Latinas residing in the U.S. have twice the incidence, and 1.4 times the mortality rate from cervical cancer than non-Hispanic white women. Current guidelines indicate that all sexually active women and/or those who have reached 18 years of age should undergo an annual Pap smear test. However, Latinas tend to have lower rates of compliance toward the recommended guidelines of Pap smear testing compared to other U.S. women. Studies have shown that cultural and structural justifications persuade Latinas' behaviors toward seeking cervical cancer screening resources. Influential factors such as low socioeconomic status, health insurance, legal status, levels of acculturation, and age have been identified. Culturally influenced factors such as moral discomfort with the examination due to issues of virginity are vaguely mentioned. The goal of this study was to examine how morality plays an important role in 18 to 25 year old Latino women’s beliefs toward the examination. Only women who had never received a Pap exam were eligible for the study. Individuals from this particular group showed moral aversion/discomfort toward the examination. Another factor found relevant to their reluctance was the lack of appropriate information and awareness. Moral aversion and the lack of appropriate information negatively influence the disposition of Latina’s beliefs and behaviors toward receiving initial and repeated Pap smear testing.

Being a Social Chameleon
Shwetha Hareesh
*Mentor:* Jen’nan Read

Throughout the centuries, a women’s role in society has been continuously changing as women have become more aware of what certain injustices they had been facing and become able to overcome them as they unite, fight, and then achieve for issues that they are passionate about. Not even a half a century ago, females were viewed as a man’s commodity, where the purpose of a woman was to try to snag herself a great husband and then basically dedicate her life to serve her husband and her children. They were raised to be perfect wives, learning how to tend to the housework and the children, maintain their beauty for their husband and the community, and to bow down and respect their husband. From the second wave of feminism, many females have evolved to become independent, strong women who are driven to excel in their studies, choose the relationship that they want, be the ones that are powerful in bed, and strive to become successful, career-orientated individuals, etc. Gradually adapting to feminist ideals, some women have strayed away from the beauty myth, that to be successful in this world, one must be beautiful. However, though Indian women are exposed to this atmosphere, they seem to fulfill expectations set to them. In other words, they try to grasp every quality that might define one as the perfect girl: being able to maintain our cultural identity, having an intellectual mind by excelling in our studies and absorbing information about the world, maintaining our natural beauty, and being traditional women at heart by knowing that we must step back and retain those traditional gender roles when married. So is this the new social type immerging amongst Indian women?

Assessing Coronary Artery Disease With an Angiographic Technique for Measuring Fractional Flow Reserve
Mohamed Hassanein
*Mentors:* Sabee Molloi

Coronary artery disease (CAD) causes a thickening of the arterial walls and reduces the flow of blood to the myocardium. In 2002, CAD accounted for 1 in 5 deaths in the U.S. Better assessment is needed to facilitate the diagnosis of this disease. Fractional flow reserve (FFR), which is a quantification of flow reduction due to a stenosis, is presently the best method of assessing CAD. This project introduces an angiographic technique for determining FFR. A swine animal model was used to examine an angiographic method for determining FFR for different severity stenoses. Fasted swine were sedated with atropine and ketamine. Open chest surgery was performed, and the heart was suspended in the pericardial cradle. The left anterior descending (LAD) artery was dissected apart from the epicardium in its proximal portion. An ultrasound transit-time flow probe was placed distal to the left main coronary artery bifurcation. A vascular occluder was positioned distal to the flow probe to apply different stenosis severities. Coronary angiograms were obtained after injections of iodinated contrast for baseline and hyperemic runs. Angiographic FFR was calculated by the ratio of measured flow to hypothetical normal flow at maximum hyperemia. This was compared to FFR measured directly with the flow probe. A comparison between FFR measured with angiography and with the flow probe showed strong correlation (r>0.95). It can be concluded that regional coronary flow can be determined with angiography, which would allow for a robust method for calculating FFR from the same images obtained from routine coronary arteriography.

Rewarding Effects of Endocannabinoid Deactivation Inhibitors
Amin Hedayat
*Mentors:* Marco Bortolato & Daniele Piomelli

Derivatives of *Cannabis sativa*, such as marijuana, are one of the oldest and most consumed recreational illicit drugs. Cannabinoids and their endogenous counterparts were studied through two experiments in their ability to produce drug-induced reward (addiction), using a two-
compartment conditioned place preference as the behavioral model and a well-established paradigm of Pavlovian conditioning. The difference in time spent in the non-preferred compartment between pre-conditioning and post-conditioning tests followed by one-way analysis of variance, post hoc (Tukey) was considered the critical measurement for evaluation of preference induced by the drug. Compared with the pre-conditioning phase, rats treated on the test day with AM404 (2.5mg/kg, i.p.) WIN55212-2 (1mg/kg) and morphine (5mg/kg) spent significantly more time in the non-preferred side than in the preferred side, showing a significant shift in preference toward the environment that had been associated with drug. Rats treated with URB597, however, showed no preference, arguably failed to affect dopamine release and therefore it may devoid of potentially hazardous addictive properties. The main finding of our study is that AM404 induced a dose-dependent inverse U-shaped preference, while URB597 did not show such an effect, revealing a pharmacological differentiation between inhibitors of anandamide reuptake and hydrolysis.

Therapeutic Interventions Using Amyloid Peptides to Decrease the Pathology Found in Alzheimer's Disease
Irma Hernandez
Mentor: Andrea Tenner
Alzheimer's disease is characterized by cognitive dysfunction, neuronal loss, tangled neurons and senile plaques, which have been found to contain Aβ peptides. In vitro, high levels of Aβ are neurotoxic and can lead to neuronal death. However, Aβ can also bind to activate the complement cascade causing inflammation which if unregulated can lead to further neuronal loss. The present study focuses on testing the hypothesis that using Aβ peptides to immunize animals will reduce Aβ plaque accumulation thereby decreasing inflammation and preventing the progression of pathology. Several candidates, Aβ peptide, including fibrillar Aβ1-42(fAβ), Oligomeric Aβ (Oligo), Padre Aβ 1-15(Padre), and Multiple Antigen Peptide 1-33(MAP1-33) were tested. Mice models in which 12 and 16 month old APP and B6/SJL mice were immunized for 4 months were used. Our previous results using fAβ and Oligo showed a decrease in total plaque accumulation and inflammatory response at 12, but not at 16 months. Mice here were immunized with one of the following: Super Complete Freund’s Adjuvant (SCFA), Padre, and MAP1-33. Immunohistochemistry was used to observe pathological and inflammatory markers such as total amyloid deposition, fibrillar amyloid, microglia and astrocytes, which are then compared between age groups and treatments. Preliminary results show that immunization at 16 months does not decrease pathology or inflammation. However, at 12 months, MAP1-33 significantly decreased Aβ deposition and microglia activation.

Does Environmental Enrichment Provide Neuroprotection Against Excitotoxic Cell Death?
Melissa Hill
Mentor: Oswald Steward
Although studies are mixed, most previous experiments have shown that environmental enrichment reduces cell damage in Huntington’s Disease transgenic mouse models. Additionally, such enrichment increases the amount of neurotrophic factor and reduces the amount of cell death after excitotoxic injury in rats. We chose two different strains of mice: FVB and C57BL/6 to participate in the study. Mice were kept in environmentally enriched cages for 14 days, and then received a unilateral quinolinic acid lesion in the striatum, and euthanized after two days. We found that, contrary to previous research done, seven-week old mice that lived in the environmentally enriched cages actually showed more cell death than mice from standard cages. The mice in the environmentally enriched cages weighed less than the mice in the standard environment, and the FVB strain showed a trend towards more cell death compared with the C57BL/6 in both the enriched and standard conditions. Factors contributing to our results may be age, time point of surgery, and duration in enriched or standard environment.

Social Phobia Among Parents with Autistic Children
Elizabeth Hoang
Mentor: Anne Spence
Autism is a complex neurological and developmental disorder that affects an individual in the areas of social interaction and communication. Children with autism are characterized by unresponsiveness, difficulty in mixing with others, little or no eye contact, preference to be alone, and behaving in an aloof manner. Social phobia is a disorder characterized by fear and avoidance of situations where others may scrutinize an individual. Several studies have documented higher rates of social phobia in the first-degree relatives of autistic probands than in first-degree relatives of control probands (Piven & Palmer, 1999; Smalley, McCracken, & Tanguay, 1995). There are two subtypes to social phobia: generalized and specific. The question to address is whether or not characteristics of the generalized subtype of social phobia are inheritable. To address this question we looked at the relationship between characteristics of social phobia among parents, and the severity of impairment in social interaction occurring in their autistic children. There are five questionnaires that were used as measures
of social functioning. These include the Social Interational Anxiety Scale, Fear of Negative Evaluation Scale, Social Phobia Inventory, The Schizotypal Personality Questionnaire and The NEO Five Factor Inventory. My sample consisted of parents of autistic children. From these tests, I analyzed characteristics of social anxiety, schizophrenia, and personality disorders. With the data I collected, I observed the occurrence of social anxiety and characteristics of schizophrenia among the parents of autistic children. Although this is observed, this does not conclude to causation.

Transgenic Expression of RecA of *Borrelia burgdorferi* and *Borrelia hermsii* in *Escherichia coli*

Thuy Tran Hoang

*Mentor*: Alan Barbour

The RecA gene is the major gene in bacteria that promotes homologous recombination. The RecA protein is highly conserved among all bacteria, including pathogenic spirochetes *Borrelia burgdorferi* and *Borrelia hermsii*, the agents of Lyme Borreliosis and relapsing fever, respectively. *E. coli* expressing the RecA gene from *B. hermsii* and *B. burgdorferi* were subjected to DNA damage and recombination assays. Results of these studies show that the survival of *E. coli* expressing *B. hermsii* RecA was significantly less than *E. coli* expressing *B. burgdorferi* RecA, while recombination levels were the same for both proteins. Examination of the deduced protein sequence of *B. hermsii* RecA revealed a glutamine for lysine substitution at position 152. This residue is located between the ATP hydrolysis and a DNA binding site. We hypothesized that difference in complementation between the two *Borrelia* species is due to the K152Q substitution found in the RecA of *B. hermsii*. For *E. coli* expressing modified *B. burgdorferi* RecA, DNA damage repair assays show that complementation is adversely affected by the mutant protein. Increased resistance to the chemical agent methyl methan sulfonate is observed in *E. coli* expressing modified *B. hermsii* RecA. However, in both UV survival assays and in homologous recombination assays, no statistical difference was observed between modified and wild-type proteins activity. From these complementation studies in the heterologous *E. coli* system, it appears that RecA functions differently when catalyzing homologous recombination and homologous recombination DNA repair.

Parachute Kids: The Impact of the Parachute Experience on College Adjustment

Catherine Hsieh

*Mentor*: Jeanett Castellanos

Parachute kids are characterized as children who come to the U.S. unaccompanied by their parents to seek educational opportunities. The separation between these children and their parents has prompted parachute kids to experience emigrational and developmental challenges. Limited research has attempted to understand and to explain the consequences that accompany the parachute phenomenon on a personal, social, and cultural level. Moreover, there is no research that has investigated the adjustment of parachute kids in college. This study examines parachute kids’ self-esteem, self-efficacy, loneliness, perceived social support, ethnic identity, cultural role model exposure, and minority status stress on college adjustment. Parachute kids are often considered as international students and/or first generation immigrants, as the majority of them come from Taiwan. Due to the ambiguous status of the parachute population, data collection will consist of 150 surveys from three groups of students: parachute kids, Chinese American, and international students. It is hypothesized that Chinese Americans will report the highest adjustment rate among the three groups while parachute kids will be better adjusted than international students. Findings will provide recommendations for educators and counselors to better serve the parachute population.

Regional Patterns of Fossil Fuel CO2 in the Planetary Boundary Layer Across North America Using Radiocarbon in Annual Plants

Diana Hsueh

*Mentor*: James Randerson

Radiocarbon levels in annual plants provide a means to map out regional and continental-scale patterns of fossil fuel emissions and biosphere-atmosphere exchange. The imprint of the local atmosphere is recorded within the leaves of these plants and represents a time-integral of atmospheric levels over a period of several months, complementing both flask and aircraft sampling techniques. We collected corn (*Zea mays*) from 67 sites across North America during the summer of 2004. Our sampling protocol was designed to capture regional and continental scale patterns of fossil fuel CO2 levels; we avoided areas directly influenced by point sources such as major roads or cities. Leaf samples were analyzed for $\Delta^{14}C$ using the W.M. Keck Carbon Cycle Accelerator Mass Spectrometer at the University of California, Irvine. In places where the plants were exposed to sustained and elevated levels of CO2 from fossil fuel emissions, $\Delta^{14}C$ levels were reduced. We found a drop of 7.5 per mL between the western U.S. (Idaho, Colorado, New Mexico and Alberta, Canada) and the eastern U.S. (Massachusetts, New Hampshire, New York, Indiana, Ohio, Pennsylvania, Maryland, West Virginia, Kentucky, Tennessee, Virginia, Mississippi, Alabama, Georgia, Florida, and Halifax, Canada). This corresponds to a 2.6 ppm increase in fossil fuel CO2 levels as air moves from west to east across the continent. An even larger drop
was found between the western U.S. and the Ohio/Maryland region. (11.1 per mil drop = 3.9 ppm added CO₂). These data provide a means to test our understanding of the coupling of biosphere atmosphere exchange, planetary boundary layer mixing, atmospheric transport, and fossil fuel emissions in mesoscale and global models that estimate the spatial distribution of carbon sources and sinks.

The UCI Exfiltration Project: Caffeine as a Sewage Tracer
Sara Huber
Mentor: Jan Scherfig
Clean drinking water is a fundamental component of life and society, therefore regulatory agencies seek to minimize public exposure to waterborne contaminants. Exfiltration, the process by which wastewater leaks from sewer lines into the surrounding soil, is a growing concern in areas where aging (and deteriorating) sanitation systems overlie groundwater reservoirs. Most exfiltration studies focus on flow across the pipe defect, so little is known about sewage flow through the soil surrounding the pipe. One way to observe wastewater contamination is to use chemical markers like bacteria and inorganic ions. However, these indicators are less reliable when applied to soil studies, because ions and bacteria are not unique to human waste. To solve this problem, the UCI Exfiltration Project studied the feasibility of using caffeine as an alternative indicator of sewage exfiltration. During the study, caffeine, bacteria, and inorganic ions were extracted from soil cores taken from a control site and multiple other sites with known pipe defects. The data formed vertical profiles of the compounds in the soil. Studying the soil profiles near the defects and the compound concentrations in raw sewage confirmed the fallibility of traditional chemical markers. The results also indicated that caffeine can be used to identify sites of exfiltration.

Construction of Controllable Gene Expression Vector
Christopher Huynh
Mentor: Guey Chuen (Oscar) Perng
Herpes simplex virus Type I (HSV-1) is a neurotropic DNA virus with many favorable properties as a gene therapy vector. The first noticeable property of HSV-1 is its ability to establish latent infection in sensory neurons of its host. With a broad host cell range, HSV-1 is highly infectious, thus it can act as an efficient vehicle for the delivery of foreign genes to cells. Secondly, the HSV-1 viral genome is large (~152 kilo base pairs); as a result, several viral genes are dispensable without affecting the replication ability of HSV-1 in vitro. In our area of study, we exploit features of the latency active promoter complex to achieve a controllable, stable foreign gene expression in the nervous system. The first part of the project required characterizing a previously generated HSV-1 Doxycycline-inducible vector system by Western and Northern blot. A leakage gene expression was detected; therefore, a new construct of the tight regulated HSV-1 was created. To carry out the homologous recombination of the new HSV-1, we cloned the key tight regulated and inducible elements into the proper plasmid. In RS cells, co-transfection of the newly-constructed plasmid with infectious prototype viral DNA containing Tet-on elements was performed. Currently, we are screening the viral recombinants by picking and growing viral plaques in RS cells, isolating and treating viral DNA with restriction enzymes, and identifying the desired viral recombinants by probing with a radiolabel-specific gene probe. When the desired tight inducible HSV-1 vector system is found, testing of the construct in tissue culture will follow to see if transcription levels are inducible by Doxycycline. In doing so, we hope that our study can eventually provide a valuable tool for gene function study and lead to the development of an effective, manageable gene therapy vector.

Bioenergetics of Little Skate Development
Ahmed Ibrahim
Mentor: Adam Summers
The little skate (Raja erinacea) is a common species of the North Atlantic marine ecosystem. Though the species is well known and frequently studied, its bioenergetics has not been fully investigated. We measured the metabolism of development of the little skate, Raja erinacea, using two approaches to metabolic measurement. The first method was homogenized skate tissue (n=31) and yolk samples (n=29) for the measurement of energy content via micro-bomb calorimetry. The second approach used respirometry, where live individuals (n=6) were placed in chambers and oxygen consumption was measured. Calorimetry results showed that energy provided by the yolk was found to be 7.5 kcal. The total energy needed for development was found to be 6.15 Cal while the mean (n=31) energy content in skate tissue (assimilation energy) was 4.25 Cal/g. The mean crude energy in the mean dry mass of hatchlings was 3.17 Cal. The conversion efficiency was 47.8%. The conversion efficiency is lower than most other oviparates which is due to the active cost of pumping water into the egg capsule. This study confirms the evolutionary correlation between egg capsule morphology and metabolism.
Effects of Tunneling on Brownian Motion in Chemical Reaction Rate Theory
Fatima Ibrahim
Mentor: Roger McWilliams
The effects of tunneling on Brownian motion in chemical reaction rate theory can be studied through molecular dynamics simulations. Deviations from tunneling-free systems will be qualitatively explored. Measuring the dependency of the correlation function on temperature will display the effects of tunneling, which can be measured via Scanning Tunneling Microscopy. The dependency of each factor will be an extra term in the correlation function. Each reaction will be unique depending on its energy barrier and phase. Electron transfer, energy transfer, quantum Brownian motion at low temperature, and electron tunneling will all be factors that contribute to the correlation function. Overall an accurate relation will be accomplished between equilibrium fluctuations and dissipative transport coefficients through correlation functions, the simplest of which is between the velocity correlation function and the self-diffusion coefficient.

Factors Mediating Microglial Uptake
Jalene Imaoka
Mentor: Andrea Tenner
Alzheimer’s disease (AD) is the most common form of dementia and is characterized by pathology, including neuronal loss, β-amyloid (Aβ) plaques and neurofibrillary tangles. Microglia are the phagocytes of the brain; they ingest cell debris and any other foreign particles in an attempt to defend the brain against possible harm and facilitate repair. Clusters of activated microglia appear on the senile plaques of the AD brain, while few, if any, are seen in the control brain, indicating a potential role for microglia in the disease. Still, it is unclear whether this role would be detrimental, protective or both under different conditions. Also implicated in AD is C1q, the recognition component of the classical complement pathway, which has also been found co-localized with Aβ plaques in the AD brain. Because microglial ingestion of Aβ could possibly play an important role in AD, I wanted to determine how various conditions affect the level of microglial-mediated uptake. Therefore, aggregated Aβ (fAβ) and fAβ-anti-Aβ immune complexes were prepared using different conditions, and then ingestion of Aβ was measured using FACS analysis and anti-Aβ to detect Aβ within microglial cells. In these trials it was determined that different Aβ peptide preparations will generate varied uptake levels. In addition, different lots of Aβ peptide also result in variable amounts of microglial Aβ uptake, even when the peptide is prepared under the same conditions as previous lots. Finally, I determined the optimal concentrations of C1q that enhance uptake of suboptimally opsonized fAβ in immune complexes.

Venial Discourse Unblamed: The Question of Knowledge and Censorship in Milton’s Paradise Lost
Stephanie Irene
Mentor: Douglas Pfeiffer
I explore English writer John Milton’s epic poem, Paradise Lost (1674), which is explored in relation to his treatise on censorship, Areopagitica (1644), to investigate the implications of censorship and the qualities of forbidden, as well as permissible knowledge. Special attention is given to the separate falls of Adam and Eve and their distinctive learning practices and patterns before the fall. The keyword “venial” in Book IX’s “venial discourse unblamed” is traced back to its Latin roots to show the vital significance of Eve in this climactic point in the epic. Through these legendary sagas, Milton reveals the fundamental difference between prelapsarian and postlapsarian knowledge, and exposes waywardness as merely disobedience and not sin. Knowledge can be both holy and sacrilegious.

Web-Based PDF Document Creation and Editing Tool
Karl Isenberg
Mentor: Pai Chou
Electronic document formatting poses several problems in a collaborative environment. Proprietary file formats may support WYSIWYG editing, but the information is unstructured and cannot be processed by other tools. Moreover, by passing copies of a document around and working on different sections simultaneously by multiple authors, it is nearly impossible to construct a consistent, authoritative view of the document. Combining changes is also tedious and error prone. To address this problem, we propose a web-based PDF generator. It uses web forms to enforce structured editing of information and possibly control version and access control by multiple authors. Information from multiple sources can be formatted in PDF while structured data is embedded as XML. This decoupling of data from presentation and use of open data formats make it possible to automate the combining task in multi-author collaboration. An HTML-based form generator also enables non-technical users to generate customized forms for their own applications.
Studies of Immunogenicity and Protective Efficacy of Herpes Simplex Virus-1 (HSV-1) Lipopeptides against Ocular and Genital Herpes in Mice
Annie Issagholyan
Mentor: Lbachir BenMohamed

Herpes simplex virus has become a prevalent disease worldwide that affects thousands of people with ocular herpes in the U.S. alone. HSV-1 transmission may occur from contact with secretions from or around the mouth. There is no cure for HSV, so our interest is to obtain an immunotherapeutic vaccine that would prevent the virus from recurring in herpes patients and from being contracted in persons without herpes. The Ocular Mucosal System is the barrier that protects the eye, and in this study we seek an effective way to develop a vaccine that would elicit immune responses of CD8 and CD4 T cells to protect the eye from HSV-1. In this study, mice were injected subcutaneously with one of four types of lipopeptide vaccines: P1, P2, P3, or PC. These vaccines are composed of palmitoyl-tailed helper Tc lymphocyte chimeric epitopes that induce HSV-1 specific CD8 T cell responses. The palmitoyl-lysines are bound to a specific peptide in groups of one, two, or three. The vaccinated mice were then challenged with HSV and were monitored. Spleen, lymph nodes, and serum samples were taken from the mice and various methods were used to determine whether an immune response was elicited and how successful each vaccine was in doing so. The results of this study have been obtained and interpreted, and have recently been submitted to the Journal of Virology, awaiting publication.

The Son Jarocho: A Music and a Culture
Michael Iyanaga
Mentor: Robert Garfias

El Son Jarocho is a folk music that comes out of the region of Veracruz, Mexico. Historically, the music was always used as a form of public celebration, whether it be a wedding, fandango (traditional party), or funeral service. Certain songs and song forms are associated with certain celebrations. Most frequently El Son Jarocho is played during fandangos, an open celebration to anyone who might wish to partake. The musicians typically understand that El Son Jarocho is not just a style of music, but also a way of life. The culture of El Son Jarocho is one connected with the natural world of animals and harvest, respect for elders and their histories, and the ability to work in collectives. The music is an oral tradition that has only within the last 50 years begun to be documented. In the last 15 years or so, there has been a large resurgence in interest in El Son Jarocho in both Mexico and California, due mainly to efforts by Jarocho groups to educate youth about El Son Jarocho and keep the tradition and culture alive. My research was gathered through a combination of bi-weekly classes, extensive seminars, and conversations with veteran musicians.

The Paradigmatic Shift in Global Politics: The United States, the War on Terror, and Human Rights
Helia Jazayeri
Mentor: Lina Kreidie

Traditionally and from a legalist perspective, human rights acts and regulations in international law have provided the basis for legal protection to people, organizations and countries, mostly during times of crisis and war. Review of the related literature indicates that fundamental human rights norms and standards have not changed until 9/11. Although some research focuses on the implications of global politics on international law enforcement and compliance, none look at the legal-political paradigm shift in states’ behavior with regard to human rights laws. The ‘war on terror’ is not a new type of conflict; however, the way it is constructed has signaled a new era in human rights laws. The United States politics of the war on terrorism has set the precedent to a new body of regulations. The issues related to the detainees and the Abu Ghraib abuses brought to the forefront the entanglement of the legal and the political. Many scholars questioned the United States’ policies and legal strategic tactics as largely an effort to provide justifications for what traditionally are flagrant violations of international law. The aim of this research is to analyze this legal-political paradigmatic shift critically. The study will be based on legal analysis of the once classified memoranda regarding the United States administration’s conduct in times of war. This legal analysis is grounded in a political context to portray the implications for U.S. foreign policy. This analysis shows that the U.S. has diverged from the prevailing human rights legalist approach, fundamentally marginalized existing human rights treaties, and ultimately reached a point of reshaping basic international laws and norms.

Motes
David Je
Mentor: Richard Nelson

Sensors have become a part of everyday living. Consumers have forgotten that sensors are being utilized in a multitude of ways that make life more enjoyable and comfortable. They have become the backbone for most consumer electronics. They provide feedback and information to be computed or adjusted. Today’s sensors include environmental monitoring, structural monitoring, and proximity and location sensors. Although these sensors are very useful, they have one critical flaw. The design of the sensors, often times, also limits them in their specific uses. Sensors are designed
for one specific reason: data acquisition. Every sensor is utilized to collect data, which it then transmits to a processor or computer that analyzes the data. The next generation of sensors comes about with a new technology known as Motes. These new age sensors are tiny, self-contained, and battery-powered computers with radio links, which enable them to communicate and exchange data with one another, and to self-organize into ad hoc networks. Motes have the ability to compute the data, as well as to share and send data wirelessly through radio frequency technology.

**Detection of Low Levels of Mitochondrial DNA Mutations in Diabetic Patients**

Richard Jimenez  
*Mentor:* Vincent Procaccio

Mitochondria are organelles that produce essential energy for cell function, often referred to as the ‘powerhouses of the cell’ (Wallace, et al., 2002). Each mitochondrion contains multiple copies of a small circular piece of DNA called the mitochondrial DNA (mtDNA) that code important proteins needed for energy production. This mtDNA is only inherited from the mother and is able to mutate, changing the genetic information. Mitochondrial mutations cause many known mitochondrial diseases, and a diagnosis is usually made from a muscle biopsy. For example, a common mtDNA mutation at position 3243 is present in the cell at different levels from a few percent to 100% mutant and causes diabetes at low levels of mutation and severe neurological diseases at higher levels. Conventional techniques used to detect this 3243 mutation often overlook the presence of the mutation at very low levels, and we sought to develop an alternative technique that improves the detection sensitivity and throughput of mtDNA mutations. To test the sensitivity of our new mutation detection method, we analyzed diabetic patients' blood samples that may possibly carry the mutation. We found that several patients carry the 3243 mutation while conventional techniques missed the presence of the mutation in the blood samples. This study suggests that our more sensitive technique can accurately diagnose a carrier of a mtDNA mutation without the use of a painful muscle biopsy. In addition, the use of our technique may help redefine the frequency or prevalence of the 3243 mutation in the diabetic population.

**Analysis of the Performance of Novel Truss Lattice Structures**

Michelle Johnson Palmer  
*Mentor:* Daniel Mumm

Lightweight structures are used in applications that require high fuel efficiency, blast resistance and heat dissipation. One type of lightweight structure is the sandwich panel construction, with attributes that have long been recognized. As compared to a single solid sheet of metal, an equal-weight panel with dense face sheets and a porous core will outperform the solid sheet in terms of bending stiffness (a critical parameter in designing advanced vehicles). This research examines a new class of sandwich structures with cores made of truss networks of small diameter. These cores can perform better in compression and shear at equivalent weight, if the cores are designed properly. The core design is optimized using finite element methods to yield the best load bearing characteristics for the least amount of weight.

**Professional Performing Experience in European Jazz Dance Festival**

Liz Jorgensen  
*Mentor:* Robert Boross

For this project, I performed as an invited guest artist at the “III International Jazz Dance Forum Evening of Solos and Duets” in a solo choreographed by UCI faculty member, Bob Boross. The solo I performed was to “Music and the Mirror” from the musical *A Chorus Line*. In Professor Boross’s version, the dancer is required to act as well as dance, a highly unusual combination, in that it requires an emotional motivation for each choreographed movement. It is not enough for the dancer in this piece to simply master a few steps, one must master an entire character and the emotional qualities that must be conveyed to an audience. As an attendee of the Forum, I also had the opportunity to study in master classes under some of the top names in international jazz dance with teachers that are not available in the United States. Through this project I gained a great deal of much needed exposure to the jazz culture that is predominant in Europe at one of the top schools in France as well as exposure onstage through an authentic piece of classic American jazz dance choreography.

**Sharks: The Skinny**

Sabreena Kasbati  
*Mentor:* Adam Summers

How shark skin structure relates to function is still uncertain. Shark skin is covered in many tooth-like structures called denticles embedded in the dermis and projecting through the epidermis. The number of denticles should affect the material properties of the skin in which they are embedded. The three objectives of this study were to 1) determine variation in mineral content (# of denticles) within shark species in different locations on the body and among shark species, 2) determine variation of skin strength and stiffness, and 3) compare mineral content with strength and stiffness. Shark skin from the dorsal and ventral surfaces of the
head from three species (*Isurus oxyrinchus, Mustelus lumulatus*, and *Prionace glauca*) was heated to 500 °C in a muffle furnace for three hours to remove organic matter to determine mineral content, 16%, 28%, and 24%, respectively. Dorsal and ventral skin from the same three species plus *Caranx ruber* were biomechanically tested, and data was analyzed to compute strength and stiffness. Mineral content, strength, and stiffness differed between species (p < 0.0001). Mineral content and strength did not differ within species, but stiffness did differ within species (p < 0.0001), ranging between 1x10^5 to 1x10^7 Pa. Mineral content did not affect strength or stiffness (p > 0.05). These results suggest that mineral content does not co-vary with strength and stiffness. Skin collagen fibers could contribute greatly to strength and stiffness. The mineralized denticles in the skin may be involved in locomotion more than in skin strength and stiffness.

**Resistance Noise of Carbon Nanotube Circuits in Different Gases**

Omar Khatib  
**Mentor:** Phillip Collins

Single-walled carbon nanotubes (SWNTs) can be used as a means of chemical sensing. The strength, small size, high sensitivity, and fast response time of SWNTs makes them more effective than current solid-state room temperature detectors. Exposure to different gases or chemicals changes the electrical properties of a nanotube. One method of detecting the presence of a gas is by measuring the resistance in a nanotube circuit, and analyzing the resistance noise. Plotting the power spectral density S(f) versus frequency reveals nonlinear components in the resistance noise. These nonlinearities will be different in nature for each gas, and thus can be used as a means of chemical association for the sensor. The purpose of this study was to analyze the resistance noise of a SWNT circuit exposed to various gases and chemicals, and compare the nonlinearities associated with each one to existing data for vacuum and air.

**Tuberculosis in LA: What Can We Learn From the NYC Epidemic?**

Matthias Kleinsasser  
**Mentor:** Mike Davis

My presentation will discuss the NYC tuberculosis epidemic of 1989-1993, focusing on social factors such as overcrowded housing, homelessness, and the under-funded health care infrastructure which contributed to the epidemic. The primary focus of the presentation will be to highlight social factors that could lead to a similar epidemic in LA. LA currently has a problem with tuberculosis among homeless and immigrant populations that could spiral out of control given the right circumstances. I will briefly discuss the concept of a population threshold in relation to epidemics to give some indication of how close LA could be to a tuberculosis epidemic. Los Angeles has thousands of homeless persons and new immigrants, two particularly susceptible populations. In addition, the number of inmates circulating in and out of the state prison systems presents a problem, given the widespread incidence of tuberculosis in prison. I will discuss the way in which all of these social factors intertwine to create the perfect environment for the spread of tuberculosis, using research conducted in Fall 2004 with Professor Mike Davis concerning the NYC epidemic.

**The Success and Failure of Democracy in Sub-Saharan Africa**

Sarah Knoesen  
**Mentor:** Anthony McGann

Current democratic theories cannot explain why some democracies in Sub-Saharan Africa succeed while others fail. My research addresses this gap in our knowledge of how democracy functions by exploring the differences between successful and failed democracies in Sub-Saharan Africa. The countries in this study were classified as successful or failed based on Freedom House’s Freedom in the World Country Rankings. I studied a total of 12 countries that became fully democratic in the last 15 years. Of these 12 countries, 7 have succeeded at staying democratic, while the other 5 have reverted back to non-democratic regimes. I compared these countries on their electoral system, level of debt, whether or not there is a single party majority, level of corruption, and GDP breakdown. These variables help measure different levels of power-sharing in each country. The goal is to test if power-sharing plays a role in the success and failure of democracy in Sub-Saharan Africa. I used a Boolean variable approach to analyze relationships between the independent and dependent variables. This analysis shows that having proportional representation, or not having high levels of corruption, or having agriculture make up more than one-third of GDP, or not being highly indebted while not having a single party majority, are sufficient conditions for being a successful democracy. The analysis further shows that not having proportional representation and being severely indebted, or having a single party majority and high corruption, are sufficient conditions for being a failed democracy. From these results I argue that democracy is more likely to succeed in countries with higher levels of power-sharing regardless of whether the power-sharing comes in traditional or non-traditional forms.
Preliminary Studies on the Role of Cyclin D3 in the Bcr-Abl Kinase Signal Transduction Pathway in the Development of Chronic Myelogenous Leukemia
Je Ko
Mentor: Tiong Ong

The uncontrolled proliferation of the Chronic Myelogenous Leukemia (CML) is characterized by the presence of the Bcr-Abl Tyrosine kinase that often becomes resistant to the specific treatment against the protein. The process of Bcr-Abl leukemogenesis is possibly mediated by D-type cyclins (cyclins D1, D2, and D3) that are components of the core cell cycle machinery in mammalian cells. This study was performed to determine whether forced-expression in Cyclin D3 in Bcr-Abl transgenic cells show a level of resistance to Imatinib Mesylate (Gleevec), and whether its knock-out renders the cells vulnerable to apoptosis. We observed what might appear to be the partial imatinib resistance of Ba/f3 P210 leukemic cell line that forced cyclin D3 expression. The biochemical assay seemed to support the correlation between the level of cyclin D3 and resistance to Imatinib for the cells expressing them. Also, the Ba/f3 p210 leukemic cell line that forced cyclin D3 also had a higher proliferating rate and higher percentage of survival in the presence of selective media, as well as Imatinib. These findings provide a bigger picture of the Bcr-Abl pathway, which is important for an alternate treatment for CML.

Latino Parents and Baseball: Pressure to Succeed
Michael Koehler
Mentor: David Smith

There has always been a unique relationship between fathers and sons when it comes to sports, and baseball is no exception. What I am attempting to do is create an analytic explanation of the differences in the treatment of children among Latino families and white families involving sports. The main focus of my research is trying to establish if there is a correlation between Latinos and lower class families and a high amount of pressure put on their children to be successful in athletics, in hopes that they will receive scholarships or professional contracts. On the other hand, I want to see if middle class white parents put less pressure on their children in athletics because of a more solid financial future. Currently I am in the process of conducting retrospective ethnographic research on white and Latino athletes, and I will attempt to establish a relationship between the dependent variable: parental pressure, and the dependent variable, race. Upon conclusion of my research and analysis of the data, I will be able to create a relationship between the two groups of people.

Face Recognition: The Effect of Perceived Gender on Recognition Capabilities
Shawneen Koop
Mentor: Donald Hoffman

Face recognition studies have shown that women are better than men at recognizing faces, especially female faces. Assuming this is true, it is quite possible that women will have better recognition for feminine men than masculine men, and better recognition for feminine women than masculine looking women. I test this possibility by altering the perceived gender of men and women by manipulating gender related facial features and then giving participants a recognition task. I predict that women will have better recognition for faces that have been feminized regardless of the actual gender of the face. I also predict, based on previous research, that no difference will be found between any of the face types for male participants.

Newborn Neurons in the Adult Hippocampus and Their Associated Radial Glial Cells
Matthew Korn
Mentor: Charles Ribak

Adult neurogenesis has become the focus of extensive research due to growing interest in stem cells, neurodegenerative disease, and neuropathological disorders. Recent data have shown that neurogenesis occurs in the subgranular zone of the hippocampus and along the rostral migratory stream for newborn neurons in the olfactory bulb in the adult rodent. The newly born neurons of the subgranular zone of the hippocampal dentate gyrus were also shown to be incorporated into the existing hippocampal circuitry. Here, we describe three observations related to the migration and process outgrowth of newly generated neurons in the adult dentate gyrus using immunocytochemical, light microscopic preparations for doublecortin (DCX, microtubule-associated protein associated with growth cones) and glial fibrillary acidic protein (GFAP, astrocyte specific). First, we show a unique one-to-one relationship between GFAP-expressing radial glia-like cells and DCX-labeled newborn neurons in the subgranular zone. Second, the dendrites of these newborn neurons grow along the radial processes of radial glial cells to extend into the molecular layer. Third, the basal dendrites of DCX-labeled newborn neurons from epileptic rats extend for longer distances than those from control rats. Their association with GFAP-expressing processes in the subgranular zone suggests that they are growing on an ectopic glial scaffold in the hilar. These latter observations from epileptic rats could be caused by the gliosis that occurs as a result of epileptic seizures. We speculate that such changes contribute to additional recurrent excitatory circuitry,
allowing for the presence of chronic spontaneous seizure activity, a typical feature of temporal lobe epilepsy.

Ty3 Mutagenesis Project: A Study of VLP Formation
Kathryn Kosaka
*Mentors:* G. Wesley Hatfield & Suzanne Sandmeyer

Ty3 is a retrotransposon found in *Saccharomyces cerevisiae*, with a life cycle similar to that of many retroviruses. Ty3 contains two overlapping open reading frames (ORFs), called GAG3 and POL3. These ORFs are homologous to the retrovirus *gag* and *pol* genes respectively. GAG3 encodes for the major structural proteins while POL3 encodes for functional proteins such as integrase and reverse transcriptase. The goal of this research effort is to mutagenize the GAG3 ORF of the Ty3 retrotransposable element to better understand the mechanism of virus-like particle (VLP) formation. We took the sequenced Ty3 genome and made mutations in specific amino acids to identify structural motifs essential to VLP assembly. Our intent was to locate areas of the protein that are responsible for the correct assembly of the capsid by changing charged amino acids to alanine residues. We also made mutations within specific, highly conserved domains in the Ty3 genome. These domains included: 1) Major Homology Region (MHR), important for replication and assembly; 2) late domain, thought to be significant for budding in retroviruses; 3) zinc finger motif, important for RNA binding by *gag*; 4) residues thought to be modified by phosphorylation; and 5) the sites where processing of the Gag3p precursor protein occurs. By performing transposition assays, Western Blots and Southern Blots, we aim to further investigate the role of these domains in the Ty3 life cycle. This project is an ongoing, collaborative effort.

Smooth Panning and Zooming in Virtual Reality Visualization of Large-Scale Datasets
Mykhaylo Kostandov
*Mentor:* Joerg Meyer

The project addresses the issue of non-standard navigation techniques in large-scale volumetric data such as the large tree model of the cardiovascular system currently developed at Creative Interactive Visualization Laboratory (CIVL). This system emphasizes small details that can lead to enhanced risk assessment of heart failure and utilizes multiple level-of-detail visualization methods. This and other datasets that involve enormous amounts of data cannot be fitted into main memory, and utilize out-of-core processing that makes regular zooming and panning methods useless. The navigation system designed in this project aims to solve this problem by providing intuitive controls that keep the end user well oriented within the virtual space of the simulation. Provided with such controls, the user will be able to interactively run a complex simulation without having to know the underlying details of the process being simulated. A vital step includes the calculation of necessary preprocessing steps based on the coordinate pairs of initial and target subvolumes and their positions within the simulation environment. Based on a given amount of discrete animation steps, a buffer is filled with data slices read from octree volume files, and timing intervals for each animation step are calculated to assure that the animation sequence is smooth and seamless. Despite a noteworthy tradeoff in preprocessing speed caused by reading the file, resizing textures, and filling the buffer, the actual animation step will not exhibit any time delays, since the animation sequence itself only includes placing textures into card buffer and stepping through necessary OpenGL transformations.

Rootless
Karl Kottman
*Mentor:* Miles Coolidge

“Rootless” is a collection of 15 16” x 20” black and white photographs whose subject is new growth in Southern California. By focusing on immature landscaping that is so pervasive, the photographs show the newness, or lack of a past, that so many communities in the area have. This also emphasizes that these communities not only have new growth, but are springing up from previously undeveloped land. By doing so, the photographs question the way in which communities are built in Southern California and show a gap that asks to be filled.

Vacuum Leak Detectors
George Krboyan
*Mentor:* Roger McWilliams

A patent is an intellectual property right relating to inventions, a right which encourages the development of new technology. A patent is granted by the government to the inventor (or whoever applies) and gives the right for a limited period to stop others from making, using or selling the invention without permission. The work presented here concentrates on the invention of a vacuum leak detector, an instrument designed to locate and/or measure leakage. The making of such an invention requires some legal attention, because the inventor needs to be sure that the product is not a replica of another similar product, so with some assistance from an attorney this can be done. The work presented here examines a leak detector patent and an infringing design produced and sold without license. The patent and infringing detector were analyzed to determine the infringement issues.
On Affordable Housing and Everyday Forms of Resistance: An Examination of the Spatial Politics of the Housing Code in Santa Ana, California

Mukul Kumar

Mentor: Mike Davis

The disjuncture between affordable housing development and population growth in Santa Ana, California poses multiple challenges to low-income families and immigrants. What are the ways in which low-income families and immigrants resist housing code enforcement and inordinately high monthly housing costs? Inquiries into this question have either focused on moments of outright political contest (e.g. Haas 1991) or have been altogether confined to empirical policy analyses. This paper attempts to reconceptualize notions of resistance within the context of the Santa Ana housing scene by tracing the commonplace or everyday ways in which individuals consciously negotiate, contest, or transgress housing code. Moreover, the paper argues that housing code is an important site of political contest around which struggles of race and class are particularly entangled with the politics of housing in Santa Ana.

Diversity University Irvine (D.U.I.)

Peter Kuo

Mentor: Daphne Lei

Diversity University Irvine, D.U.I., offers a large number of opportunities to many of the students at UC Irvine. D.U.I. focuses on under-represented artists in different communities, including women, ethnic minorities, religious followers, and those defined by sexual orientation. Other than providing students a learning opportunity of various aspects of theatre production (especially management), D.U.I. also explores alternative performance space, styles and themes. By building a grassroots organization and producing shows that reflect the heritage of diverse American lives, we offer a fountain of knowledge that brings a number of communities together. From the productions we have done over the past year, we have gotten a large array of feedback regarding different issues around the world. We’ve also built a strong management system involving different managerial positions to help run the organization. We’ve reached out to over 50 actors, and over 15 production members. Our audience size per show ranges from 125 viewers, to over 350 viewers. As of last quarter we have produced four full-length shows and one full-length musical with a live band. A show runs on a budget from $300 to $1250. D.U.I. has been and will continue to be a beacon for under-represented artists to produce and be a part of a unique theatre community. The stories that have been presented by the organization deal with Asian-Americans, African Americans, people of Jewish faith, Catholic faith, and others. Productions have been performed in classrooms, outdoors, and in housing facilities.

Amygdala-Prefrontal Cortex Interactions on Working Memory

Brian Kurose

Mentor: Benno Roozendaal

Stress-level glucocorticoid treatment is known to impair working memory, which depends on the medial prefrontal cortex (mPFC). We recently reported that bilateral lesions of the basolateral amygdala (BLA) block working memory impairment induced by bilateral infusions of the glucocorticoid receptor (GR) agonist RU 28362 into the mPFC. The present study investigated whether the interaction between the BLA and mPFC in regulating glucocorticoid effects on working memory is ipsilaterally organized. Male Sprague Dawley rats received a unilateral infusion of RU 28362 (3-10 ng) into the left mPFC 60 min before testing on a delayed alternation task, combined with an ipsilateral or contralateral BLA lesion. Neither dose of RU 28362 induced a significant impairment of working memory. Moreover, lesions of either the ipsilateral or contralateral BLA did not affect working memory in rats that received RU 28362 or vehicle. However, unilateral infusions of RU 28362 induced a dose-dependent increase in the level of activated extracellular-regulated kinase in the ipsilateral BLA, as compared with that on the contralateral side. These findings indicate that although GR activation on both sides of the mPFC is required to induce working memory impairment, GR agonist infusions into the mPFC induce neuronal activation of the BLA in an ipsilateral fashion.

Effect of Picture Similarity on Recognition Memory

Mercedes La Voy

Mentor: Mark Steyvers

Similarity between stimuli plays a critical role in the study of recognition memory. A widespread belief in this field was that there is an inverse relationship between the similarity of stimuli and the accuracy of performance on a recognition memory test. However, more recent experiments have found a direct and positive correlation between similarity and accuracy. This study was a novel improvement upon previous research, using a lineup situation in which participants viewed study pictures. Their recognition memory was then tested by viewing five pictures (1 target and 4 foils) lined up across the computer screen. The similarity of the foils was continuously manipulated, which is analogous to changing the characteristics of the suspects presented in a police lineup. The purpose of this work was to examine the relationship between similarity and recognition memory, and apply this knowledge to eyewitness testimony. Upon completion of data analysis,
I predict that there will be a positive relation between similarity and accuracy, so, as the stimuli become more similar to one another, participants’ accuracy should increase. This would support previous research and suggest that for the memory of an event to be most accurate, the suspects in a lineup should be similar to one another. From this work, it is possible to infer the ideal amount of similarity between suspects in a lineup, so that bias is significantly decreased or eliminated, and the eyewitness can make the most accurate judgment.

**The Bank Panics of the Great Depression: Tennessee**

Francesca Labordo  
*Mentor*: Gary Richardson

The Great Depression of the 1930s was the worst economic downturn in American history. The unemployment rate grew to nearly 25% as businesses began to decline. Americans were left with no way to support themselves. The nation’s nominal GDP fell by about 46%, while real GDP fell about 33%, indicating that price levels had dropped significantly. This environment led to a multiple contraction of the money supply. Consequently, American citizens began to fear their bank deposits were no longer secure. Mass withdrawals took place all over the country, which today is known as the “run on the banks.” Bank reserves were lost as well, leading to a collapse in American money supply. This chain of events constituted the Bank Panics of 1930-33. Since the panics began, economists have speculated over the main cause of the Great Depression. A theory, made famous by economist Milton Friedman, was that these Bank Panics were the primary sources of economic contraction. Therefore, it is necessary to consider their origins. The first incidence of the Bank Panic began in Tennessee. This research project constructs a database representing Tennessee bank activity, allowing us to analyze and interpret which banks failed, and for what reasons. Using the dataset and the resources from economics and statistics classes, I intend to run regressions on bank life and money flow. I hope I will learn the direct effect bank activity had on the Great Depression, and help policy makers and bankers in the future.

**Inhibition of Interferon-α-Induced Apoptosis by Epstein-Barr Virus in Burkitt Lymphoma**

Kristen Lackey  
*Mentor*: Ingrid Ruf

Lifelong latent infection with Epstein-Barr virus (EBV), a human herpesvirus, may result in the development of certain types of cancer, including Burkitt Lymphoma (BL). The research presented here investigates the role of the virus in promoting cell survival, which likely contributes to the oncogenic potential of EBV. Cell viability and rates of apoptosis were measured using trypan blue dye exclusion and cleavage of poly (ADP-ribose)-polymerase (PARP) in BL cells treated with interferon-alpha for up to 96 hours. Our data indicates that EBV infection confers increased resistance to IFN-induced apoptosis and that the expression of two small non-coding viral RNAs (EBERs) may be in part responsible for this increase in resistance. Currently, the role of the PI3K/mTOR pathway as a mediator of IFN-induced apoptosis is being investigated using pathway specific inhibitors. Specifically, Ly294002 is being used to inhibit PI3K and rapamycin to inhibit mTOR. Treated cells are being evaluated for their sensitivity to interferon induced cell death, as described above. The net result of this research will likely shed light on the mechanisms through which EBV promotes cell survival and thereby contributes to the oncogenic potential of infected cells.

**Can Emergency Physicians Diagnose Appendicitis Using Bedside Ultrasound?**

Shadi Lahham  
*Mentors*: John Christian Fox & Federico Vaca

The diagnosis of acute appendicitis is the most common abdominal surgical emergency seen in the ED. This diagnosis falls directly upon the emergency physician to make, yet it still remains a challenge because symptoms of appendicitis often resemble the symptoms of other abdominal complications. Despite the current technology, there is still a 10% negative appendectomy rate in men and a 30% negative appendectomy rate in women. While there are a variety of factors that contribute to perforation, the main factor is the time delay to diagnosis. With increasingly over-burdened emergency departments already relying heavily on radiology performed imaging studies, the time-savings of bedside ultrasound to obtain a diagnosis of appendicitis (BUSA) would be valuable in obtaining quick and accurate diagnosis to efficiently identify and treat the condition. The goal of this study is to determine whether or not emergency physicians can identify patients with acute appendicitis by using a bedside ultrasound instead of relying on professional radiology. This study will be the first of its kind to determine the effectiveness of a portable bedside ultrasound machine in diagnosing acute appendicitis.

**Privacy Attitudes of Internet Users in the U.S. and Europe**

Elsy Lao  
*Mentor*: Alfred Kobsa

In recent years, the growing concern about privacy on the Internet has prompted numerous surveys that collected data on privacy attitudes of Internet users. The vast majority of these surveys restricted themselves to
Cultural Retention Among Second Generation Vietnamese Americans

Caroline Le  
Mentors: Kenneth Chew & John Liu

Second Generation Vietnamese Americans comprise a unique yet diverse group that has much to reveal about the maintenance and/or evolution of Vietnamese culture in America today. It is unique in that these individuals are the first generation of Vietnamese to be completely socialized in American society and thus must mediate between being Vietnamese, which is naturally imbued in them by their parents, and being American. The concept of culture in and of itself is difficult to define; attempting to “measure” it is even a more difficult feat. Therefore, by interviewing individuals of the second generation, valuable insight is gained into what variables are important in assessing cultural retention by observing patterns and tendencies. Because of the strong familial bonds which exist in the Vietnamese household, I have chosen to explore the differences in the cultural retention of the second generation within the framework of refugee cohorts, that is, distinguishing those whose parents arrived in the United States immediately after 1975 and those whose parents arrived after 1980. Using cohort analysis, I will be able to determine the extent to which Vietnamese comprise a homogenous group. These time frames were chosen because there are distinct features which generally define these two groups and have thus created different life experiences for the individuals. Utilizing first-hand interviews of second generation Vietnamese Americans, I will be able to identify and analyze factors which affect Vietnamese cultural retention, and specifically, whether refugee cohorts played a role.

Odor Binding Protein Expression in Female and Male Antennae of the Mosquito Anopheles gambiae

Diana Le  
Mentors: Harald Biessmann & Peter Bryant

Anopheles gambiae mosquitoes are the primary insect vectors for transmission of the Plasmodium parasite that causes malaria. While both female and male mosquitoes feed on nectar as their main source of food, only the females blood-feed to reproduce. We used molecular techniques to understand the olfactory processes that control host-finding behavior of female A. gambiae mosquitoes versus sugar-feeding males. We hypothesized that certain odorant-binding proteins expressed in antennae are crucial to the host-finding behavior of female mosquitoes. Differences in expression of olfaction-related proteins between males and females were analyzed by a custom microarray to identify genes that may contribute to female blood-feeding behavior. By determining female to male expression ratios, we have identified some odorant-binding proteins that are highly expressed in female antennae. Based on these findings and with a better understanding of the mosquito odor recognition processes, new insect repellents can be developed.

Mapping the Essential Bipartite Nuclear Localization Signal Domain of UOL Protein

Gwendolyn Le  
Mentor: Guey Chuen (Oscar) Perng

During the course of herpes simplex virus type 1 (HSV-1) infection, viral proteins shuttle in and out of the cell organelles, such as the nucleus, playing a crucial regulatory role in infected cells. For a protein to be localized in the nucleus, a nuclear localization signal sequence (NLS) is required to fulfill the task. UOL, a newly identified gene from HSV-1 viral genome, contains two bipartite NLS. My goal is to check whether these NLS in the UOL protein are functional. If functional, I will further characterize which one of the two NLS is (are) essential for the UOL protein in targeting the nucleus. Preliminary results, using a red fluorescent protein (RFP) indicator gene fused to UOL, indicated that the NLS in UOL protein is functional in transient transfected cells. I continued onto mapping the NLS domain. In this process, five sets of overlapping PCR primers attached with universal restriction enzyme sites, EcoRI and BamHI at 5’ and 3’ ends respectively, were designed to facilitate the directional cloning. The amplified PCR fragments were then fused in frame to the RFP gene, which will show a visible red signal. In my research so far, I have obtained three sets of fusion clones into pDs-Red vector and am currently performing transient transfection assays to check for the organelle localization of RFP signal. I have also cloned the remaining two sets into the pGEM-T vector and am...
currently cloning them into the pDs-Red vector to further perform the transient transfection assays.

The Effects of Trimethylamine N-oxide on the Response of Epidermolysis bullosa Simplex Cells to Hyperosmotic Stress
Delia Lee
Mentors: Jerry McCullough & Elizabeth Rugg

Epidermolysis bullosa simplex (EBS) is a genetic skin disorder caused by mutations in keratin genes. Because the mutant keratins cannot properly protect keratinocytes from physical stress, the skin is prone to blistering. Trimethylamine N-oxide (TMAO) is a chemical chaperone that has been shown to reverse the effects of abnormal proteins. I hypothesize that TMAO can restore normal function to EBS keratinocytes. I subjected EBS KEB-1 cells and normal SVK14 cells to the hyperosmotic shock of 300 mM sorbitol for various amounts of time. The KEB-1 cells exhibited an overall decrease in cell number after the hyperosmotic shock, while the SVK14 cell number was largely unchanged. Then, in another experiment, I pretreated the cells with different concentrations of TMAO and examined their response to hyperosmotic stress. Although high doses of TMAO were toxic to both cell lines, the TMAO treatment at low dosage eliminated the sharp decrease in number of KEB-1 cells. I used Western blot analysis to determine how hyperosmotic shock affected the stress activation pathways. Hyperosmotic shock did not change the levels of HSP27 and JNK/SAPK produced by both cell lines. In my upcoming experiments, I plan to investigate phosphorylated JNK/SAPK as the amount of these proteins has been shown to increase in keratinocytes exposed to osmotic shock. These experiments indicate that chemical chaperones can reverse the effects of keratin mutations and that they may be used in the future for treatment of keratin disorders.

The West According to Three Russian Intellectuals, 1830-1860
John Lee
Mentor: Lynn Mally

Is there such a thing as “Occidentalism?” Throughout history, have non-Western intellectuals crafted their own idea of the “West?” Here, I explore this concept of Occidentalism by showing how three Russian intellectuals—Aleksei Khomiakov, Ivan Kireevsky, and Alexander Herzen—depicted Western civilization in the period from 1830 to 1860. All three of these Russians shared a common belief that Russia had a destiny completely separate and unique from the “West,” which, to these three, meant all of Europe west of the Ukraine, but especially implied Western Europe. These Russians saw in the nineteenth-century West a materialistic and overly rational civilization, which they contrasted with the more virtuous, pure, and organic society of the ‘uncorrupted’ Russian peasantry. I argue that these Russian intellectuals’ idea of the West relied on a specific, exclusive historical relationship, that between Russia and the rest of Europe. Thus, at least in this context, Western civilization becomes an artificial notion subject to regional preconditions stemming from Russia’s peripheral position in relation to the “West.” Consequently, as shown by Edward Said in his study on Orientalism, we can surmise that how one invents the “other,” whether Western or Eastern, is entirely dependent on how one sees oneself.

Isolation of HSV-1 Small RNA Interference Molecules in Latently Infected Rabbit Trigeminal Ganglia
Teresa Lee
Mentor: Guey Chuen (Oscar) Perng

The herpes simplex virus type I (HSV-1) becomes dormant once infecting its host in sensory neurons of the trigeminal ganglia (TG). However, how HSV-1 establishes life-long latency is yet to be understood. Studies have shown all organisms have some type of counteractive mechanism towards their host’s immune system. Small RNA interference molecule (RNAi) is one such mechanism. RNAi, a homology-based silencing system, introduces double-stranded RNA into a cell, resulting in targeted silencing of gene expression. During HSV neuronal latency, the major gene actively transcribing is the latency associated transcript (LAT) gene. Thus, LAT is the distinct feature of HSV neuronal latency. RNAi is expected to be present in the trigeminal ganglia (TG) of HSV latently infected animals. By isolating and studying RNAi, we may gain better understanding of how HSV-1 remains latent in humans by studying immune competent hosts such as mice. We first tested our theory in HSV infected culture and total RNA was extracted from cultured rabbit skin (RS) and monkey kidney (CV-1) cells. The extracted RNA was separated by running them on 3% agarose-formaldehyde gel electrophoresis and transferred onto a nylon membrane via Northern capillary method. The membrane was dried, UV-crosslinked, and hybridized by a P-32 isotope HSV LAT DNA fragment. Probed RNA could then be visualized by autoradiography. Results showed the presence of small RNA molecules in infected cells and this suggested that isolation of RNAi was feasible in latently infected neurons.
Pulmonary surfactant includes phospholipids and specific air sacs of the lung. Functional components of surface active agent (surfactant) located in the alveolar membrane. Normal human respiration depends on the presence of a functional surfactant system with its components to substantially reduce the work involved in breathing. Pulmonary diseases associated with improper surfactant function include Neonatal Respiratory Distress Syndrome and Acute Respiratory Distress Syndrome. The design of effective therapies requires knowledge of the composition and interactions between each of the surfactant components. To closely analyze these interactions at the atomic level, molecular dynamics simulations were carried out on a model system containing a Palmitic Acid monolayer and the surfactant protein B (SP-B) peptide. The model system maintained its stability through electrostatic interactions between the charged residues of the peptide and the hydrophilic head groups of the lipid, and between the aromatic residues of the peptide and the hydrophobic tail region of the lipids. To determine the specific role of the charged residues, the four cationic residues were removed in a model mutant SP-B1-25, which was also simulated. Similarly, the aromatic residues of SP-B1-25 were removed in a separate model mutant and simulated. A third mutant lacking charged and aromatic residues was also simulated to determine the role of sequence specificity. Comparison of the mutants and the native revealed that the presence of the charged and aromatic residues affect the orientation and secondary structure of the peptide as well as the order of the lipids in the monolayer.

Effects of Orphanin FQ/Nociceptin Antagonist Interactions With Noradrenergic Mechanisms in the Basolateral Amygdala on Memory Consolidation

Ray Lengvilas
Mentor: Benno Roozendaal

There is extensive evidence that hormones and neurotransmitters interact with the noradrenergic system of the basolateral amygdala (BLA) in modulating memory consolidation. Based on previous observations from our laboratory, orphanin FQ (OFQ), a neuropeptide, has been shown to inhibit memory consolidation on an inhibitory avoidance learning task. The present study examined the effects of the OFQ receptor antagonist, [Nphe1]nociceptin(1-13)NH2, administered into the BLA immediately after aversively motivated inhibitory avoidance training on memory consolidation. [Nphe1]nociceptin(1-13)NH2 dose-dependently enhanced memory consolidation and its effects were blocked by co-administration of the β-adrenoceptor antagonist atenolol into the BLA. These findings suggest that the OFQ system interacts with the noradrenergic system of the BLA in modulating memory consolidation.

Analysis of Surfactant Protein B and its Functional Components Utilizing Molecular Dynamics Simulations of Model Systems

Jenny Lester
Mentor: Douglas Tobias

Normal human respiration depends on the presence of a surface active agent (surfactant) located in the alveolar air sacs of the lung. Functional components of pulmonary surfactant include phospholipids and specific proteins which decrease surface tension in the alveoli and substantially reduce the work involved in breathing. Pulmonary diseases associated with improper surfactant function include Neonatal Respiratory Distress Syndrome and Acute Respiratory Distress Syndrome. The design of effective therapies requires knowledge of the composition and interactions between each of the surfactant components. To closely analyze these interactions at the atomic level, molecular dynamics simulations were carried out on a model system containing a Palmitic Acid monolayer and the surfactant protein B (SP-B) peptide. The model system maintained its stability through electrostatic interactions between the charged residues of the peptide and the hydrophilic head groups of the lipid, and between the aromatic residues of the peptide and the hydrophobic tail region of the lipids. To determine the specific role of the charged residues, the four cationic residues were removed in a model mutant SP-B1-25, which was also simulated. Similarly, the aromatic residues of SP-B1-25 were removed in a separate model mutant and simulated. A third mutant lacking charged and aromatic residues was also simulated to determine the role of sequence specificity. Comparison of the mutants and the native revealed that the presence of the charged and aromatic residues affect the orientation and secondary structure of the peptide as well as the order of the lipids in the monolayer.

Assessment of Collagen Expression During Nd:YAG (λ =1.32mm) Laser Mediated Repair of Hyaline Cartilage

Chao Li
Mentor: David Gardiner & Brian Wong

Laser reshaping of cartilage in surgical procedures often results in thermal damage, leading to thermal necrosis or apoptosis of chondrocytes. However, previous studies have identified regenerating chondrocytes on the periphery of the laser irradiated regions in hyaline cartilage. However, the phenotype of the proliferating cells has not been previously identified. The focus of this study was to locate populations of proliferating cells in whole-mount via fluorescent antibody staining, and to isolate this population of cells for assessment of collagen type I (fibrocartilage/scar tissue) and type II (hyaline cartilage) gene expression to determine the phenotype of this tissue. In this investigation, ex vivo cartilage specimens were irradiated using an Nd:YAG (λ=1.32μm) laser with combinations of time (4, 6, and 8 seconds) and power (4, 6, and 8 watts) settings. Tissue specimens were evaluated for expression of collagen types I and II 10 days after irradiation. PCR was performed using Taq polymerase and primers for collagen I and II for 30 cycles at 59 °C. PCR products were visualized using gel electrophoresis on a 1.5% agarose gel. PCR found that both untreated and...
regenerating cells are expressing collagen type II and not expressing collagen type I. This leads us to believe that photothermally-modified chondrocytes that are undergoing cell-proliferation have maintained their phenotype during the regenerative process, and are not producing fibrous scar tissue.

**Nitric Oxide Studies on Myoglobin Mutants**
Alejandro Lichtscheidl  
*Mentor: Patrick Farmer*

Nitric Oxide (NO) is a radical diatomic molecule, recently shown to play a central role in diverse processes such as vasodilation, immune response and long-term memory. Within the body, its transport and storage is thought to be controlled by the O$_2$-binding heme protein hemoglobin. NO can bind to the iron of heme group of hemoglobin, or to a peripheral cysteine amino acid group forming a nitrosothiol. How the NO is shifted from the heme inside to the cysteine outside of the protein is not understood. To develop a better picture of the relative binding affinities of both cysteine and the heme iron, we are developing mutant myoglobins containing surface cysteine groups positioned near the heme (positions 103, 109), with which the reactivity of NO with both sites can be kinetically assessed. The mutant versions of myoglobin are prepared by site-directed mutagenesis (Polymerase Chain Reaction, ligation (combination) of mutant template to a linear DNA vector, transformation in *E. coli* cells, induction of protein synthesis) with the ultimate goal of my project being the purification, concentration, and crystallization of the protein (if possible) for further analysis. The DNA template coding for each mutant has been obtained and the expression of the mutant proteins in *E.coli* cells is ongoing. Ultimately, the binding of NO to the heme-iron and to the cysteine mutants will be compared to that of wild type. We will also perform EPR (electron paramagnetic resonance) experiments, which to follow electron transfer from the heme to the peripheral cysteine group, modeling that naturally present in human myoglobin.

**Simulation of DNA Anti-Cancer Automaton**
Shaoshan Liu  
*Mentor: Jean-Luc Gaudiot*

Major cancer therapies, including surgery, radiation, chemotherapy, hormones, and immunotherapy, cannot accurately target cancerous cells and thus often fail to provide a cure or introduce serious side effects. We propose a new approach towards cancer treatment, based on the design and validation of a nano-scale DNA automaton that will operate on the molecular level to cure genetic diseases such as cancer. The DNA Killer Automaton (DKA), unlike other cancer therapies, will be very accurate and effective. Equipped with an internal DNA Computing algorithm, DKA will detect cancer at the molecular level and only eliminates the cells that express cancerous behaviors. In addition, DKA will be cost effective and less invasive, since it has the potential to permanently remove the entire cancerous cell line in one treatment. If successful, this high-risk, high-yield research project has the potential to be applied on a much broader level to cure other genetic mutation diseases, such as Parkinson’s disease. At this stage of the research project, we are simulating the DKA mechanism in a 50%-50% mix of cancer cell line and healthy cell line by using JAVA programming language. Based on the simulation result, we will modify our design and carry out further investigations.

**The Anandamide Hydrolysis Inhibitor, URB597, Attenuates Naloxone-Precipitated Morphine Withdrawal**
Jennifer Lockney  
*Mentor: Daniele Piomelli*

In this study, we investigated the effects of administering the anandamide hydrolysis inhibitor, URB597, on naloxone-induced morphine withdrawal in rats. In a rodent model of withdrawal, we recorded behavioral signs of withdrawal including stretching, wet-dog shakes, head shakes, locomotion, rearing, and jumping. URB597 administration attenuated naloxone-precipitated morphine withdrawal. The attenuation of morphine withdrawal by URB597 may be due to enhanced brain anandamide levels, which in turn increases the release of serotonin, thus attenuating behavioral withdrawal symptoms. These findings suggest a powerful therapeutic strategy for managing opiate withdrawal involving the endocannabinoid system and anandamide hydrolysis inhibition.

**Carbon Nanotube Synthesis With Computer Controlled CVD**
Kevin Loutherback  
*Mentor: Phillip Collins*

Carbon nanotubes are fullerene-related structures composed of a single layer of carbon wrapped around to form a seamless cylinder. Their unique characteristics have generated strong interest in their use in nano-electronic and nano-mechanical devices. Of the various methods available for producing carbon nanotubes, Chemical Vapor Deposition (CVD) stands out as most useful for electronics applications. The focus of this research project was to design and implement a computer control system for the CVD system used by the Collins group. A computer program was written in LabVIEW to control and record the growth parameters via a data acquisition card, and appropriate circuitry was added to the manually controlled CVD system so the computer could communicate with it. This computer
controlled system allows the gas flow rates to be changed quickly and accurately. It automates the switching of gas flow rates between different growth phases, greatly reducing human error. This computerized control system will ultimately provide numerous benefits in the synthesis of nanodevices. More consistent nanotube production will result from better recordings of gas flows during each CVD run. The quality of the tubes produced directly correlates with the growth conditions, and the computer control will more accurately set those conditions. It will allow production techniques to be refined through examination of the quality of nanotubes grown at each particular setting. This system could eventually be used to grow nanowire heterojunctions by switching gas flow levels during the growth phase.

**Beginnings: A Multimedia Dance Exploration**

Marc Macaranas  
*Mentors: John Crawford & Lisa Naugle*

The creative process is never without its stops and starts, new beginnings, discarded ideas and intermittent hiccups of inspiration. The concept behind the creation of this piece was the idea that nothing should be thrown away. Instead, I worked under the paradigm that all points of inspiration are valid and can be utilized in the finished product. With that idea in mind, I created a series of movement phrases that were tied around a key theme; these phrases were all “beginnings” of dances I never choreographed to completion. “Beginnings” is multimedia dance utilizing a live soloist and his/her video counterpart. In addition to choreographing the live movement, I shot the footage myself and edited the video component using Final Cut Pro. The musical accompaniment, a beginning in itself, is derived from a recording of the UCI Symphony Orchestra warming up before a performance of Tchaikovsky’s *Serenade for Strings* at Dance Visions 2005. The piece was first presented in March at Bare Bones Dance Theater’s “Body Art” concert at Winifred Smith Hall. The process of putting “Beginnings” together compelled me to re-evaluate and expand my role as a choreographer as I found myself realizing my own visual aesthetic through coaching my live dancers and editing the compiled footage.

**Investigating Contemporary Traditions: The School at Jacob’s Pillow**

Marc Macaranas  
*Mentor: Lisa Naugle*

The School at Jacob’s Pillow in the Berkshires of Massachusetts is one of the most prestigious summer dance programs in the country. Jacob’s Pillow is considered by many in the dance community to be “sacred ground,” as it was the home of Ted Shawn and his Men Dancers, pioneers of American modern dance.

Of the hundreds who audition and apply every year, only 25 students are accepted into each of the programs offered by the school: classical traditions (ballet), contemporary traditions (modern), cultural traditions, jazz, and choreography. I was fortunate enough to be one of the 25 students in attendance of the contemporary traditions program, studying for three weeks under Milton Myers and Pam Pribisco as well as learning and performing repertory from vital and internationally acclaimed choreographers. A highlight for me, besides dancing among some of the best dancers in the country, was festival life at the Pillow. Every week, two new companies came and performed, bringing with them highly original and technically masterful work. The experience wholly transformed me as a dancer, artist and scholar. This total immersion in dance technique, performance, discussion and history has altogether inspired me and forged an even stronger perception of myself as a dance artist.

**The Antidepressants Imipramine and Fluoxetine Affect Behavior Through Different Signaling Pathways in Caenorhabditis elegans**

Scott Mackenzie  
*Mentors: Catherine Dempsey & Ji Ying Sze*

Drugs that target the serotonergic system are the most commonly prescribed therapeutic agents and are used for the treatment of a wide range of behavioral and neurological disorders. However, the mechanisms of these drugs’ actions remain unclear, and further study could suggest new methods of treating biochemical imbalances. Here, we examine the genetic targets of serotonin (5HT), the selective serotonin reuptake inhibitor (SSRI) fluoxetine (Prozac®), and the tricyclic antidepressant imipramine in the animal model *C. elegans*. Our results show that fluoxetine and imipramine may target serotonin reuptake transporter (SERT) and 5HT receptors independently to stimulate egg-laying. Mutants lacking SERT or 5HT receptors can partially respond to fluoxetine and imipramine via distinct G protein-coupled 5HT receptor pathways. Deletion of the 5HT1 receptor subtype SER-1 abolishes the response to 5HT but has a minor effect on the response to imipramine and fluoxetine. In contrast, deletion of the 5HT2 subtype SER-4 confers significant resistance to imipramine but leaves the response to 5HT and fluoxetine intact. Furthermore, fluoxetine can stimulate egg-laying via the Gq protein EGL-30 independent of SER-1, SER-4, or 5HT. These results demonstrate that the actions of these drugs at specific receptor subtypes could determine their efficacy and that SSRIs and tricyclic antidepressants may activate 5HT-regulated behavior in mutants that cannot produce or respond to 5HT.
Effects of Emotion and Cognitive Load on Memory
Namrata Mahajan
Mentor: Peter Ditto
Our memories must be accurate in a variety of tasks, including making change, driving on the freeway, or even running into an old acquaintance. Therefore it is essential to understand and study its complex and multifaceted dimensions. Research has indicated that two factors may play an important part in whether a memory is accurately stored or recalled. First, research has indicated that what an individual remembers is affected by their emotional state, both at the time of recall, and at the moment the event occurred. Second, memory has also been shown to be influenced by cognitive load, or the sum of mental activity imposed on working-memory at any point in time. Although numerous studies independently report on the impact of mood or cognitive load on memory, research on the influence of both variables jointly is unavailable. The goal of this study was to examine how memory was affected when both emotions and cognitive load were present. In the current study, 190 college students were randomly assigned to one of three conditions: happy, sad, or control. They were then subdivided into a cognitive load or a no load condition. It was expected that participants would recall mood-congruent pictures better and that cognitive load would intensify these results. Results to be discussed.

Coverage Protocol in Sensor Networks
Tony Mai
Mentor: Tatsuya Suda
A sensor is a small and inexpensive device that is typically powered by batteries. A collection of sensors that communicate with each other is called a sensor network. Sensor networks can be used in many scenarios such as battlefield surveillance, environmental monitoring, or intrusion detection. A sensor network must be able to provide acceptable sensing coverage while minimizing overall power consumption. I have devised a coverage protocol to maintain high-quality coverage in a distributed and self-organizing way. The protocol only requires the sensors to communicate with their local neighbors to form a global coverage in the sensor networks, which enables dynamic and efficient deployment of full sensing coverage in a large-scale network. We are currently finishing a Java-based simulator to evaluate the proposed coverage protocol. We plan to perform extensive simulations to test the performance of the proposed protocol and compare it with other existing protocols by the end of the quarter. Conclusions on the effectiveness, scalability, adaptability, and efficiency of the proposed protocol will be drawn based on careful examination of statistic data collected from the simulation.

Microarray gene expression data of mouse skin from birth to 22 days revealed mRNA expression of genes that had not been known to be present in the epidermis or hair follicles. The expression levels of RIKEN cDNA 4631426H08 (4631426H08Rik), carbonic anhydrase 6 (Car6), cysteine-rich secretory protein 1 (Crisp1), fructose bisphosphatase 1 (Fbp1), and ribosomal protein L8 (Rpl8) mirrored that of the initial hair follicle development. Their respective mRNAs increased from birth to 14 days, and then reached a point of regression. In situ hybridization was performed on these five genes to investigate their mRNA localizations in the epidermis and hair follicles, using non-radioactive DIG-labeled RNA probes. The results showed that the five selected genes all exhibited a pattern of expressions in the hair follicles of 3- and 14-day old mice. Furthermore, Fbp1 and Rpl8 also had strong signals in the superbasal layer of the epidermis. These findings suggested that the five genes could be involved in the regulation of hair growth during development. Knowing whether these genes could be hair regulators would allow a better understanding of the underlying mechanism of hair follicle development. This, in turn, would open more possibilities for new drug treatments against hair loss from male pattern baldness and cancer chemotherapy.

Evaluating High School Participants in Global Connect@UCI: Enriching and Promoting Education
Dante Mapanao
Mentor: Louis DeSipio
Global Connect is an educational partnership initiative between the University of California, Irvine and secondary schools in the Newport/Mesa School District. Due to the constant changes of global realities such as economics, technology, political and social issues, the state’s History-Social Science framework has not yet mandated the inclusion of these concepts into secondary school curriculum. Global Connect seeks to assist the improvement of the curriculum by developing curriculum and teaching such topics in high schools using lessons based on the concept of Globalization. This project investigates how successful Global Connect has been in introducing globalization as a concept and as a tool of promoting opportunities for higher education to high school students in Orange County. Global Connect selected these high schools because they send a low percentage of their graduates to 2-year and 4-year colleges. Specifically, this research will assess how a curriculum based on Globalization has impacted high school students academically and in pursuing higher education. In addition, it will look at how well the
program has assisted host teachers in the AVID (Advancement Via Individual Determination) program and the effects of college student mentorship in preparing high school students. Findings will provide recommendations on how to better assist schools in improving education and on future outreach endeavors.

Latin Women in Mainstream Sororities: A Look at Ethnic Identity and Acculturation
Alexandra Mapp
*Mentor: Jeanett Castellanos*

Latino students have increased in number at colleges and universities during the past decade. Many of these students join social organizations either to integrate themselves with the mainstream population or to join organizations that are geared towards Latinos. One type of social organization that has become increasingly attractive to minorities, more specifically, Latinas, is sororities. Two important factors in the decision for Latinas to join mainstream sororities are the levels of acculturation and ethnic identity. Unfortunately there has not been much research done on this topic, but it is a topic that demands attention. The purpose of this research is to determine if these factors are present and if they play a major role in their ability to comfortably become an active members of their sorority. At the present moment the data collection, which is being done via interview and two questionnaires, and analysis portion of the research are still being done.

KLF4 Transcription Factor Suppresses B Cell Proliferation
Autumn Maruniak
*Mentor: David Fruman*

The Krüppel-like factor (KLF) family of transcription factors regulates a variety of biological activities, including cell proliferation and development. KLF2 has been established as a quiescence factor in T cells but not in B cells. KLF4, most closely related to KLF2, appears to be a good candidate for promoting quiescence in B cells, as overexpression of KLF4 in B cells consistently results in cell cycle delay at the G1/S phase. To carry out structure-function analysis of KLF4, epitope-tagged KLF4 and KLF4 mutants were cloned into retroviral vectors and overexpressed in B cell blasts. Mutants lacking either the DNA binding domain or transactivation domain were shown to express in B cells by immunoblotting. However, these mutants had lesser effects on cell cycle arrest than the wild-type KLF4. These findings indicate that the growth-suppressive effects of KLF4 in B cells require intact DNA binding and transactivation domains.

Applying the Bivariate Probit Model to Intra-Family Labor Force Decisions
Summer Mastous
*Mentor: Ivan Jeliazkov*

A sample of over 400 families has been extracted from the Panel Study of Income Dynamics (PSID) database to study intra-family labor force participation decisions. The bivariate probit model explicitly accounts for the presence of simultaneity of labor choice within families, suggesting that labor force participation decisions are not independent. The paper offers a review of the existing literature as well as some directions for future study.

Dioxin and Host Susceptibility to Infection
Vivek Mehta
*Mentor: Sastry Gollapudi*

Dioxin increases host susceptibility to infection, but little is known about the mechanisms by which this occurs. Recent research has identified a family of molecules, the Toll-like receptors (TLRs), that are integral in pathogen recognition and initiation of inflammatory and immune response. This study aimed to determine the effect dioxin might have on TLR expression and signaling. A monocytic cell line (U937, ATCC) was cultured with or without various concentrations of dioxin (1ng/ml, 10ng/ml, 50ng/ml, 100ng/ml). Surface expression of TLR-2, TLR-4, and CD-14 was determined by flow cytometry. Dioxin treated and control cells were stimulated by Pam3 and LPS, ligands for TLR-2 and TLR-4, respectively. Activation of MAP kinases and production of Tumor necrosis factor was determined by flow cytometry using phycoerythrin-labeled anti-TNF-α, anti-P-38 and anti-P-ERK1 antibodies. Dioxin, in a time and concentration dependent manner, inhibited the expression of TLR-2, TLR-4 and CD-14. Altered expression of TLR was associated with decreased activation of MAP kinases, P-38 and P-ERK1, and decreased production of TNF-α. These data suggest that dioxin may increase host susceptibility to infection by modulating TLR expression and signaling.

The Influence of Acculturation, Values and Relationship Power on Latina HIV Prevention Strategies
Eva Sofia Mendoza
*Mentors: Kris Beals & Susan Charles*

HIV and AIDS cases are escalating at alarming rates in the United States. HIV transmission has been on the rise since the 1980s, yet there is a disproportionate amount of Latinas that have been infected with this disease compared to their racial make-up in the U.S. There will be an examination of the associations between acculturation, values and relationship power on Latina
HIV prevention strategies. Approximately 70 Latina students from UC Irvine and 80 Latinas from Los Angeles and Orange County were surveyed. Survey items were adapted from the Marin Short Acculturation Scale, the Mirande Sex Role Inventory (MSRI) and the Sexual Relationship Power Scale (SRPS). Data collection is still in process and results have not yet been analyzed. However, results will or will not support the hypothesis that those respondents with higher levels of acculturation, less adherence to traditional values and high relationship power will be more likely to use condoms as a prevention strategy.

Community College Students and Social Mobility
Mario Mendoza
*Mentor: Leo Chavez*

What shapes a community college student’s educational/career goals and the social class position they desire to reach through these goals? I interviewed 25 community college students from north Orange County. My interview focused on three areas/goals: 1) Why these students chose to attend a community college, 2) What their educational/occupational goals were and how they shaped them, and 3) If these future goals would lead towards positive social mobility for the individual. The majority of my students attended a community college to discover or pursue an education or a career path, this pursuit in turn determines one’s social mobility. My thesis states that communication (both spoken or visual signs) within the students’ social networks was the prominent factor in shaping their goals. These social networks became the students’ key reference points when revealing their career goals during our interview. They exposed the individuals to new possibilities; modified, corrected, aligned or eliminated existing ambitions; served as a source of personal experience; and provided confidence, support or criticism. Their networks also supported the idea of community colleges being a natural progression from their secondary education, sharing with friends a desired “comfortable” life in their goals of social mobility.

The Relative Salience and Pervasiveness of Jewish Identity: An Ethnic Study
Nicole Mitnick
*Mentor: David Snow*

Many factors effect one’s expression of an ethnic identity. With a minority group whose membership is not outwardly apparent, such as Jewish Americans, compartmentalization of that identity occurs to some degree on a daily basis to integrate with ease into society. The choice to incorporate a hidden identity is personal. While the study focuses on Jewish Americans, the principles apply when examining other minority groups. This study explores the circumstances surrounding the act of prioritizing one’s characteristics through examination of twenty-five separate Orange County Conservative and Reform Jews ages eighteen to forty that were chosen at random. To what degree do young Jewish adults perceive themselves to be “Jewish,” and how do those who feel a similar degree of identity intensity relate to each other? Also, the differences with self-proclaimed religious Jews and cultural Jews are dissected in a sociological light. The following theory will be tested: the less compartmentalized one’s Jewish identity is, the less overlap between their different selves, resulting in a more salient Jewish identity. Scholars point out that there is a great deal of maintenance required to keep fully developed identities separate and strong. Those who have different versions of themselves may experience frustration. This can lead to a deterioration of the lower-priority identity. The Jewish identity is usually one of the first identities to be softened. Typologies will be formed from the data extracted in the interviews to prove or disprove the theory. My goal is to have the findings of this project contribute to a greater sociological knowledge and understanding of ethnic identities in America.

Laminin-5 Treatment Results in the Down Regulation of E-cadherin in Breast Cancer
Haik Mkhikian
*Mentor: Philip Carpenter*

E-cadherin is a membrane protein found on epithelial cells that is involved in intercellular binding. It has been reported that metastasis, the invasive stage of cancer, is often accompanied by decreased levels of E-cadherin. Furthermore, it is known that several substances can act as motility factors and promote the separation of cancer cells from each other and the main tumor, thereby promoting metastasis. However, how these motility factors function and the pathways by which they cause cell separation remain unclear. We have previously shown that normal breast tissue secretes substances that increase motility in breast cancer cells and that treatment of breast cancer cells with these secretions causes down regulation of E-cadherin. In this study, we hypothesized that the active agent in the secretions that caused down regulation of E-cadherin was Laminin-5. Laminin-5 was purified from conditioned medium in a three step process by the successive use of three separate purification columns. The purified Laminin-5 was used to conduct E-cadherin and β-catenin staining experiments. In addition we also conducted flow cytometry, reverse transcriptase PCR, and cell aggregation experiments to show that Laminin-5 indeed was an active agent of the normal breast cell secretions. By exploring the phenomenon of motility induction at the molecular level, we hope to clarify its mechanistic
Melanoma is a serious type of skin cancer, which, if not removed early while it is thin, can spread internally, which is usually fatal. The incidence of melanoma exceeds that of new HIV infections; 55,100 new cases were predicted in 2004 (MEF 2005). The purpose of the project is to understand the role CK2 plays in the NFκB signaling pathway. Using PCR mediated site-specific mutagenesis we generated a Serine to Alanine mutation of the transcription factor RelA. In the near future, we will transfect melanoma cells with these phosphorylation defective mutants to investigate the specific pathways and kinases that may be involved in melanoma survival rates. Expected results are that RelA S529 mutants will have decreased RelA transactivation.

A Survey of Early Intervention Programs in Orange County

Seth Morgan
Mentor: Elliott Currie & Valerie Jenness

This research surveys home visitation programs in Orange County to determine what proactive programs the county has to prevent crime and help improve family environments. Through interviews and observations, the researcher has been able to gain a better understanding of how the home visitation programs operate, some of the limitations and needs that the programs face, and the degree to which these programs are successful. The findings of this research show that Orange County has several well-run home visitation programs that are able to give parents effective parenting strategies, educate families about county resources that will help low-income families with their monetary needs, and provide hope for families that find themselves in hopeless situations. The findings also indicate some areas in which the programs could improve, including increasing the funding to sustain and expand the reach of these programs. Future research in this area might use this data to propose effective solutions to the problems that the clients of these home visitation programs face in their day-to-day lives. Some of the problem areas include: lack of transportation, limited childcare, low educational levels of the adults, inadequate housing and poor job prospects.

Survey of Dance Studios and Teachers in Paris, France

Jessica Morreale
Mentor: Janice Plastino

Like most art forms, the creation and production of dance begins in the studio. In fact, dancers often train for years before they begin performing and exhibiting their abilities. It is of utmost importance that a studio provides a healthy work space which will improve dance technique and not contribute to injury. This project was conducted over a four month period of time in Paris, France to examine the safety and quality of local dance studios. The goal was to offer a resource for dancers in UC dance programs as a means of promoting study or travel abroad. The result of this project is that dancers will be provided with a pamphlet listing all local Parisian studios that offer modern, jazz and ballet training at the UC level. The studios were examined based on floor type, floor surface, and temperature regulation, as well as the type of dance taught and the amount and quality of teachers. Several American or English-speaking teachers were noted as resources for students who are not fluent in French. Out of the 125 studios listed in the Paris phone book, four of them stood out as being conducive to the needs of a college aged dancer: they were large, professional and offered open classes with several different teachers in the disciplines of ballet, modern and jazz.

Universal Cross-Platform Remote Loader

Jesse Morrow
Mentor: Michael Franz

The developers of next-generation mobile devices are apparently resigned to an architectural paradigm that executes all “applets,” or “mobile agents,” locally on the device, leaving the resource-intensive burden of code verification, dynamic linking, loading, code optimization, and just-in-time code generation to the device itself. However, there is another architectural paradigm that takes advantage of the high bandwidth of third generation wireless networks by moving such resource-intensive tasks to a code generating router base station, thus effectively reducing the mobile device to a dumb terminal. This network-centric approach has the added advantages of avoiding replicated storage and compilations, quicker start-up times, and more aggressive code optimizations, all done transparently on smaller and cheaper devices with longer battery lives. The core logic comprising this architecture has to operate seamlessly on base stations of various processor and operating system platforms and must service numerous mobile devices simultaneously, running on equally diverse platforms. At the heart of this logic is an extendable cross-platform compiler coupled with a dynamic linker/loader. The full realization of this
architecture depends on the development of an extendable universal cross-platform remote loader that relieves the mobile device of the task of dynamic loading and provides a platform transparent interface to the base station. This paper describes a prototype universal cross-platform remote loader and the mobile device executable stub and, through partial implementation, presents the technical methods and limitations of such a model.

The Effects of Mentoring on Educational Goals
Melissa Murphy
*Mentor: Tonya Schuster*

The literature states that mentoring programs have a positive effect on how people of all ages view their education. This study evaluates how a particular mentoring program, one which mentors eighth grade girls, affects their short term and long term goals for their education. All of the girls participating in the program for the 2004-2005 school year were chosen to participate in the study. The eighth grade mentees were surveyed about their feelings of the program and their views about their education before entering the program and after being in the program for some time. The college-aged mentors were interviewed about their mentee and their mentee’s educational goals. The data shows that being mentored by a college woman has given the young girls a role model and opportunity to think about their educational future. The results of this study have not yet been concluded, as data collection is still in process.

Structural Basis for the Functional Difference Between Two Essential Enzymes
Neloofar Naderi
*Mentor: Thorsten Ritz*

One of the key regulation points in the biosynthesis of fatty acids and polyketides is the carboxylation of acetyl-CoA and propanoyl-CoA to malonyl-CoA and methylmalonyl-CoA. The two enzymes responsible for catalyzing these reactions are acetyl-CoA carboxylase (AceCC) and propanoyl-CoA carboxylase (PCC). AceCC and PCC are used for therapeutics against diabetes, obesity, cancer, tuberculosis, and the development of antibiotics; a complete study of their structural and functional properties will aid the progress of drug design and treatment. We know that AceCC is specific to acetyl-CoA and PCC is specific to propanoyl-CoA; but why? More importantly, research done at the Tsai laboratory in the biochemistry department has shown that a single residue mutation changes the specificity of AceCC and PCC. The goal of my study is to explore if the difference in binding affinities explains the difference in substrate specificity. Two important things to keep in mind: 1) are the crystal structures we have available consistent with the *in vivo* environment, and 2) are there effects on binding dynamics that are not easily seen in static structures? Using a molecular dynamics tool, NaMD, I was able to show that the crystal structures were, in fact, consistent with the *in vivo* environment. Furthermore, using the powerful method of steered molecular dynamics, I was also able to identify and investigate the crucial biophysical interactions that will help us understand the intricate specificity of these two enzymes.

Mapping Memories of the Home Environment
Paul Nakashima
*Mentor: Sanjoy Mazumdar*

In research on housing and the home, limited consideration has been given to studying the kinds of memories people have about the homes they have experienced. People’s memories about their homes are a valuable source of data. They can teach us about attachments and emotional connections residents have with their homes, what design features lead to positive associations and those that are disliked. Analysis of this information can teach us about the emotional link and other relationships residents have with their homes. It can also lead to pragmatic lessons regarding designs of homes. In my research, I analyzed the aspects of the design that are remembered positively or negatively to see what these memories reveal about how the residents viewed and experienced the design features and décor of their homes. Results of this research reveal that there are factors beyond the physical dimensions of the home that contribute to residents’ satisfaction with their homes. The social, cultural, and sensorial experiences and memories they have associated with this space are some of the aspects that contribute to this.

Basolateral Amygdala and Nucleus Accumbens Modulation of Memory Consolidation Requires Dopamine Receptor Activation in Both Structures
Erene Nawar
*Mentor: James McGaugh*

Previous studies indicate that the basolateral amygdala (BLA) and the nucleus accumbens (NAc) influence memory consolidation and require the other structure to be intact to perform such modulation. Furthermore, each structure receives a significant dopaminergic innervation that influences memory consolidation of emotionally arousing events. The current study investigated whether BLA- and NAc-mediated memory enhancement requires concurrent dopamine (DA) receptor activation in the other structure after training on an inhibitory avoidance (IA) task. Rats were implanted with unilateral right-side cannulae, aimed at the BLA and the ipsilateral NAc shell or core. One week later, they were trained on an IA task and, 48 hours later, tested for retention. Drugs were infused into the BLA
and NAc shell or core immediately after training. Posttraining intra-BLA infusions of DA enhanced retention. Concurrent NAc shell, but not core, infusions of the DA receptor antagonist cis-Flupenthixol (Flu) blocked this memory enhancement. In the reverse experiment, posttraining NAc shell infusions of DA enhanced retention, and this enhancement was blocked by Flu infusions into the BLA. These findings indicate that the modulation of memories by the BLA requires DA receptor activation in the NAc shell and not the core. Similarly, the modulation of memories by the NAc shell requires DA receptor activation in the BLA. Together with previous findings, these results suggest that the dopaminergic innervation of the BLA and NAc shell is critically involved in the modulation of memory consolidation.

I Am a Trumpet
Bridget Nestor
Mentor: Margaret Murata

Our knowledge of musical ideas and idioms expanded immensely throughout the 1900s. While there is a multitude of information about how common instruments are built and played, there are few works which explore the many capabilities and uses of instruments in this era. The music of the classical period is drastically different from the music of our grandparents, which is again much different from “modern” music. For us to understand the music of our time, I feel it is important to research and understand the way in which individual instruments are interpreted and played across genres and different musical subgenres, so that we can further contribute to its progress. Using programs such as Protools, I have edited and compiled a collection of musical excerpts which exemplify the musics of a single instrument, the trumpet. In place of an academic study which synthesizes book knowledge, I have created a performance in the form of a lecture, with selected visual illustrations, that explores trumpet playing in a variety of modern musical subcultures. The excerpts have been chosen as more than informational illustrations; they are presented anonymously and without identifying their sources. This technique was chosen to reveal the semiotic importance of each trumpet idiom as a series of cultural signs. The performance itself is an experiment in musical communication.

Chinese-Americans on the Western Frontier: An Exploration of Historical Occupations
David Newell
Mentors: Kenneth Chew & John Liu

I explored and compared the industries and occupations of an eastern industrialized state, Massachusetts, with those industries and occupations of a western frontier state, California, to show the differences in the labor force. Just after the middle of the 19th century, the manual labor-intensive California had significant numbers in the mining and agricultural industries while the industrial Massachusetts had relatively small numbers in these categories. This labor-intensive society in California, coupled with low wage immigrant Chinese workers, was the driving force for the Chinese Exclusion Act. Between 1882 and 1943, the Chinese Exclusion Act excluded Chinese laborers, as well as their wives and children from entering the United States. This raises the question of how the Chinese survived economically during the Exclusion period. My research addresses this question by examining the occupations of Chinese in the U.S. during this period. I investigated economic sectors in which Chinese participation grew and decreased, occupational differentiation patterns among Chinese and Whites, and the speed at which occupational patterns changed. The historical census microdata (IPUMS) used to complete this research has not been available to previous researchers and has enabled me to shed a new light on what types of occupations the Chinese held and the impacts that exclusion had on their occupational distribution over an extended period of time. The strategies adopted by the Chinese may also provide insights on the contemporary immigration situation.

Infants’ Mode of Delivery and Subsequent Stress Response
Larry Ngo
Mentor: Elysia Davis

The goal of this study is to examine the effects of acute intrapartum stress on infants. Evidence from animal studies had suggested that acute fetal or neonatal stress on newborns could have long-term effects on the hypothalamic-pituitary-adrenal (HPA) axis, one of the body’s major stress systems. As a result, early experiences of distress may increase response levels to stress later in life. Babies that experienced fetal distress during birth had been found to have higher levels of cortisol than those that did not experience distress. It has been observed from the study that, in comparison, there was no significant difference in stress response to a painful event after birth, a heelstick blood draw. Measured cortisol levels and behavioral response levels were found to be without significant difference between spontaneous vaginal delivered, elective cesarean delivered, and non-elective cesarean delivered babies.
Approaching the Post-Colonial and the Francophone: Vietnamese-Francophone Literature and the Case of Le Roman de Mademoiselle Lys
Catherine Nguyen
Mentor: Philippe Barbé

Today, most of the post-colonial literatures we are familiar with come out of Africa and the Caribbean. Most of the Francophone literatures we are familiar with come out of North and West Africa, the Caribbean, and Québec. But what about Vietnam, formally known as French Indochina, and its post-colonial, Francophone literature? Only recently has Vietnamese-Francophone literature, that is Vietnamese literature written in French and usually written during its period of colonization, emerged as a veritable and credible field of research. Historically, Vietnamese-Francophone literature is a result of and response to the colonization of Vietnam as a part of the French Indochinese enterprise. The first appearance of what may be called Vietnamese-Francophone literature did not appear until the 1920s with the publication of Nguyen Phan Long’s Le Roman de Mademoiselle Lys, (Hanoi, 1921). With Vietnam as a particular and unique case of French imperialism, and colonization in general, how do we read and examine its resulting colonial/post-colonial and Francophone literature? In my research, I approach this broad question through having read several Vietnamese-Francophone works in various contexts such as post-colonial theory; social, educational, and linguistic histories; and different critical theories. In particular, working with the socio-historical literary context and theories of narratology, I reexamine the established linear and thematic readings of Le Roman de Mademoiselle Lys. With this approach, I read Le Roman in its complexity, attending to its polyphony of narrative voices, its dialogic dimension, and the tensions of using the French language to express a Vietnamese experience of colonization.

The Effect of Neuregulin Splice Variants in Human Corneal Epithelium Cells After Wounding in vitro
Christine Nguyen
Mentor: Donald Brown

Neuregulin-1 is a member of the epidermal growth factor family. Neuregulin is present in human corneal cells and tissue as different splice variants. These different neuregulin variants, though produced by the same gene, make at least eight known proteins with different functions. Our goal is to examine cell response after wounding in vitro to determine if corneal cells respond differently to these variances during cell migration. We performed our experiment with an in vitro wound model of human epithelium corneal cell culture. A wound was induced on the culture using an applicator, and then each wound was treated separately with various dosages of alpha neuregulin, beta neuregulin, or forskolin (an agent that raises cyclic AMP). We photographed our cells at different time intervals over a 24-hour period. The wounds were then measured with computer software to determine the area of wound closure. Our experiments show that alpha neuregulin has a convincing effect in promoting epithelium cell migration while beta neuregulin also promoted migration when present in higher dosages. The drug forskolin impeded migration. Our study suggests that the dosage of neuregulin had an important effect on migration and that higher dosages increased cell migration. Certain neuregulin splice variants may stimulate wound healing that may lead to the development of new treatments for corneal disorders.

The Effects of Perceived Educational Barriers, Cultural Fit, and Coping Strategies on the Psychological Well-Being of Vietnamese Undergraduates: A Quantitative Study
Hannah Nguyen
Mentor: Jeanett Castellanos

Out of all Asian subgroups, Vietnamese Americans are more likely to experience psychological distress due to their migrational status as refugees and recent arrival to the United States. The following study will examine the effects of perceived educational barriers, cultural fit, and coping strategies on the psychological well-being of Vietnamese American undergraduates. One-hundred and fifty questionnaire packets were distributed to Vietnamese American undergraduates at a four-year university. It is hypothesized that, as more perceived educational barriers exist, undergraduates will report lower levels of psychological well-being. Similarly, as higher levels of cultural fit and positive coping mechanisms exist, undergraduates will possess higher levels of psychological well-being. Results will contribute to a better understanding for an integrative framework addressing Vietnamese American college students’ well-being, and will provide recommendations to improve counseling services for the population.

Drosophila Genetics- fl(1)n-7 Mutagenesis Using Homologous Recombination
Hao Nguyen
Mentor: Peter Bryant

The DLG protein is required for proliferation control in Drosophila epithelia. DLG is characterized by protein domains PDZ 1-3, SH3, HOOK, and GUK. The DLG protein locates at the septate junctions of epithelial cells. It not only has a function in growth control but also in the proper organization of the skeleton, the differential localization of membrane proteins, and the apicobasal polarity of epithelial cells. Null mutations in DLG can cause the overgrowth of epithelial cells, and the gene dlg,
therefore, act as a tumor suppressor in cell proliferation control. However, some of these mutations do not affect the other functions of DLG listed above because the mutations in protein domains PDZ-2 and PDZ-3 cause the loss of normal cell proliferation control without affecting other functions of the DLG protein. As we have identified in humans, the candidate EGF Receptor protein found in database as binding to the PDZ-2 and 3 in DLG is involved in cancer development. In Coenorhaditis elegans, LET-23, the homologous structure of EGFR, is also found to bind to LIN-7 and together with the complex LIN-7/LIN-2/LIN-10, works for the growth control. In Drosophila, flin-7 in complex with flin-10, is found to bind to protein receptor DER, the homolog structure of EGFR, to function in growth control. Because DLG binds to EGFR (human) as well as flin-7 binds to DER (Drosophila), the question is whether there is a competence between DLG and flin-7 in binding to DER to be function in growth control in Drosophila. Another question is that among three proteins of MAGUKS family, DLG, CAMGUK, and P55, which appears in the complex of flin-7 and flin-10 such that the combination flin-7/ (DLG/CAMGUK/P55)/flin-10 as binding to DER will function as proliferation control in Drosophila. These two questions will be clarified if we can determine the protein interactions among the MAGUKS family and the complex flin-7/ (DLG/CAMGUK/P55)/flin-10.

**Ventral Lateral Periaqueductal Gray Inhibits Rostral Ventral Lateral Medullary Neuronal Activity During Electroacupuncture Effects to Modify Autonomic Pressor Responses**

Jim Nguyen  
*Mentors: John Longhurst & Stephanie Tjen-A-Looi*

Electroacupuncture (EA) at P5-6 acupoints alleviates cardiovascular conditions, such as myocardial ischemia, but little is known about the mechanisms by which EA induces its beneficial effects. Studies have shown that the stimulation of the median nerve underneath P5-6 by low frequency, low current EA (2-4mA, 0.5 ms, 2Hz) decreases autonomic pressor responses and neuronal activity in the rostral ventral lateral medulla (rVLM), a cardiovascular integrative center. We hypothesized that the prolonged EA inhibition of rVLM impulses and autonomic pressor responses involves the ventral lateral periaqueductal gray (vPAG). We monitored mean arterial pressure (MAP) and rVLM neuronal activity in anesthetized and ventilated cats. Every 10 min, bradykinin (BK 10ug/ml) applied to the gallbladder induced pressor responses and electrical stimulation of the splanchnic nerve (0.4-0.6 mA, 0.5 ms, 2 Hz) evoked rVLM neuronal discharge. EA stimulation for 30 min at P5-6 inhibited autonomic pressor responses and rVLM neuronal activity for a prolonged period. Microinjection of kainic acid (50 nl), an agent that blocks neuronal depolarization, into the vPAG reversed the inhibitory effect of EA and restored MAP and rVLM neuronal activity temporarily. In the absence of EA, microinjection of the excitatory amino acid D,L-homocysteic acid (50 nl) into the vPAG decreased the pressor reflex and rVLM neuronal discharge, thus mimicking the inhibitory effects of EA. These data suggest that the inhibitory influence of EA involves vPAG to decrease rVLM neuronal activity that, in turn, modifies the autonomic reflex.

**Fusion of FLAG Peptide to G-Protein Coupled Receptor**

Mai-Le Nguyen  
*Mentor: Olivier Civelli*

G-protein coupled receptors (GPCRs) are a class of receptors that, when activated by a signal, themselves activate another class of proteins called GTP-binding proteins. The ultimate goal of this signal transduction pathway is to relay a message from the external environment into the interior of the cell. While many GPCRs have been linked to the signals (termed ligands) that are responsible for their activation, many other receptors remain unconnected to a source of activation. In order for these GPCRs to be studied, they must first be cloned. I have cloned a specific GPCR named GPR22 by adding an extra sequence of DNA called a flag-tag. The addition of this flag-tag to GPR22 allows for cells displaying these receptors to be differentiated from cells which do not display this receptor. As a result of the successful assembly of this flag-GPR22 construct, an extension of this project will be performed in the future. GPR22 will be transfected into cells, these cells will be immunostained, and then cells expressing GPR22 will be selected to undergo ligand compatibility testing in the hopes of discovering the ligand that activates GPR22.

**The Effects of Nonnutritive Suckling-and-Sucrose-Induced Analgesia on Cortisol Levels in Human Newborns**

Ngoc Nguyen  
*Mentor: Curt Sandman*

The objective of study was to examine the analgesic effects of sucrose and nonnutritive suckling on cortisol levels in full-term newborn infants undergoing a stressful event, namely heel-stick blood draws. Salivary cortisol levels were measured in four groups of full-term infants (37-41.43 weeks) who underwent the painful and stressful event of a heel-stick blood draw. The groups consisted of: 22 controls who received no intervention, 31 whom were given sucrose only, 6 were given pacifier only, and 15 were given both a pacifier and sucrose. Behavioral measures were also used to evaluate observed
pain and stress of infants undergoing the blood draw. Infants who received sucrose or pacifier alone, and those who received both sucrose and pacifier treatment exhibited no significant differences in cortisol levels when compared to the control group. However, those receiving either sucrose alone, or sucrose and a pacifier had significant decreases in their rated behavioral distress compared to the control group. The lack of increased cortisol despite a decrease in behavioral distress in treatment groups compared to the control group suggests that there is a dissociation from behavioral and physiological indicators of pain and stress.

Targeted Mutagenesis of the Genes flin-7 by Homologous Recombination in Drosophila melanogaster
Sheila Nguyen
Mentor: Peter Bryant

In the last 35 years, the fruit fly Drosophila has been intensively used as a model system to study the genetic changes that occur in cancer cells. One of the best studied tumor suppressor genes in Drosophila is lethal(1) discs large-1, encoding the Discs large (Dlg) protein, which functions in larval brain and imaginal discs. Similar to other tumor suppressor genes in Drosophila, Dlg has human homologs implicated in various cancer types. Preliminary evidence indicated that Dlg may exert its tumor suppressive function by regulating the localization and/or function of DER (the Drosophila Epidermal Growth Factor Receptor) either directly or through its interaction with the putative cytoskeletal proteins flin-7. To test these ideas, we are producing genetic mutations of flin-7 using homologous recombination, a new technique in Drosophila that uses DNA repair and recombination mechanisms to replace normal DNA with exogenous mutant DNA at a target locus. To create the necessary DNA construct, we used pGEM-T as an intermediate cloning vector, which increased the efficiency of subcloning into the final vector pW25. This construct contained the necessary elements for its own insertion into fly genome and facilitated recombination. Thus far, we have created the flin-7 construct, injected it into fly embryos, screened and identified eight lines of transformants, and obtained nine mutant candidates. We are in the process of carrying out phenotypic and genotypic analysis. The study of the phenotypic defects caused by the flin-7 mutation will show whether the gene product have the suggested functions in controlling cell proliferation.

Mourning Hemans: Resolving the Problem of the Woman Writer
Theresa Nguyen
Mentor: Hugh Roberts

In “Felicia Hemans” (1839), Letitia Elizabeth Landon (1802-1838) attempts to articulate and resolve the problems faced by the women writers of the Romantic period through her elegy on the titular fellow woman writer (1793-1835). Writing, publishing, and the resulting fame moved women writers, such as Hemans and Landon, out of the private domestic sphere, traditionally identified as feminine, and repositioned them in the male public sphere. As public figures, they were highly susceptible to accusations and rumors, such as impropriety and promiscuity. Thus, fame for the woman writer was a double bind; she needed celebrity to succeed economically and yet such celebrity threatened her reputation. This paradox is further complicated for those participating in the project of Sensibility, which is focused on making the private public. The intimate connection of the Sensibility discourse with the physical body calls for its writer to display it—a project that is inappropriate for the period’s women. In memorializing Hemans, Landon contends with this paradoxical position of the woman writer and works to resolve it through the appropriation, questioning, and, finally, reconstruction of the conventions of form and mode, of the elegy, and of Sensibility. To accomplish this, Landon reworks the figure of Prometheus to insert the woman writer into a mythic tradition of creators. Her Promethean figure becomes the model of the cultivation of Sensibility, acting as a substitute for the female body on which the exteriorizing project develops. The paradoxical situation of Hemans, the representative woman writer, is finally resolved by her death; it is in death that she is both fully private and fully public. Finally, in successfully positioning Hemans for eternal fame, Landon constructs a literary genealogy for women writers into which she can insert herself.

Formation and Utility of Alkylidenesilacyclopropanes
Thong Nguyen
Mentor: Keith Woerpel

Recent developments in silver-catalyzed silylene transfer to carbon-carbon double and triple bonds have expanded the synthetic utility of silacyclopropane-related intermediates. The selectivities of silylene transfer to cumulated dienes and reactions of the silacyclopropane intermediate with carbonyl compounds were investigated. Subsequent oxidation would provide diols and triols, which are common motifs in biologically active molecules. Results have indicated good yields and selectivities of silylene transfers to cumulated dienes and insertion of carbonyl compounds. Epoxidation and
hydrogenation of the oxasilacyclopentane also gave high selectivities and yields.

**Titin Mimicking Polymers**

Vivian Nguyen  
**Mentor:** Zhibin Guan

The Kevlar polymer has many practical commercial uses because of its strength and rigidity, due to the inherent firm nature of its strong supramolecular hydrogen bonding. The Kevlar structure is highly ordered, held by aromaticity, amide bonds, and hydrogen bonds. Despite its many practical uses, the Kevlar polymer has not proven profitable for Dupont even 40 years after its discovery, due to its low solubility. A variation on the Kevlar structure could make it more soluble while maintaining its properties, making the synthetic process more profitable. To improve solubility, the hydrogen bonding in the proposed structure is between two different polymers. If there is only one monomer, the structure will hydrogen bond upon itself and want to precipitate out of solution. Without intramolecular hydrogen bond, both monomers will stay in solution until mixed to form the soluble Kevlar structure. Separate containers containing the two polymers in solution are slowly mixed in methanol. As the soluble Kevlar forms and precipitate out of solution, machinery pulls on the newly formed strands, producing tension and encouraging strand formation. Kevlar has intramolecular binding so as soon as its monomers are synthesized, they clump together and form the polymer immediately. If two molecules bind to each other but not to themselves, their joining can be controlled by a slow introduction in a solvent system that will precipitate the fiber out of solution. This method eliminates the need for Teflon coating and solubilization in sulfuric acid, making the process efficient and profitable.

**Mechanical Properties and Fracture Toughness of Oxide Film Deposited on Ultra Fine Grain Al 5083 and Nanocrystalline Ni**

Bryan Nishimoto  
**Mentor:** Farghalli Mohamed

Oxidation changes a material’s mechanical properties, and hence the safe operating conditions of a device. Therefore, investigating oxidation effects on various common working materials is important. This study scrutinizes the mechanical properties in the elastic and plastic regimes, and the fracture toughness of oxide films formed during the thermal oxidation in laboratory air of ultra fine grain (UFG) Al 5083 and nanocrystalline Ni. The growth of an oxide film on a bare metal surface by oxidation is a complex process, usually involving multiple rate-determining mechanisms. The initial and subsequent stages of oxide-film growth consequently involve the absorption and dissociation of oxygen on the bare metal surface and the nucleation and growth of an oxide film covering the metal surface, in association with transport of cations and/or anions, as well as electrons, through the developing oxide film. The composition and structure of the developing oxide film can be variable depending on the oxidation temperature, time, and thickness. It is probable that the cryomilled UFG Al 5083 material, an aluminum deficient alloy as compared to Al2O3, develops an amorphous oxide film at low temperatures. At high temperatures, an Al-enriched, amorphous oxide film forms initially but gradually attains the stoichiometric composition of Al2O3 and becomes crystalline γ-Al2O3. The present study focuses on the relations between the oxide film growth kinetics, the associated mechanical properties, the evolution of the chemical composition, and the morphology and microstructure of the developing oxide film as a function of the oxidation temperature.

**Effects of FGF-4 Growth Factor on Axolotl Fibroblast Gene Expression**

Banafsheh Noosha  
**Mentor:** David Gardiner

Although vertebrae develop limbs as embryos, only salamanders (urodele amphibians) are able to regenerate limbs as adults. Recent studies of salamanders indicate how gene expression varies amongst different stages of regeneration *in vivo*, however, little is known about regulating gene expression *in vitro*. Such information is important in designing strategies to induce the expression of regeneration genes in animals that normally do not regenerate, such as humans. Growth factors alter gene expression, and thus it is important to study how different growth factors and their varying concentrations affect the genes involved in limb regeneration. Fibroblast cells from axolotl tissue were grown in culture medium (60%L-15 + 5%FBS + 1%ITS). Cells were plated on T75 tissue culture flasks and incubated for two weeks as controls. Following this two-week period of growth (cell division), cells were supplied with new culture medium. Half of the cells were treated with 100 ng/mL of FGF-4 growth factor and half were treated in culture medium without exogenous FGF-4. After 18-24 hours, cells were trypsinized, centrifuged, and lysed to extract total RNA (Qiagen’s RNaseasy MiniPrep kit). Total RNA was quantified, Reverse Transcribed, and run in a Polymerase Chain Reaction, in which primers were designed based on the genes to be studied. These genes were GAPDH, a normalizing control, TGFβ-1 and MMP-9, which have been implicated as being involved in regeneration. Agarose gel electrophoresis revealed the amount of amplified experimental cDNA relative to the amount of GAPDH. Preliminary results indicate that MMP-9 is expressed at high levels in control cells, and that TGFβ-
that gestational nicotine exposure will lead to learning deficits in adolescence (postnatal day (PN) 30). We hypothesize that norepinephrine release, an observation that persists until PN 45, can alter nicotinic receptor mediated responses. In our lab, we have illustrated that gestational nicotine exposure can alter nicotinic receptor mediated responses and memory impairments in the neonatal rat due to this mechanism. To test this hypothesis, we first aimed to set up an olfactory learning paradigm that is dependent on noradrenergic stimulation. Pups on PN 7 were randomly assigned to three testing conditions: a paired shock and odor stimulation (30 s of peppermint odor coupled to a mild 1 s electric shock (0.5mA) in the final second of odor exposure), an unpaired shock and odor stimulation, and an odor only presentation. Behavioral movement was scored on a scale of 0-5, representing the number of limb movements shown by the pup. The following day, pups were tested in a Y-maze for odor preference. Our results showed that paired pups showed slightly higher preference toward the peppermint odor than the unpaired or odor only groups. However, the findings were not statistically significant. This may have been due to inadequate adaptation of the pups to the training apparatus leading to stress effects. We have modified training sessions to minimize stress by incorporating a two-day habituation period to the training apparatus. After we see significance for our paired group, we will test the effects of gestational nicotine exposure on olfactory learning. The findings from these experiments will help shed light on the mechanisms responsible for cognitive deficits seen in offspring of maternal smokers.

Visions for the Future: The Impact of Taui on Tahitian Culture in French Polynesia
Makana Nova
Mentor: Raul Lejano
In 2004-2005, French Polynesia experienced a political phenomenon commonly referred to as Taui, or “change” in the Tahitian language. After 20 years under one president, Gaston Flosse, corruption and public unrest led to the election of a new president: Oscar Temaru. This regime change led to new perspectives and values of cultural and political entities in French Polynesia. Twenty interviews were conducted over a two-week period in December of 2004 to understand reactions to Taui, and to identify implications and ideas for the future development of culture in French Polynesia. This situation is significant to grasp the influence of policy and organization of a dominant culture in preserving another. For Tahiti, it is vital to understand the influence that a stronger nation like France has over its protectorate. The data shows that while many citizens do not perceive a connection between politics and culture, an indirect connection exists between the two entities in terms of monetary control and organizational regulation. The situation in French Polynesia is the result of two regimes and a split society that holds different priorities for the future. A number of interwoven historical elements have impacted French Polynesia, such as French nuclear testing, the economic structure of an island, and the cultural emphasis on the value of tradition, language, and the land. In the future, opportunities for cultural expression should be readily available. Traditional and contemporary modes of cultural expression should be utilized to help strengthen the connection between Tahitian culture and the outside world.

Olfactory Learning Method Development to Test the Cognitive Effect of Gestational Nicotine Exposure
Maria Oh
Mentor: Frances Leslie
Clinical studies indicate that one out of four women smoke during pregnancy. Offspring of maternal smokers exhibit a number of neurobehavioral deficits that have been linked to noradrenergic dysfunction. In vitro studies in our lab have illustrated that gestational nicotine exposure can alter nicotinic receptor mediated norepinephrine release, an observation that persists until adolescence (postnatal day (PN) 30). We hypothesize that gestational nicotine exposure will lead to learning and memory impairments in the neonatal rat due to this mechanism. To test this hypothesis, we first aimed to set up an olfactory learning paradigm that is dependent on noradrenergic stimulation. Pups on PN 7 were randomly assigned to three testing conditions: a paired shock and odor stimulation (30 s of peppermint odor coupled to a mild 1 s electric shock (0.5mA) in the final second of odor exposure), an unpaired shock and odor stimulation, and an odor only presentation. Behavioral movement was scored on a scale of 0-5, representing the number of limb movements shown by the pup. The following day, pups were tested in a Y-maze for odor preference. Our results showed that paired pups showed slightly higher preference toward the peppermint odor than the unpaired or odor only groups. However, the findings were not statistically significant. This may have been due to inadequate adaptation of the pups to the training apparatus leading to stress effects. We have modified training sessions to minimize stress by incorporating a two-day habituation period to the training apparatus. After we see significance for our paired group, we will test the effects of gestational nicotine exposure on olfactory learning. The findings from these experiments will help shed light on the mechanisms responsible for cognitive deficits seen in offspring of maternal smokers.

A Revised Look at the 1960s Los Angeles Youth Counterculture
Alison Okuda
Mentor: Mike Davis
The depth of the youth counterculture in 1960s Los Angeles has been misconceived by succeeding generations through cultural and social misrepresentations. Popular images of the Sunset Strip supplied by the Hollywood television industry as seen in 77 Sunset Strip portray the West Hollywood area as a glamorous and elite neighborhood where few riotous youths would be found hanging out in front of night clubs and cafes. These forms of mass media led people to the conclusion that Los Angeles did not have a youth counterculture as San Francisco did, but that it was a place where the stars of Hollywood wined and dined in elegant lounges. When people learned about the youth rebellions that took place in West Hollywood during 1964, they misjudged the youths because of the preconceived notions that the media had planted in their psyche. By studying the true events and circumstances that youths and residents of the West Hollywood area experienced during the sixties, one may be able to correct these past misconceptions and educate people about the 1960s Los Angeles youth counterculture. The search through numerous texts and articles written during the sixties and since has allowed the truth about these youths to surface. They were not simply rebellious teenagers looking to make West Hollywood an