshold for cryoinjury, independent of the application time of the cryogen probe and without limiting so severely the cryoablation of the prostate. This investigation proposes the use of laser irradiation as a means to protect the urethral wall during cryosurgery. The present work determines the validity of a computer simulation to predict the location of the protective boundary provided by the laser. To do this, we measure the temperature of six miniature thermocouples placed at known distances from one another within a gel tissue model, and determine the temperature gradient from the cryoprobe to such locations. The measurements are then compared to the results predicted by the computer simulation and we show that the computer simulations can accurately predict the location of the protective boundary. Future experiments are under development to test the correlation of the code’s prediction and the viability of cells within living tissues.

Near Source Modeling of Transportation Emissions within Cities and Major Arterials

Jonas Gutierrez, Mechanical Engineering  
*Mentor*: Marko Princevac  
Department of Mechanical Engineering

Research regarding environmental health is very important especially regarding emissions due to vehicles needed for transportation. Not only are the emissions man made, but it is spread in areas that many people work, or perhaps live. The team can create models of the buildings or areas that these pollutants are spread within and test the dispersion in a water channel. With this data, the team can analyze the way the smog spans the zones. With this data, programs can be enacted where there will be more effective ways of disposing this airborne waste and thus create a more safe environment. With this research possible ways of dealing with the emissions can be found. There is an increasing threat for these cities and major arterials because of their close proximity to the gases that could be a health risk. With this research we can find the dispersions and find better ways of dealing with them.

High Aspect Ratio Powder Milling

Corey Hardin, Mechanical Engineering  
*Mentor*: Javier Garay  
Department of Mechanical Engineering

The structure of a material can greatly affect its properties. Using this principle we can engineer materials which exhibit properties that we preferentially select. High aspect ratio materials, specifically, are advantageous due to their high bonding area, and ability to take advantage of in or out of plane properties of a material. We present a process that mills powdered graphite into nano-scale, high aspect ratio, platelets. We choose graphite because it has shown to be an extremely diverse material with excellent mechanical and electrical properties. It has very high mechanical stiffness in plane that can be advantageous for composites and also has favorable electrical and thermal properties that could be used to increase the quality of semi-conductors.

Classical Ballet Costume Construction

Katherine Hawkins, Biological Sciences  
*Mentors*: Bonnie Cherrie, Marc Longlois  
Department of Theatre

My project was completed as an Upper Division Honors Thesis and focused on the design and construction of classical ballet tutus, for eventual use in annual productions of *The Nutcracker* presented by Inland Dance Theatre. Current knowledge about ballet costume construction is limited to a relatively small group of costumers who usually work specifically for large ballet companies and have construction techniques taught to them directly by preceptors. Additionally, there is a very limited body of
mass-produced literature on the mechanics of actually assembling, from start to finish, a ballet tutu. My goals were to study the technical aspects of classical ballet costume design and creation. To this end, I researched the construction of professional classical ballet tutus with emphasis on structure and function; pattern drafting and modification relative to the needs of costume design; and the creation of professional tutus to ultimately produce an analysis of techniques that would provide instruction for tutu construction by others. My research has also encompassed a comparison of the different styles of ballet costume in contemporary use and a brief survey of the historical development of ballet tutus.

**Steam Hydrogasification of Glycerol Waste from Biodiesel Production Using a Batch Reactor**

Eru Kyeyune-Nyombi Jr.,
*Co-Authors:* Joseph M. Norbeck
Chan S. Park
*Mentor:* Professor Joseph M. Norbeck
Bourns College of Engineering
Center for Environmental Research and Technology

The Bourns College of Engineering-Center for Environmental Research and Technology (CE-CERT) at U.C. Riverside has developed a thermo-chemical process for converting carbonaceous matter to synthetic fuels. The first step in this process is the conversion of carbonaceous feedstock to methane rich gas using steam and hydrogen (steam-hydrogasification). This paper presents results of the steam hydrogasification of glycerol, a waste product of biodiesel production. Initial results for experiments conducted at 650°C and 100psi show a carbon conversion as high as 90%. This is considerably greater than that of dry pyrolysis (without steam and hydrogen) at 650°C. Further experiments are being conducted to determine the optimal conditions for the conversion of glycerol to desirable synthesis gases and the chemical reaction pathway. Nevertheless, there is already sufficient evidence to show that the CE-CERT process is a viable pathway to mitigate the glycerol problem in the biodiesel industry. The results of the experiments conducted and an explanation of the reactive process will be presented.

**Diversity of Methylated Sugar Residues in Various Plant Cell Walls**

Wilson Lau, Biological Sciences
Tung Trinh, Biochemistry
Daranee Yongpradit, Chemistry
*Mentor:* Eugene A. Nothnagel
Department of Botany and Plant Sciences

Recent investigation in our laboratory has revealed that cell wall proteoglycans in moss, a primitive plant, contain approximately 15 mole percent 3-O-methyl-L-rhamnosyl residues. This finding was surprising because this methylated sugar residue has not been previously found in cell wall proteoglycans from a wide variety of more advanced, flowering plants. The present study was undertaken to more broadly survey the occurrence of methylated sugar residues in plant cell wall polymers and to gain insight into how the presence of these methylated sugar residues changed during evolution. Growing tissue, usually leaf, was collected from 18 plant species ranging from primitive (alga) to advanced (angiosperm). In each case, the tissue was homogenized and extracted to yield a cell wall-enriched fraction. Specimens of cell wall were subjected to total hydrolysis in sulfuric acid to depolymerize the polysaccharides to monosaccharides. The monosaccharides were then derivatized, generally by two complementary procedures, and analyzed by gas chromatography-flame ionization detection or by gas chromatography-mass spectrometry. Among these 18 cell wall preparations, at least six different methylated sugar residues were detected, although not all of the methylated sugars were present in all 18 species. Generally, the diversity and abundance of methylated sugars appeared to be greater in the more primitive plants than in the more advanced plants. A challenging and remaining aspect of this field of research is to assess the function of methylated sugar residues in cell wall polymers. Strategies to assess such function will be discussed.
Mosquito resistance to chemical pesticides is rapidly increasing globally, stimulating our current focus on development of novel biopesticides. Ecdysone agonists are a new class of insect growth regulator with a hormonal mode of action that act as insecticides to control pest species of Lepidoptera, Coleoptera, and Diptera. Ecdysone agonists mimic the 20-hydroxyecydsone molting hormone in insects. When the agonist binds to the ecdysone receptor, the larva undergoes a premature molt which eventually leads to its own demise. Mosquito larvae treated with ecdysone agonists had significantly higher rates of mortality than control larvae treated with solvent only. But the question remains if the age or instar of the mosquito larva affects its susceptibility to the ecdysone agonist methoxyfenozide. Since the levels of the 20-hydroxyecydsone hormone cycles high and low throughout the larval stage, our experimental goal was to determine if there was a difference in the sensitivity of the larvae treated in different instars of the larval stage. Different dosages of the ethozyfenozide formulation Intrepid were added to experimental cups containing ten larvae of the same instar to compare the responses of second, third, and fourth instar larvae to the same dosages. The LC₅₀ concentrations were determined for each instar and comparisons made across all instars. The results showed that second instar larvae are more susceptible to Intrepid than third instar larvae. Third instar larvae, in turn, are more sensitive than fourth instar larvae. These results show that even low dosages are highly effective in targeting earlier instars of mosquito larvae.
two men fall for each other, they debate over whether or not this new found love is a sin. The arrival of Ben’s sister Cathy forces Ben to choose between everything he wants and knows and the man that is perfect for him. For this play I drew heavily on research, such reading book excerpts and articles by Dr. Joseph Nicolosi, the co-founder for the National Association for the Research and Treatment of Homosexuality (NARTH) and testimonials and statistics published by the Exodus International Ministries. The presentation at the Symposium would take the form of a showing of the DVD of the staged reading of the play or if the DVD is not available, then a live reading by actors.

The Theatre Festival and Academia

Majd Murad, Music and Theatre
Contributor: Yuri Daniels,
Theatre and Creative Writing
Mentor: Erith Jaffe-Berg
Department of Theatre

This presentation centers around the question: what is a theatre festival and how can it be integral to the academic learning process? My presentation will consider the kind of work completed through the UCR theatre department and its involvement in the national theatre festival sponsored by the Kennedy Center. We recently attended the Kennedy Center American College Theatre Festival (KCACTF) which took place at Cal State Los Angeles this year. There, we competed for a very prestigious acting scholarship named after Irene Ryan, a famous comedic actress. At the festival, we were able to explore what types of plays other schools in our region are involved in, learn new workshops on vocal techniques, movement, etc. and watched productions from other universities. This enabled us to expand our knowledge of our subject and contextualize our own work by seeing the work of others outside of our university. In my presentation I will address two key issues that are emerge from my contemplation of my participation in the KCACTF. First, I would like to describe the theatre festival and what we did there. For this, I will reenact one of the performances created for the festival. Then, I would like to underscore the kinds of learning involved through both the creation of the performance itself and also in the analysis of the performance in the context of the festival.

Life Histories of Fish in the Subgenus Limia—The 5-Gallon Assay

Samantha Natividad, Biochemistry
Mentor: Dr. David Reznick
Department of Biology

Livebearing fish in the family Poeciliidae exhibit multiple, independent origins of the placenta and also display a continuum of variation in reproduction. Within the family, we find close relatives that do or do not have placentas and even those with intermediate stages of placentation. Even so, the placenta is a complex organ that requires many different adaptations for proper functioning; however, the evolution of complexity is controversial in that it seems as though these adaptations have arisen all at once. Investigating the life history patterns of these fish will give clues as to how these adaptations came together and the conditions associated with the evolution of placentation. In this study we are reporting on life histories of Poeciliid fish in the subgenus Limia, which are members of the genus Poecilia. Using a common garden 5-gallon setup, we found that all four species of Limia gave birth about every 30 days to a single, large litter of small young, with developing embryos that lost 30-40% dry mass between fertilization and birth. These results indicate the lack of placentas and the allocation of nutrients in yolked eggs prior to fertilization. In contrast, other Poeciliid fish in the genus Poeciliopsis were found to have high degrees of placentation and the ability to develop multiple litters at differing stages of development. Nevertheless, this comparative life history study reveals that fish in the subgenus Limia may resemble a common ancestor that did not have placentas.
Sequential Feeding of *Homalodisca vitripennis* on Oleander Leaf Scorch (OLS) and Pierce’s Disease (PD) Strains of *Xylella fastidiosa* and its Effects on Bacterial Acquisition

Tracy-Tram Nguyen, Entomology and Biological Sciences (Medical Biology Track)
*Mentors:* Dr. Thomas Perring
Dr. Matthew Blua
Department of Entomology

*Xylella fastidiosa*, a bacterial pathogen in many plants, is responsible for causing Pierce’s disease (PD) in grapes and Oleander Leaf Scorch (OLS) in oleander. Specifically, the PD strain was not detrimental to the agricultural industry until *Homalodisca vitripennis*, the glassy-winged sharpshooter (GWSS), was introduced into southern California. This exotic species was responsible for the spread of PD and was attributed with the $13 million loss in crops since 1990. The dispersal and feeding habits of GWSS are believed to expedite the spread of PD throughout southern CA. *H. vitripennis* feeds down at the older, woody portions of the stem. This is unlike other native sharpshooters, which feed at the tips of the canes of grapevines. Since the tips of grapevines are continually trimmed, the likelihood of such speedy transmission of PD in the past has been low. In conjunction with feeding behavior of *H. vitripennis*, it has been proposed that the salivation of the vector plays a role in transmission of *X. fastidiosa*. Recently, there have been studies to diagram how the feeding of *H. vitripennis* on OLS-infected oleander contributes to the degree of inoculation of *X. fastidiosa* on grapes. Current studies are being conducted to verify that acquisition of *X. fastidiosa* on grapes decreases when GWSS are given access to OLS-infected oleander. If this connection is established, a relationship between the acquisition access period (AAP) on OLS-infected plants and subsequent acquisition of PD on grapes could be determined.

MSW to Reusable Energy

Vu Nguyen, Chemical Engineering
Brian Forsberg, Chemical Engineering
*Mentor:* Bin Yang
Department of Chemical Engineering

In the world we live in today, the continuous use of crude oil has dramatically increased over the last decade. Not only does the emission of the toxic gas worsen our ozone, the price of oil had continually increased to over $100 /barrel. So why don’t we do something about it? With current researches being conducted, we are able to help reduce the gasoline usage by the use of another problem, municipal solid waste. MSW had also been an increasingly growing with the rising population. With MSW, we are able to solve two problems with one stone. The cellulosic material in MSW such as grass, cardboard, etc., could be used by converting it to ethanol. And ethanol in turn could be used in automobiles. With ethaol as a fuel it produces virtually no harmful green house gases and the price would be considerably lower due to the fact that it comes from trash. In our research we are trying to figure out how to improve the efficiency of converting the properties of trash to ethanol.

Capturing the Pain: The Ethics of War, Conflict, and Crisis Photography

Shady Grove Oliver, Foreign Languages and Religious Studies
*Mentors:* June O’Connor
Department of Religious Studies
Georg Michels
Department of History
Charles Whitney
Department of Creative Writing

With the advent of photography, it suddenly became possible to show people ‘true’ images of things they otherwise would only be able to read about and imagine. I examine the history and culture of tragedy photography from wars and international conflicts to famines and medical crises. I then analyze several overarching ethical quandaries inherent to crisis photography. As case studies, I look at the war
images of photographers such as James Nachtwey. I analyze the potential problems of voyeurism, viewing human beings as subject matter, overlooking cultural sensitivity for the sake of a picture, the photographer’s crafting of an image (what is shown and what is left out), a photograph as ‘truth’, seeing pain and violence as entertainment, and the ethical issue of placing photographers in potentially fatal situations. In addition, I argue that because of a recent American societal acceptance of violence in entertainment and the media, there is a call for more graphic or visceral images to effectively communicate ‘the news.’ To illustrate this point I look in particular at the video game “Bioshock” in which players must photograph their victims to progress through the levels. Finally, I argue that although potentially voyeuristic among other things, photography has become an integral part of how we understand war, conflict, and crisis situations in modern society.

**Spontaneous Shrines: Dealing with the Pain of Loss on the Roadside and the Internet**

Shady Grove Oliver, Foreign Languages and Religious Studies  
*Mentors*: Ivan Strenski  
Department of Religious Studies  
Vivian-Lee Nyitray  
Department of Religious Studies

Spontaneous shrines are spaces where a loss (typically an unexpected death or disaster) is dealt with through a physical preservation of communal memory. Unlike flowers or cards left at gravesites, spontaneous shrines typically appear at the actual location of the tragedy. I look at the recorded history of spontaneous shrines with a specific focus on roadside accident sites. Through fieldwork in Southern California and case studies, I examine the culture of spontaneous shrines in terms of their origins, upkeep, and manner of presentation. Looking through an academic lens, I argue that spontaneous shrines are part of the overarching idea of the material culture of both personal spirituality and American civil religion. I then argue that with the advent of the internet and its prevalence in the daily lives of the younger generations, spontaneous shrines as websites and weblogs dedicated to the deceased present an immaterial space to preserve communal memory and provide a safe space for mourning.

**The Bridge That Is My Self: A Man Growing Up in a Two-Mother Family**

Camilo M. Ortiz, Interdisciplinary Studies  
*Mentors*: Alicia Arrizón  
Department of Women’s Studies  
Scott Coltrane  
Department of Sociology

I plan to examine the relationship between the internal-matriarchal and the external-patriarchal cultures that shape my identity as a culturally-queer, erotically-straight male. As a son of two lesbian mothers, my identity has been constructed under and along side the model of a matriarchal center filled with queer politics, feminist theories, pluralism, and marginalization, as well as, patriarchal cultural values supported by normative heterosexuality. My presentation is a self reflection of my identity (gender construction) and self acceptance as “radical” heterosexual. I intend to use a theoretical framework in my discussion to move beyond the personal narrative and engage with an array of interdisciplinary works by U.S. Third World feminists like Gloria Anzaldúa and Cherríe Moraga; social scientists such as Michael Kimmel and Peggy Drexler, and queer theorists such as Victoria Ortiz and Jennifer Elrod. While my analysis will provide a socio-historical and referenced empirical analysis on “non-traditional” individuals and families, I will show that through the efforts of U.S. Third World feminists, queer theorists and activists as “bridge builders,” the continued call for equality is paramount: it helps me to comprehend the fluidity and contradictions of my identity as I try to “bridge” the various locations I navigate as a Latino man.
Anatomical Correlates of Cortical Reorganization

Margarethe Pappademos, Anthropology
Mentor: Peter Hickmott
Department of Psychology

The brain is an organized structure containing cortical representations of specific peripheral structures (maps). The adult brain was thought to be static, especially with regards to maps; we now know that it is dynamic, since changes in maps can be induced by stroke, skill learning and amputation. For example, the rat has a distinct border between paw and chin representations in the somatosensory cortex (S1). Disrupting the sensory input from the forepaw reassigns cells from responding to paw stimulus to jaw stimulus. Our lab uses adult rat S1 as a model to investigate mechanisms mediating adult representational plasticity. One possible mechanism is growth of new connections (axons). There are many different populations of axons in the cortex: sensory input to the cortex comes from the thalamus, and horizontal connections occur in superficial cortex; both microcircuits are potential substrates for reorganization. We are researching whether either of these axon populations changes their trajectories during cortical reorganization. Axonal trajectories are labeled by injecting fluorescent tracers into paw and/or chin representation in S1. Over time, the axons and their cells of origin become labeled. By counting these cells, we can determine the relative numbers of axons that project into a tracer injection site. Both axons from the thalamus and within the cortex can project from one area of S1 to another, which provides a preexisting ‘scaffolding’ of cross-border axons for reorganization. Furthermore, the distribution of labeled cells changes during cortical reorganization, suggesting large-scale changes in axonal trajectories underlying this process.

Tainted Path: Battling the Odds and the System that Subjugates Our Youth

Janeth Pineda-Navarro, Women’s Studies and Ethnic Studies
Mentor: Amalia Cabezas
Department of Women’s Studies

As people of color do we have agency to execute our decisions or are we strategically targeted and criminalized through racialized laws? Furthermore, what influence and/or impact—if at all—does our educational system have over the choices that we make? Agency to execute one’s own decisions is clouded by discriminatory laws and a biased judicial system, where people of color are criminalized as a result of a racialized system of oppression. Those in positions of power have transcribed their principles and prejudicial views into laws and regulations that have kept the subordinate group in-check. Those currently in power are determined in keeping it and secure it by criminalizing the body of color through racial stereotypes and a biased judicial system that protects their interests. Therefore, how do youth of color have agency over their actions? Young people of color have been strategically targeted as criminals because they are subjected to a judicial system that already perceives them as such. Through a series of interviews with both teachers and high school students in the South East Los Angeles area, my research concluded that agency is in fact impacted by two factors; a biased judicial system and the educational system where stereotypes serve as a tool for prejudice that, not only reinforces the image of criminality, but also contributes to an educator’s perception of people of color. This then is projected in their curriculum, which affects a person’s agency, by failing to provide an unbiased and equal education.
Biochemical Analysis of Sperm Membrane Proteins in the Nematode Caenorhabditis elegans

Briana Rice, Biology
Contributor: Juan Fraire Zamora
Mentor: Richard Cardullo
Department of Biology

In the nematode Caenorhabditis elegans, male and hermaphrodite individuals are present. The males produce only sperm and the hermaphrodites produce sperm early in development and then switch to the production of eggs. The eggs from hermaphrodites can be self-fertilized by sperm stored in their spermatheca or by sperm from males. Previous genetic studies suggest that there may be different spermiogenesis signaling pathways due to different environments for production of sperm in males and hermaphrodites. The present study focuses on the characterization of hermaphrodite sperm proteins in C. elegans to establish whether or not there are differences in protein composition compared to male sperm. Hermaphrodite sperm was isolated from fem-3 mutants; fem-3 is a temperature sensitive mutation that masculinizes the germ line so that only sperm cells are produced in hermaphrodite worms. To achieve protein characterization we used a large scale sperm isolation method to collect samples. Sonication and differential centrifugation were used to render two cellular fractions: membrane and cytosol. Proteins from both fractions were separated by SDS-Polyacrylamide gel electrophoresis according to their mass. In order to visualize the separated proteins we used the silver stain method. The resulting protein patterns from the fem-3 hermaphrodite sperm were compared with protein patterns isolated from male sperm. Future biochemical analysis of male and hermaphrodite sperm proteins will shed light on the molecular differences of cells produced in different environments that must achieve the same goal; fertilization of an egg.

Factors That Impede and Advance Religious Freedom

Emanuela Alina Sana, Political Science/International Affairs
Mentors: Feryal Cherif
Juliann Allison
Department of Political Science

In 2003, approximately 40 percent of the world’s states imposed some limitations on their citizens’ freedom of religion. This raises an interesting but understudied question about the origins of religious discrimination and why these policies and practices persist. Most studies of religious discrimination have focused on a single country or region. These studies lack a larger frame of reference which contextualizes single country or regional studies of religious discrimination. In this project, I analyze the factors that impede and advance religious freedom globally across time. I argue that discrimination is sustained in non-democratic countries and countries with a predominant Muslim population (90 percent), ethnic homogeneity, domestic security threats, low levels of GDP, and a reliance on oil abundance. The existing literature argues that past levels of discrimination, a history of imperialism, and undemocratic political systems may all increase the prospects of discrimination (Poe, Tate and Keith 1999). This may well be true, but the existing economic situation within a country can greatly affect levels of religious repression, and economic factors are not considered in much of the existing literature. Using cross-national data from the CIRI Human Rights Project, on 160 countries from 1981-1995, I find that probability of discrimination is higher in poorer, less democratic countries that are experiencing domestic unrest. Discrimination also appears to thrive in countries that are more homogeneous and are shielded from change by their reliance on natural resource abundance. These findings shed preliminary insight into why discrimination persists and helps in identifying the factors that can be altered to enhance the probability of religious freedom.
The Abercrombie and Fitch Dilemma

Reana Leena P. Shah
Philosophy: Law and Society
Mentors: Dr. Georgia Warnke
Department of Philosophy
Dr. Raj Singh
Department of Business Administration

This paper examines retail corporation Abercrombie and Fitch (New York Stock Exchange: ANF) from a collaborated business, ethical, philosophical, and legal perspective. ANF changed as a retail corporation following a split from retail conglomerate Limited Brands in 1996. The retailer has since completely changed their product, target market, store appearance, and demographic. These new changes have brought ANF increased success; the retailer currently enjoys a solid spot in the NYSE Top 20 Retail Companies and boasts an impressive current $80 price per share. This paper emphasizes the heated legal, ethical, moral, and philosophical debates that have come with ANF’s newfound success. ANF has been sued several times since going public, for charges including but not limited to obscene advertising and store displays, obscene product, racial discrimination, and unfair/unethical hiring and employment practices. This paper sheds light on the lawsuits, while simultaneously examining the actual moral, ethical, and philosophical issues behind them. ANF ultimately expresses apologies for their wrongdoings, and have debatably sacrificed First Amendment freedoms in agreeing to a variety of court-ordered mandates aimed at preventing future racial and gender discrimination. They are currently offering college scholarships to winning National Society of High School Scholars who propose plans for increasing diversity and inclusion within the corporation.

Nitric oxide-dependent somatodendritic vasopressin release requires soluble guanylate cyclase activation

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Co - Authors: E.R. Gillard, C.G. Coburn, M. Gaertner, G. Blanco
Mentor: Dr. Margarita Curras-Collazo, Department of Cell Biology and Neuroscience

Local somatodendritic release of vasopressin (VP) from magnocellular neuroendocrine cells (MNCs) in the supraoptic nucleus (SON) takes place in response to systemic and local osmotic stimulation. This contributes in the autoregulation of systemic VP release from MNC axons terminating in the posterior pituitary. Previous studies have shown that SON punches prepared from rats subjected to osmoregulatory challenge in vivo display stronger local VP release when kept in a hyperosmotic environment in vitro, and the stronger release in these conditions depends upon nitric oxide (NO) signaling. Other studies conducted show that an increase in endogenous NO release goes with osmotically-stimulated local VP release from the SON, and the block of neuronal nitric oxide synthase (NOS) decreases both local NO and VP release due to osmotic stimulation. In order to address the possible importance of soluble guanylate cyclase (sGC) as an intermediary of NO-dependent local VP release, the effect of 1H-[1,2,4]oxadiazole[4,3-a] quinoxalin-1-one (ODQ), an sGC inhibitor, on local extracellular VP release and NO release from SON punches in response to hyperosmolar stimulation were examined. We found that ODQ decreased local VP release in osmotically stimulated rat SON (mean and SEM, 4.1 ± 1.2 vs. 9.0 ± 1.6 pg/ml/microgram) compared to VP release from the SON of normal osmotically injected rats. As was suspected, NO was not affected by ODQ. These results propose that sGC is an important effector of NO-mediated enhancement of somatodendritic VP release in osmotic stimulation.
Study Abroad: Is it for me?

Jessica Shillings, Interdisciplinary Studies
*Mentors:* Charles Whitney
Joshua Hardina
Department of Creative Writing

My intention is to compose a portrait of the study abroad experience; through a series of interviews with students who have participated in the Education Abroad Program (EAP), as well as the parents of these students, and EAP officials. I will start with our campus EAP office, asking them for the contact information of EAP students from UCR itself. I will then contact the subsequent EAP offices of the other UC campuses. In my interviews, I’d like to focus on comparisons between each program. For instance, how a student’s experience in Spain compares with another individual’s experience in Egypt. I want to talk to as many study abroad participants, parents and study abroad officials as time will allow me. I am particularly interested in the risk factor, either perceived or real, that is involved in each experience. For instance, how does a student’s risk factor in Cordoba, Spain compare with the risk factor that is involved in studying at a University in Cairo? Naturally I’d like to speak with the parents of these subsequent students as well, and hear what the experience was like for them.

Recovery from Drought Stress in Three Species of Rhamnaceae

Lindy A. Shomper, Biology
*Mentor:* Louis Santiago
Department of Botany and Plant Sciences

Some global climate models predict future increased rainfall variability in California. During extreme drought, mortality can be observed in perennial plant species. The winter of 2007 was one of the driest on record. During the summer of 2007, we measured recovery from drought stress and estimated critical physiological limits on chaparral shrubs. We compared plant water potential, leaf water content, hydraulic conductivity, stomatal conductance, and soil volumetric water content among three species of the plant family Rhamnaceae: Ceanothus crassifolius, C. tomentosus, and Rhamnus ilicifolia, to investigate how related species recover from drought stress after experimental irrigation. Irrigation increased mid-day water potential by 30% and predawn water potential by 50-60% over control plants within one day. Hydraulic conductivity and stomatal conductance increased with irrigation in both Ceanothus species, but not in Rhamnus. We also expressed stomatal conductance as a function of water potential to demonstrate the water potential at which stomatal conductance goes to zero leading to plant mortality. Considering the possibility of environmental change and increasing variation in rainfall this helps us understand critical physiological limits. We conclude that irrigation improved water status of all three species with varied responses among species, and when drought limits physiological activity, experimental irrigation can be used to evaluate physiological recovery from drought and estimate critical physiological limits.

Can Higher Education Play A Leading Role in Inland Empire?

Jason Song, Political Science
*Mentor:* Ron Loveridge
Department of Political Science

Universities are the engine of economic growth in the twenty-first century through professors conducting research in their laboratories, studying in-depth about a specific issue, discovering an innovative research that they have originally conducted, and turning an innovative discovery into a patent that would enable a faculty member to start-up their company. This has been the case in universities throughout the United States and the world like Cambridge University, Stanford University, UC San Diego, and etc. In addition, other regional community actors have also impacted their community by lending their support to the university to take a leading role in economic development through creating a social networking program. This would bring venture capitalists, business service providers, entrepreneurs, and researchers in the same arena.
The social networking program enabled the region to be economically prosperous and the university to gain the world’s attention through collaboration between the university and industry through knowledge and social networking. Can UC Riverside play a leading role in Inland Empire’s economy? UCR can play a leading role in Inland Empire’s economy through the creation of ideas and sources that translates into companies, jobs, and wealth, centers for workforce development, and a hub for lifelong learning around where technology is going.

Notions of Irishness in Literature: Examining Romantic and Contemporary Models

Anne Sullivan, English  
*Mentors:* Joseph Childers  
Department of English  
Dana Simmons  
Department of History

Assuming that literature influences the definitions of identities, and vice versa, this paper examines how notions of Irishness have changed during the nineteenth and twentieth centuries. Irish writers like W.B. Yeats created a romanticized idea of Irishness in order to unite a fractured Ireland against English oppression. James Joyce did not rely on such an idyllic picture of Ireland, but he created such a distinct national narrative that his work can be read as another “type” of Irishness. However, the idea that one unifying form of Irishness exists overlooks the diversity and dynamic quality of Ireland’s pluralistic identities. Contemporary Irish writers, like Roddy Doyle and Nuala Ní Dhomhnaill, contend with a long history of post-colonial and post-national literature in the shadows of Yeats and Joyce as they attempt to construct and deconstruct Irish national identities. Contemporary Irish writers, like Roddy Doyle and Nuala Ní Dhomhnaill, contend with a long history of post-colonial and post-national literature in the shadows of Yeats and Joyce as they attempt to construct and deconstruct Irish national identities. One critic claims Roddy Doyle’s works are important if only because the people he writes about (1980's working-class Dubliners) actually read his books whereas most of them do not read or identify with James Joyce’s *Ulysses*. This paper explores the continuities and breaks from post-colonial and national discourse in contemporary Irish literature as the new medium for defining national identities.

Our Legislators and Their Sensitivities to Our Concerns

Hung Tran, Biochemistry  
*Mentor:* Benjamin Bishin  
Department of Political Sciences

We elect our legislators on the basis that they serve our interests and answer our questions – but will they? Media reports and muckrakers suggest that our legislature is overrun with corruption and special interests. But is this really the case? It becomes imperative to find out for ourselves. This study seeks to discover how responsive our legislators are when it comes to the problems which concern us and our environment. E-mails concerning SEIU 721’s fight for reforms to Riverside’s temporary assignment program and education were submitted to Riverside’s state assemblymen, as well as an e-mail regarding the state of public K-12 education being submitted to congressmen in Washington. Their responses are the measure by which it is determined whether or not the everyday citizen still has enough power to influence their government.

Phylogeography of “Sky Island” Plants in the Great Basin

Nolan M. Ung, Botany and Plant Sciences  
*Mentor:* Seung-Chul Kim  
Department of Botany and Plant Sciences

The Great Basin is a landscape of high peaks and low valleys that stretch from Utah through Nevada and into California. Focusing on two flowering plant species restricted to high peaks (sky islands), *Castilleja nana* (Scrophulariaceae), and *Astragalus kentrophyta* (Fabaceae), we are investigating genetic variation to determine how small herbaceous plants with limited dispersal ability show current wide distributions across multiple mountain ranges. We will test two competing hypotheses: (1) the Pleistocene relict hypothesis, i.e., sky island populations represents remnants of much earlier broadly distributed populations, and (2)
the long-distance dispersal hypothesis. Based on both nuclear and two chloroplast DNA (cpDNA) noncoding regions, ITS of nrDNA and \textit{psbA-trnH} and \textit{trnD-trnT}, respectively, our preliminary data suggest that the more closely related populations were on adjacent peaks and adjacent mountain ranges. We are currently sequencing more populations and additional highly variable cpDNA regions. Our results will provide new insights into understanding the evolutionary history of sky island plants in the Great Basin area.

**Teenage Women’s Bodies in Film as a Correlate of Teenage Cosmetic Surgery**

Alayna Williams, Psychology and Women’s Studies  
*Mentor*: Chikako Takeshita  
Department of Women’s Studies

Women are under substantial pressure to subscribe to the hegemonic standards of feminine beauty. The ideal female body has been perpetuated through media images, in particular popular-culture films. Teenage women are especially vulnerable to film prescriptions of how their bodies should look because they are still undergoing identity formation. In this paper I will provide an analysis of teenage films that encapsulate the female body ideal of the 1980’s, 1990’s, and 2000’s. My research suggests that there has been a shift in the representation of teenage women’s bodies. Based on my own research and the current literature, I hypothesize that the unrealistic beauty expectations placed on young women are correlated with the increase in cosmetic surgery among teenage women, in particular breast augmentation procedures.

**Bacterium-Induced Fluorescence-Enhancement Kinetics: Breaking 100-Year Old Traditions of Staining Bioanalyses**

Elizabeth Zielins, Bioengineering  
*Contributor*: Marlon Thomas, Bioengineering  
*Mentor*: Valentine I. Vullev  
Department of Bioengineering

Ever since the development of the Gram stains, more than 100 years ago, the staining methodologies for detection and identification of bacterial species have two inherent limitations: (1) the outcomes have Boolean nature: i.e., “positive” vs. “negative”; and (2) solely species, which are sought for, are identified. We observed that the kinetics of bacterial staining contains a wealth of information that can be utilized for detection and identification of bacterial species with significantly increased specificity. Our studies focus on a series of cationic dyes that manifest emission enhancement in the presence of bacterial species. This presentation will cover two major efforts that are pursued in parallel: (1) photo physical studies of the fluorophores, revealing that the emission enhancement results from viscosity changes (upon staining) in the molecular microenvironment of the chromophores; and (2) development of bioanalytical methodologies based on emission-enhancement kinetics. Therefore, single-step analyses yield multi-value outcomes (rather than Boolean results).