Abstracts

Individual Projects

Conchero/Aztec Dancers and their Projection of Continuity Across Borders
Fatima Acuna
Mentor: Ana Rosas
The binational social structure of Conchero/Aztec dancers in both Mexico and the United States is critical toward understanding the cultural exchange that nurtures the longevity of this spiritual expressive culture within and beyond U.S. borders. This spiritual expressive culture’s vision, incentives, membership, and performances are oriented to advance the individual and collective well being of those who practice it. In relation to the research at hand, the social network of Conchero/Aztec dancers creates a spiritual bond between people in Mexico and across the United States that serves to nurture continuity and cohesion among this spiritual expressive culture’s membership. Themes that prevail in the research include the development of cultural identity as a Conchero/Aztec dancer in Mexico and the United States, spiritual empowerment, and social interpretations of their body politics in relationship to other iconic figures of expressive culture, such as the zoot suiter of the 1940s and 1950s as a form of expression to keep their originality and self worth. Ethnographic fieldwork conducted in Mexico, as well as ongoing fieldwork undertaken in the United States, informs my investigation. Findings include the relevance and utility of Conchero/Aztec dancers as a network of informed peers willing not only to reinforce spiritual traditions but coping strategies that prioritize solidarity through a deep appreciation of a shared indigenous heritage as members navigate a U.S.-Mexico borderland rife with alienating immigration laws and, in turn, dehumanizing border enforcement and economies.

The Adoption and Safe Families Act of 1997 and its Effects on Incarcerated Mothers
Lakeshia Adeniyi
Mentor: Sara Wakefield
This study examines the Adoption and Safe Families Act of 1997, whose primary purpose is to improve the health and safety of children who have a parent in the prison system. My research aims to further demonstrate the additional effects of the act, which may include unintentional consequences to incarcerated mothers and their children. As a result of an intensive literary analysis of previous qualitative research studies of the effects of incarcerated mothers and their families, my research indicates that the act can have negative consequences on incarcerated mothers and their children. Some of these consequences include the dismantling of family structures, the punishment of children whose mothers have been imprisoned, and the aiding in the psychological distress that may occur from severing the bond between mother and child.

Ideal Diffusion Control Substrate Synthesis
Onyemaechi Ahanotu
Mentor: Keith Woerpel
In organic chemistry, diastereoselectivity in synthesis of carbohydrate-like systems is important in areas such as drug synthesis and profitability of synthetic pathways. The literature has shown that there is a preferred nucleophile attack trajectory in a nucleophile substitution reaction of carbohydrate-like systems that proceeds through the lowest energy intermediate. The literature also shows that by decreasing the stability of the oxocarbenium ion or increasing the strength of the nucleophile, diastereoselectivity decreases, to a specific limit at which the reaction is said to be limited or controlled by diffusion. While there are currently no known models for carbohydrate systems reacting under diffusion control, an important aspect in understanding diastereoselectivity is understanding the energy differences between the attack trajectories and what kind of selectivity a reaction will yield. We hypothesize that a conformationally rigid oxocarbenium ion with a fused ring can be used to accurately identify energy differences of attack of the two faces on the 6-membered ring oxocarbenium ion, assisting in generating and empirical model and explore the concept of diffusion control.

Topical Ocular Mucosal Immunization with Herpes Simplex Virus Type 1 Epitope Peptide Epitopes: The Role of the Nasal Immune System
Ayesha Akhtarmalik
Mentor: Lbachir BenMohamed
We recently reported that topical ocular delivery of herpes simplex virus type 1 glycoprotein D (HSV-1 gD) peptide epitopes plus CpG2007 adjuvant efficiently induces both ocular mucosal and systemic immune responses. We now demonstrate that topical ocular delivery of HSV-gD peptide epitopes plus CpG2007 adjuvant induced both systemic and ocular mucosal immune responses at the same levels as intranasal immunizations. The immune responses elicited following topical ocular versus intranasal delivery of HSV-gD peptide epitopes plus CpG2007 adjuvant were measured by observing specific T cell responses in both the spleen and conjunctiva using CFSE assays, and by the detection of the levels of serum and tear antibodies using ELISA assays. In addition, the effect of nasolacrimal ducts blockade on the ocular immunogenicity was investigated.
brief nicotine pretreatment affects development of male adolescent rat dopamine system

Jason Albano
Mentor: Frances Leslie

Adolescence is a critical period in development, characterized by increased risk-taking behavior and susceptibility to drug abuse. Proposed as a “gateway” drug, tobacco smoking during adolescence leads to later abuse of more dangerous and illicit drugs. This study suggests that even a brief exposure to nicotine, the primary active ingredient in tobacco smoke, can have lasting effects on adult smoking behavior and drug abuse. To test this hypothesis, we examined whether a low-dose adolescent nicotine treatment during adolescence alters drug-induced behavior compared to normal adults. Adolescent male Sprague-Dawley rats, aged postnatal day (P) 28 or P86, were given two daily intravenous nicotine injections (0.3mg/kg/0.1ml) or saline for four days. On the fifth day, rats were given an i.p. injection of the dopamine D2 agonist quinpirole or saline. Rat locomotor activity and stereotypic behavior was monitored for 30 minutes. Our preliminary findings show that adolescent rats pretreated with nicotine were sensitized to the effects of quinpirole, exhibiting increased locomotor activity and increased stereotypic behavior.

Post 9/11 Views on Immigration: How Immigrants are Portrayed Through Images and Language in the Media Post- 9/11

Luis Alberto
Mentor: Caesar Serereseres

After September 11, 2001, immigrants were seen differently. The terrorist responsible for the terrorist attacks were immigrants with expired visas. As a result, immigrants and terrorists become synonymous. “Protect our borders,” “united we stand,” and “stop illegal immigration” became some of the slogans during the post-9/11 period. Cartoon representation and pictures showed the transition of growing American patriotism, and immigration policy that targeted immigrants. People feared that the border was a potential threat for further terrorist attacks, since the U.S.-Mexican border is vulnerable. Many Americans felt that immigration was getting out of control, and a group of members called the Minuteman Group decided to aid the Border Patrol. We began to see nationalism grow, as the nation tried to unite together, chanting “united we stand” and displaying their patriotism with U.S. flags. In doing so, it created a division among the nation: “us,” the American people, and “others,” immigrants and terrorists. These events sought to combine immigrants and terrorists in one category, showing that if you were an immigrant, you were possibly a terrorist. All these ideas and fears were transmitted through images. Images carry symbols defined by society. They allow us to interpret how society sees and deals with many issues that affect the nation, like immigration. These images can be broken into three different sections based on how the images are used: affirmative, alarmist, or neutral in their portrayal of immigrants. By analyzing and categorizing these images, we can see that post-9/11 period became an alarmist period towards immigrants.

The Muslim Brotherhood and the AK Party: Islamist Parties in the Secular Confines of Egypt and Turkey

Aisha Alim
Mentors: Bojan Petrovic & Caesar Serereseres

The goal of this study is to compare the evolution of the AK Party, an Islamist political organization currently in power in Turkey, and the Muslim Brotherhood, an officially unrecognized party but a prominent social and political Islamist movement in Egypt. The influence of religion on societal values, laws and policies in Muslim countries creates a considerable difficulty in defining the boundaries between religion and the state in those cases. Turkey and Egypt are no exception in this regard. Their respective political systems have given rise to political parties that have preserved religious values while operating within traditionally secular political paradigms. The actions, perceived intentions, and motivations of the AK Party and the Muslim Brotherhood are assessed by conducting interviews with relevant regional experts and through the analysis of speeches and legislation issued by the two organizations and their respective governments. My argument is twofold. First, I claim that the secular confines of the political systems in Turkey and Egypt have, over time, contributed to the moderation of the respective political platforms of the two organizations regarding their policies on Shari’a law and the role of women and non-Muslims in government. Second, I argue that the AK Party and the Muslim Brotherhood each gained significant public support by establishing a record of effectively challenging their respective authoritarian governments, with the AK Party challenging the military institution and the Muslim Brotherhood developing social alliances and an alternative platform to challenge the Mubarak administration. The study also speculates whether the Muslim Brotherhood, following the example of the AK Party, is likely to come to power in Egypt in the near future.
The Fall of Orange County
Brendan Allison
*Mentor: Celeste Fremon*

In many ways, the story is familiar. Despite Orange County’s having declared bankruptcy more than a decade before the explosion of the present financial crisis, its story resonates with strange parallels. The main difference between Orange County’s bankruptcy declaration and the present day is one of complexity: Orange County provides a simplified version of everything that has been dragging down the country from the financial sector in recent years. The problem is that, even among those who argue its importance, very few people treat economics as a matter of urgent interest. Their prose is laden with jargon and assumed knowledge, their rhythms slow. A huge gap between business writers and the general public has arisen as a result. Although the knowledge is there, very few people have effectively communicated it. However, if one reads writers of complex ideas and clean styles, writers as varied as Kurt Vonnegut, Norman Mailer, and Oliver Sacks, one learns to translate complexity into narrative. Once they do so, the familiarity of the story makes it urgent—it is worth finding the tale of Orange County in archives of newspaper articles and old grand jury transcripts and livening it with interviews, because one finds echoes of Orange County all the way from the fiction of Tom Wolfe to the present crisis, back to Midas and the Greeks, forward to the Great Depression. Lost in the haze of jargon, the same story repeats itself over and over, and it begs to be told once more.

The Irvine Farmers’ Market: A Local Alternative to Global Agribusiness
Shaheen Amirebrahimi
*Mentors: Michael Burton & Angela Garcia*

Over the past decade there has been an unprecedented increase in the number of farmers’ markets present in both California and throughout the United States. This rise in direct consumer-producer relations is often associated with qualities that include sustainability, freshness of produce, community building, and an escape from agribusiness profiteering. The Irvine Farmers’ Market is a weekly event in which varying consumers and producers interact over a basic staple of life, food. Through participatory observations and ethnographic interviews with both farmers and consumers at the market, this study aims to elucidate the tangible realities of the produce present (its methods and purposes of growth and distribution), explore the varying beliefs and values held by shoppers with relation both to vendors and their produce, and the reasons both shoppers and sellers choose to come to the Irvine market. To maintain a consistency of discussion topics for comparison, two semi-structured interview guides have been used during interviews—one for the buyer group and one for the seller group, with each group consisting of approximately 12 candidates. The project demonstrates that the conceptions held by both groups are not simplistic in the least, but complex and varying. To a high degree both vendors and consumers make assumptions about the origins and motives of the other group; however, initial beliefs concerning individuals or produce must often be mediated or given up once discourse is initiated. This study, along with others of a similar nature, will aid in better understanding the consumptive motives of the Californian eater and their conceptions of food, while providing an outline of the various functions of the market event.

The Role of Early Surgical Decompression of the Intra-Dural Space Following Cervical Spinal Cord Injury in an Animal Model
Ryan Anderson
*Mentor: Ranjan Gupta*

Clinical outcomes following spinal cord injury (SCI) in the cervical spinal cord have historically been rather poor, with the deficits from SCI occurring both from the traumatic event and the ensuing biologic response. Traditionally, decompression of the bony and soft tissue elements has been the focus of early surgical intervention, although the timing and method of surgery remain controversial. While there is no current intervention that can prevent or repair damage that results from the primary insult, novel methods to reduce effects of the secondary insult are of great interest. We sought to determine the role of surgical decompression with either durotomy or duraplasty in acute cervical SCI and evaluate its effects on inflammation, scar formation, and functional recovery. Our data demonstrates that functional recovery after acute cervical SCI was improved with decompression of the subarachnoid space and placement of a dural allograft. The behavior data correlated with the histologic evidence of decreased spinal cord cavitation and scar formation. In contrast, animals treated with decompressive durotomy without dural allograft placement showed decreased functional recovery and a corresponding increase in inflammation, cavitation, and scar formation relative to contusion injury alone animals. The data supports the rationale of acutely decompressing the subarachnoid space following a compressive spinal cord injury. It appears that sustaining this benefit and reducing the secondary inflammatory response requires the continuity of an intact overlying dura with an expanded subarachnoid space. Surgical decompression of the subarachnoid space after an acute traumatic cervical SCI may be an important new approach to reducing the deficits from the secondary insult after spinal cord injury and warrants further clinical investigation.
Comparing the Effects of Student Culture on Academic Dishonesty: A Comparative Study
Karla Andrade
Mentors: Samuel Gilmore & Pamela Kelley

Social Strain Theory proposes that “the social pressure created by the cultural preoccupation with winning is exacerbated by inequities in socially structured opportunities, which give some individuals an advantage over others in the competition for resources.” This theory examines everything from academic competition to filing taxes. This research analyzes the social pressures and campus cultures that influence academic dishonesty in education. Research has shown that there is a significant difference in academic misconduct between private and public universities. Not much research has been done, however, on why this is the case by examining differences in student attitudes towards ethical conduct. I will analyze the impact of religiosity and ethical conduct in campus culture and further explore gender, marital status, and age as factors that affect academic dishonesty. Data will be collected through 20 in-depth interviews and 300 surveys. Thus far, the data collected shows that students who fear consequences are less likely to cheat. This fear may have derived from parents, teachers or professors and/or the academic honor code that lists the repercussions for academic dishonesty. Students at private institutions have often explained that a fear of God is also present. The data also points out that the number one factor for not turning in a “cheater” is due to the fear of being labeled a “tattle tale” and the stigma which it carries.

The Judiciary and its Impact on Foreign Direct Investment: Argentina, Chile and Peru
Marshall Andrews
Mentor: Charles Smith

Latin America, a continent relatively rich in natural resources and educated human capital, continues to lag behind the East Asian economies and the developed world in terms of its success in attracting foreign direct investment. Although there is a preponderance of research into the determinants of foreign direct investment and a great deal of agreement on the importance of a country’s judiciary to economic prosperity, there has been relatively little detailed examination of how judicial performance has impacted foreign direct investment trends in particular. The goal of this study is to rectify this situation and clearly illustrate how the judiciary has impacted foreign direct investment trends in the case countries. I demonstrate that this relationship does in fact exist by examining the literature on reforms and the history of the judicial institutions of Argentina, Chile and Peru alongside data on foreign direct investment. My findings show that the judiciaries that exhibited relative independence, accessibility and efficiency contributed to growth in foreign direct investment, but were not a necessary condition for foreign direct investment to take place. These results help to explain why Latin America, and more specifically these case countries, remain underperformers in foreign direct investment acquisition.

A Comparison of Conventional and Reactive Sintering in the Formation of Three-Phase Polycrystalline Ceramic Composites
Jesse Angle
Mentor: Martha Mecartney

This study investigates the densification and microstructure of conventionally sintered and reaction sintered three-phase polycrystalline ceramic composites. Compositions with varying weight percents of alumina – spinel – mullite were synthesized by the sintering of stock powders of these three phases or by the in-situ reaction of nanocrystalline alumina and colloidal silica to form the mullite component of the composites. Pellets were fabricated by cold isostatic pressing of powders following by sintering at temperatures ranging from 1300–1600 °C. Scanning electron microscopy (SEM) was used to observe the microstructure of each composition and determine the influence in-situ reacted mullite had on grain growth during the reaction sintering process.

Newly Discovered mt-ND5 Variant (C12352T): Investigation on the Effects in Mitochondrial Energetic and Disease Phenotype
Jacqueline Arana
Mentors: Doug Wallace & Michael Zaragoza

Complex I deficiency is the most common cause of mitochondrial disease that include neurological disorders, cardiomyopathy, liver failure, and myopathy. In studies using the mouse model to understand mitochondrial disease, our group discovered a novel mitochondrial DNA (mtDNA) nucleotide variant in our C57/B6 control mice. This mtDNA variant is located at nucleotide position 12,352 (C12352T) in the gene mt-ND5 (mitochondrially encoded NADH dehydrogenase 5). C12352T is predicted to cause a missense amino acid substitution in the enzyme. We hypothesize that a defect in the mt-ND5 gene leads to altered activity of complex I of oxidative phosphorylation, which may result in mitochondrial deficiency in generating ATP and mitochondrial disorders. To test this, we are studying the effects of the C12352T variant on mouse phenotype, including growth and general health. Through a series of crosses, we produced and examined two populations of C57/B6 mice, one group with the C12352T variant and a control group without the variant. Thus far, we find that the C12352T group is healthy without significant phenotypic differences from the control population. Thus, our preliminary results do not support a significant role for the variant C12352T in mitochondrial disease. Biochemical assays to test for alterations in Complex I activity in brain, heart and skeletal muscle are planned in order to determine
the significance, if any, of the variant on mitochondrial efficiency in generating ATP.

Walk Out! A Retrospective Study of the Motivations for Walking-Out Among Latina/o High School Students in the Midst of HR4437 in Spring 2006
Ingrid Arias
Mentor: Leticia Oseguera
In light of the recent proposed policy changes and debates on immigration reform, there has been a resurgence of political involvement around the country by marginalized immigrant groups. Latinos specifically, constituting at least half of the undocumented population, have taken action in the streets of urban centers such as Los Angeles. Policy proposals such as HR 4437 have ignited high school students in particular as many have chosen to take political activity to the streets. An estimated 5,000 students walked out in Orange County. Solórzano and Bernal define “walking out” as a manifestation of external transformational resistance. These publicly identifiable actions exhibit notions of youth who are not willing to conform to their marginalization by engaging in transformational forms of student behavior. This political activity illustrates both a critique of oppression and a desire for social justice. This retrospective study draws from both quantitative and qualitative data sources and analysis using questionnaires and interviews. This contribution brings to light the need for a more critical understanding of high school student activism and helps to identify trends that differentiate the experience of students who walked out of school from students who decided to stay in school.

The Effect of the HABLA on the Home Literacy Environment of Non-HABLA Participants and HABLA Graduates
Ingrid Arias
Mentor: Virginia Mann
The development of vocabulary has been linked to the frequency in which parents talk to their children and to literacy practices in their household. According to Foy & Mann reading achievement is dependent on the home literacy environment. Studies have found that a high percentage of children who enter first grade have poor reading skills. As a result intervention programs such as Home-Based Activity Building Language Acquisition (HABLA) were established to promote school readiness for disadvantaged Spanish-speaking children. This study will use the Adult-Child Interactive Inventory to assess and observe adult-child dyads during storybook reading. A total of 30 Spanish speaking families—15 of which participated in the HABLA program—participated in the study. This study aims to find whether participation in HABLA has an effect on the child’s home literacy environment. This study also intends to find a significant difference between the home literacy environment of a child who has completed the HABLA program compared to a non-HABLA participant.

Can the Symbioses Between Pines and Fungi Negatively Impact Symbioses Between Other Plants and their Own Fungi in the Tropics?
Tania Asef
Mentor: F. Lynn Carpenter
The intent of this study was to investigate the potential impact of ectomycorrhizal pine trees on arbuscular mycorrhizal fungi (AMF) colonization in neighboring plant species. I hypothesized that if pines at my study site form exclusively ectomycorrhizal associations, then planted pines may suppress AMF colonization of AMF associated plants. I tested my hypothesis by collecting roots from pines and grasses in high and low density pine stands, predicting that AMF colonization will be lower in areas where pine density is high. I quantified ectomycorrhizal colonization by counting the fraction of root tips in pines colonized by ectomycorrhizae. I quantified colonization of grasses and pines by arbuscular-mycorrhizal fungi by counting the number of hyphae per 50 random intersects. AMF colonization in pines roots was not significantly different in high density stands compared to low density stands. Pines were not colonized by a significantly different amount of arbuscular-mycorrhizal fungi when planted in low densities than in high density stands. Pines in high density stands had significantly higher ectomycorrhizal colonization than pines in low density stands, in which their symbioses were dominated by ectomycorrhizal fungi. The amount of AMF colonization in grasses was not affected by pine density. AMF associations are important for plants in the tropics to obtain nutrients. Because AMF associations were not suppressed, planting pines may allow for growth and restoration of AMF plants in Costa Rica. This finding is important because pines are the only species able to pioneer extremely degraded lands.

Investigating the Correlation Between Frontal and Lateral Views of the Face Using Internet-Based Ratings
David Avila
Mentor: Brian Wong
Investigating the definition of “ideal” facial aesthetics is a rigorous and complex process. Our research group has previously pioneered an approach of combining a genetic algorithm with facial morphing technology to “evolve” more attractive synthetic anterior-posterior (AP) along with lateral-posterior (LAT) facial portraits, validated an Internet-based approach towards rating facial attractiveness on a large scale; and developed a method to create realistic synthetic lateral facial portraits with morphing technology. Using this system of methods, the approach of this investigation will target whether an anterior-posterior...
view of a face will have any correlation with a lateral-posterior view of the corresponding face. Two different facial projections of the same facial portrait are analyzed, because each pair of AP portraits also has their corresponding LAT projection morphed. When the facial portraits have gathered 600 votes on the Internet-based rating system, their “beauty” scores are analyzed on account of how linear their graphs are, based on the axes of the AP score and the LAT score. No actual images were used in this study due to the intense labor of gathering written consent; therefore, the pool of 600 photographs, were developed into synthetic AP and corresponding synthetic lateral facial portraits using morphing technology. The results of this study are pertinent to reconstructive facial surgeons, because their task is to restore facial harmony, balance, and proportion, which are characteristics this investigation studies.

Immunogenicity and Protective Efficacy of Lipopeptides Vaccine Containing Human Asymptomatic CD4 and CD8 T Cell Epitopes in Human Leukocyte Antigen (HLA) Transgenic Rabbits
Arfan Azeem
Mentor: Lbachir BenMohamed
Evidence obtained from animal models and humans suggest that CD8+ T cells specific for HSV-1 contribute to protective immunity against herpes infection. The purpose of this study is to test and analyze the immunogenicity (induction in vivo and localization of the CD8+ T-cells) and protective efficacy of lipopeptides vaccine containing human asymptomatic CD4 and CD8 T cell epitopes on ocularly-infected human leukocyte antigen (HLA) transgenic rabbits. I had the responsibility to test one parameter of the vaccine immunogenicity using immunostaining to localize trigeminal ganglia (TGs) infiltrating CD8+ T-cells and one parameter of the protective efficacy using virus titration, which is a quantitative technique that measures the amount of herpes virus present in the rabbit’s eye during ocular herpes disease. We have shown that Lipopeptides immunizations induced strong CD8+ T-cells infiltration in HSV-1 infected TGs and strongly decreased the HSV replication over time. The lipopeptides vaccine strategy, containing human asymptomatic CD4 and CD8 T cell epitopes, induced in vivo strong T-cell responses that infiltrated the infected tissue (TGs) and reduced HSV replication in the eye during ocular herpes disease.

Growth, Expression, and Purification of Nogo30-60
Husein Badani
Mentor: Melanie Cocco
To understand how the interaction between Nogo and Nogo receptor (NgR) inhibits axonal regeneration in the central nervous system (CNS), it is important to isolate and purify Nogo for future studies that recognize the confor-
mation and functionality of the extracellular domain in Nogo. A limited number of ligand-receptor interactions are known to inhibit neurite outgrowth upon injury to the CNS. I have expressed Mus musculus Nogo in BL21 cells, which shows strong homology to Homo sapien Nogo. Here, I performed cyanogen bromide cleavage on Nogo, isolated the fragments with HPLC, and identified the extracellular domain with mass spectrometry to obtain a purified sample of Nogo30-60, the fragment of interest. Results depicted that Nogo30-60 elutes in the fourth fragment during HPLC. Taken together, purified samples of Nogo30-60 can be collected by using mass spectrometry to determine the composition of each eluted fraction from HPLC. This fragment will be added to NgR for structural studies.

Autism Speaks: A Closer Look at Relationships in Families of Children with Autism
Kathleen Bantad
Mentor: Wendy Goldberg
From a family systems point of view, the family is the primary socialization agent for child development. Parent-child interactions and sibling-sibling relations are relevant systems to examine; however, most of what we know about sibling relationships comes from studies with typically developing children. This in-depth study of 15 families that have a child with autism aims to consider the severity of autism as it relates to the nature of sibling and parent-child relations. It is hypothesized that parenting approaches are related to family stress and sibling perceptions of the child with autism, and that sibling interactions vary in content and quality according to the affected sibling’s severity of autism. Interviews were conducted with one sibling and one parent, and questionnaires were completed in family homes. Indicators of the quality of sibling relationships were level of interaction, sibling roles, sibling conflict, level of communication, and the level of positive and negative affect. Qualitative and quantitative analyses are being conducted to examine associations between severity of autism, parent-child relationships, and quality and type of sibling interactions. Preliminary inspection of the data suggests that although the severity of autism does challenge the process of communication with the child who has autism, it may not necessarily hinder the quality of their family relationships. Discussion will focus on the importance of severity of autism for the nature of family relationships.

The Effects of the Valence of Emotional Elaboration on False Memory
Jacob Barak
Mentor: Elizabeth Loftus
An entire field of research has sprung up to study errors in memory. These errors impact the criminal justice system because errors in eyewitness memory can heavily influence a case’s outcome. Numerous studies measure the amount
of memory distortion that is created through various forms of misinformation, such as suggestive questions meant to mislead participants’ memories. Little research to date has considered the differential impact of positive and negative emotions in this misinformation paradigm. Studying these effects will clarify how emotions influence false memories and could determine qualities characteristic of false emotional memories so they can be differentiated from true emotional memories. One key application of this research is on cases of child sexual abuse. The process of negative emotional elaboration correlates with the experience of children who have not actually been the victims of abuse and are asked suggestive, negatively emotional questions such as “Did he touch you in a bad place?” In this study, experimental subjects viewed a video stimulus and were later told that they saw a girl tear her dress in the video, although no such thing happened. Subjects were randomly assigned to think about this suggested event in terms of positive emotions, negative emotions, or simple perception. Preliminary results show that the subjects in the positive emotional condition are more likely to develop false memories than those in the negative emotional condition.

The Essentials of Ethnic Identity: A Comparative Look at the Markers Used by Koreans and Japanese to Identify those within their Community
Sarah Barber
Mentor: Ann Hironaka
Ethnic identity has its own extensive research into how and why individuals identify themselves and others of different racial communities. Most often, these collective groups share certain fundamental traits, such as ancestry, religion or language. However, not much research has been performed on how members of a specific ethnic community view others belonging to the same group, and, more specifically, what aspects of being a member of these ethnic communities they consider most valuable or important. The goal of this study, therefore, was to examine individuals of Korean- or Japanese-American descent and determine which variables (language, cultural traditions, respect for one’s elders, etc.) were more important to each group’s sense of “being Korean/Japanese.” Using ethnographic interviews involving individuals of different generations, age, and self-identification, this study found that individuals, when asked to describe characteristics of members of an ethnic group to which they belong, tended to draw from ideals of their collective ethnic identity rather than from personal experience.

Washington at Valley Forge and Mao on the Long March: Crises that Made National Patriarchs
Clifton Barnhart
Mentor: Kenneth Pomeranz
The topic of my presentation is a comparison of the revolutionary histories of Mao Zedong and George Washington during periods of comparative crisis. Specifically, I examine the winter at Valley Forge for Washington and the Long March for Mao, with the intent of explicating the importance of surviving these crises in relation to the “anointing” of these men as national patriarchs. The question my presentation addresses is: what are the compelling similarities between the revolutions of the United States and China, and how have the victories of the two founding fathers been adopted and mythologized into the national identities of their representative countries? In consultation with my advisor, Dr. Kenneth Pomeranz, I decided to limit the scope of inquiry to the periods of the winter at Valley Forge and the Long March because their material history show them to be the periods containing the greatest danger of military collapse for the rebel armies and the final political crises to be overcome before Washington and Mao emerged as the undisputed leaders of their movements. The comparisons between Washington and Mao will be explicated using three points of interest: the military situation of the armies leading up to and during the crises, the political infighting Washington and Mao instigated and emerged victorious from, and the changes in perception of the two leaders in their own countries in the years after their deaths.

Latina Undergraduates’ Persistence and Well-Being: A Psychosociocultural Perspective
Bianca Barrios
Mentor: Jeanett Castellanos
Although Latina/os are the largest growing racial/ethnic minority population in the United States, this population growth is not reflected in either their college admission or graduation rates. Further examining the educational statistics, Latina undergraduates consistently exceed their counterparts and earn higher grades while experiencing a more positive college environment. Although Latinas report higher cultural congruity and college adjustment, there is still a consistent trend underscoring the role of unique psychosociocultural challenges for this group and their impact on retention and well-being. This study examines the fit between the psychosociocultural framework and Latina undergraduates’ academic experiences. In particular, a quantitative design will be implemented to measure the influence of psychological (personal strengths, coping), social (perceived barriers, social support, collectivism, and individualism), and cultural (ethnic identity, university environment, and cultural congruity) variables on 200 Latina undergraduates’ persistence patterns and well-being.

Undergraduate Research: Enhancing the Human Experience
Given the limited work in this area, two measures were developed to facilitate the analysis; one instrument assessed Latina based positive coping skills while the latter explored the role of collectivism in Latinas’ educational interactions. To date, no work has specifically examined the role of gender specific coping techniques while integrating the role of student behavioral relationships patterns. Findings will provide insight regarding retention and gender-cultural specific tendencies for Latina persistence and well-being. Practical and research implications will also be provided.

Comparisons Between Horseback Riding Therapy and Dolphin Assisted Therapy
Ambreen Basria
Mentor: Zuzana Bic
This study examined two different types of therapies to evaluate their effectiveness. The target populations were children with Autism and Cerebral Palsy that participated in either Hippotherapy or dolphin assisted therapy. Children who participated in Hippotherapy had increased measurable outcomes such as increased range of motion, flexibility, endurance, etc., while children who participated in dolphin assisted therapy showed increased subjective results, such as increased self esteem, self-confidence, following directions, etc. In both circumstances it can be concluded that the animals, horses and dolphins, served as a motivator to encourage these children to improve. Horses and dolphins were both used as reinforcement tools for these children, which increased these behavioral or physical responses respectively. Both therapies were found to be successful within their own rights, and reaped benefits depending on the goals and objectives of each client.

Synthesis of Anhydrides and Derivatization of Glycans for Better Elucidation of Molecular Structure Through NMR Spectroscopy
Solongo Batjargal
Mentor: Athan Shaka
Glycans play essential roles in cell-cell interactions and in many other biological phenomena. The malfunctions of these glycans are often involved in human diseases. The development of a method to determine the structure of complex glycans would have widespread applications in medicine. Unfortunately, identifying the structures of glycans using NMR spectroscopy is challenging due to their types of linkages, stereoisomers, and similar functional groups. Acetylation of glycans was achieved in a previous project using acetic anhydride with a catalyst, scandium triflate, to reduce the spectral crowding. The overlapping 1H signals can spread out even more by adding more electron-withdrawing groups such as α,α-difluoroacetic anhydride, and α,α-dichloropropionic anhydride to the glycans. Developed by a graduate student in my group, a new pulse sequence called Selective Heteronuclear Hartman-Hahn (SHEHAHA), which requires 13C-isotag, allows us to identify glycans unequivocally. I have explored methods to synthesize 13C-anhydrides that are not commercially available. Dehydrating agent phosphorous pentoxide, P2O5 and polymer supported dicyclohexylcarbodiimide column (PS-DCC) were used to synthesize difluoroacetic anhydrides and dichloropropionic anhydride. P2O5 successfully synthesized clean anhydrides with a high yield; meanwhile the yield of anhydrides synthesized by PS-DCC was low. The NMR spectrum of difluoroacetic anhydride shows a triplet of proton signal at 6.02 ppm with a coupling constant of 55Hz. This anhydride can derivatize the glycans to spread out the signals of peaks.

Missile Defense and Long-Term U.S. Hegemony
Michelle Bauer
Mentor: Patrick Morgan
The United States’ current Ballistic Missile Defense System (BMDS) has two primary objectives. The first objective of missile defense is explicit. The BMDS is designed to provide a layered defense for the U.S. and its allies against missile attacks from “rogue states” or accidental and unauthorized launches. The second objective is more implicit because, through various means, missile defense is meant to enhance the protection and retention of long-term U.S. hegemony. This thesis researches exactly how missile defense is able to further U.S. primacy. Missile defense is able to increase U.S. military supremacy through the latest uses of technology and is also able to suppress potential strategic competitors because of the global presence of the system’s land-, sea- and space-based elements. Overall, a BMDS is a prime resource for the U.S. to pursue within its grand strategy objectives. Even though missile defense is a part of the equation for long-term hegemony, the U.S. also has many other assets with similar attributes. This thesis concludes, however, that missile defense will continue to play a vital role in the future for the U.S. until its policy changes or a newer asset is determined to ensure a greater assurance for the continuation of U.S. hegemony.

Arts Advocacy: Inside the Process and Beyond the Individual
Rachel Bell
Mentor: Molly Lynch
As a student of dance and future advocate for the performing arts, I set out to discover the intricate details and necessary steps to the advocacy process as it exists today in support of the arts. This project first began last summer when I had the opportunity to serve as an administrative intern with Dance/USA, the national service organization for professional dance in Washington DC. Here, I was first exposed to the concept of arts advocacy and the internal structure of a nationally and internationally recognized non-profit organization. Focusing mainly on the development of advocacy from the grassroots level to the federal
level, this study examines the contributions and processes of advocating as an individual cohesively through organizations and the significance of doing so. In an effort to gain a deeper understanding of arts advocacy, my research continued throughout the year as I set new goals to gain experience and exposure to the field. I discovered that advocacy involves a great amount of educating, and the role of a well-spoken educator weighs greatly in determining the response of your audience, whether members of the local community, a grant foundation, or legislators. After attending Arts Advocacy Day, hosted by Americans for the Arts in Washington DC, I was made aware of the importance of the arts standing together strongly in agreement with one another to further the common goal of support and further convince legislators of our significant contributions to society. If we do not advocate for and educate on the magnitude of the arts, who will?

**Carbon Cycling in California Turfgrass Ecosystems**

*Author: A. Melissa Benitez  
Mentor: Susan Trumbore*

Turfgrass has the largest extent of any irrigated crop in the United States. As global warming intensifies, there is increased public concern about the effects of turfgrass management on the environment. In semi-arid regions, urban turfgrass ecosystems can potentially store large quantities of carbon belowground, thus possibly mitigating global warming. In this study, we measured carbon storage in soils and CO₂ emissions from turfgrass at four parks established between 1975 and 2006 in the city of Irvine, California. At each park, we compared three different areas—soccer and baseball fields and picnic areas—that reflect different long-term management intensities (i.e. fertilization, aeration, etc.). Soil samples of different depths were extracted to analyze organic carbon content. Over an eight-week period from late-June to mid-August 2008, we extracted soil to assess the short-term effects of management activities, such as fertilization and irrigation. We plan to share the results of this study with the city of Irvine as part of the city’s plan to reduce their greenhouse gas emissions.

**Children of Promise**

*Rachel Bigley  
Mentor: Barry Siegel*

This May marks the sixty-first year of an endless war between the state of Israel and its Arab neighbors. It is impossible to understand the conflict if one only looks at the current situation; the intensity of propaganda in circulation often makes it difficult to tell fact from fiction. "Children of Promise" chronicles the factual history behind the fight and examines the conflict through the perspectives of two United States residents: a former Israeli soldier and a college student of Palestinian origin.

**Synthesis of High-Resolution, Magnetic Responsive, Polymer Micro-Particles for Self and Guided Assembly of Functional Microstructures**

*Robert Binkley  
Mentor: Ali Mohraz*

Self-assembly, the spontaneous emergence of higher order structures from their primary components, includes a wide range of natural phenomena, including crystallization of colloidal spheres, formation of natural biological membranes, and gelation of particulates in a suspension. Self-assembly can provide a means to synthesize functional microstructured materials from suspensions of primary colloidal particles. The final microstructure and the way the structure is assembled are highly dependent on the interactions between the particles and the external forces present. In this project we use particle geometry and their response to external fields (mainly gravitational and magnetic) to investigate the self- and guided-assembly of basic microstructures in suspension. We optimized Stop Flow Lithography (SFL) to synthesize high resolution polymeric particles of various shapes such as rods, disks and triangles, with characteristic dimensions of 2 μm and larger. To impart magnetic response to the particles, we dope the initial monomer solution with an optimized amount of ferro-nanoparticles. We also introduce fluorescent molecules, to allow for visualization by means of quantitative confocal laser scanning microscopy (QCLSM). Using QCLSM, we investigate the microstructures formed from suspensions of anisometric magneto-responsive polymer microparticles in the presence of magnetic and gravitational fields.

**Thalamic Microinfusion of the Selective Potassium Channel Blocker (ShK) Reverses Sevoflurane-Induced Unconsciousness**

*Alexandra Birch  
Mentor: Michael Alkire*

Thalamic voltage-gated potassium channels are hypothesized to be involved in regulating levels of arousal and mediating transitions between conscious and unconscious states. To assess the role of specific potassium channels, ShK toxin was micro-infused in the central medial thala-
Under the 2008 U.S. Presidential Campaign

James Bliss
Mentor: Jared Sexton

During the 2008 U.S. presidential campaign, “Socialism” was a charge leveled against both candidates, used by writers on all sides of the political spectrum to attack an array of Barack Obama’s economic proposals and John McCain’s support for the Emergency Economic Stabilization Act of 2008. Rather than crafting a definition for “Socialism” out of the many suggested definitions in contemporary discourse, my project explicates a definition for “Socialism” as an ideological construct within American political discourse. My project analyzes articles and op-ed articles from national newspapers, news magazines, and mainstream political blogs written over the course of the campaign to develop a working understanding of “Socialism” as an ideological anathema to “American” values. This research is supplemented by theoretical and historical works that explore the construction and function of ideology, as well as the intertwining histories of anti-radicalism and popular oppression in the U.S. My analyses of the anti-radicalism and the violence against the anti-lynching movement at the turn of the twentieth century, the First Red Scare and the Red Summer of 1919, and the McCarthy/Civil Rights Era create a historical context for the 2008 election, the wide charges of “Socialism,” the rhetorical attacks against popular organizations (ACORN, among others), the distancing of progressive politicians from the financial “bailout” plan, and the state violence against activists at both national conventions. As “Socialism” is (and has been) used to designate anything as anti-American, it effectively leaves groups and policies exposed to state violence.

The EU in the Congo: Using Humanitarian Interventions to Enhance International Authority
Benjamin Bohr
Mentors: Deborah Avant & Wayne Sandholtz

Conventional wisdom tells us that the European Union (EU), in spite of its economic and political power, remains unable to act coherently in the realm of security and defense policy. This study probes that claim and concludes the contrary—that the EU is in fact an increasingly authoritative security actor. The central research question, however, is not whether the EU is a security actor, but rather how it accumulated its authority in this area. One answer is that the EU gained (and continues to gain) authority by demonstrating its capacity to perform effectively in a number of military operations. To validate this hypothesis, this study examines two instances in which the EU intervened in the Democratic People’s Republic of Congo (2003 and 2006). The first military operation, ARTEMIS, was more successful than the second, EUFOR RD Congo. Therefore, if the main argument is correct, the EU’s authority should have increased more after the first intervention than the second. The EU’s authority is assessed via content analysis of international newspapers for the period of 2002–2008. According to this measure, the EU gained more authority after ARTEMIS than EUFOR RD Congo. These results indicate that the EU’s authority in security matters is indeed correlated with high performance on military operations.

YUV Video Stream Editor
Timothy Bohr
Mentor: Rainer Doemer

This report describes the purpose and the use of a flexible video stream converter program that is capable of performing various image manipulation operations on YUV-encoded video streams. The program was developed in support of a larger project that strives to make a more versatile and efficient programming environment for video processing on embedded devices such as mobile phones. The described YUV converter program assists this project by producing test video streams for evaluating the embedded applications. The converter is able to read and edit YUV video input streams with operations, such as mirroring, black and white conversion and scaling, allowing the production of controlled test video files.

Lead Exposure among Children
Somayeh Bolourchi
Mentor: Rufus Edwards

Childhood lead exposure remains a major health concern among U.S. urban and low income communities and in many parts of the developing world. Childhood exposure to lead at environmental concentrations can result in neurological impairment leading to decreased IQ. Nitrogen
Obesity as a Risk Factor for Pancreatic Cancer
Gail Boltron
*Mentor: Hoda Anton-Culver*

Obesity is a growing epidemic in the United States, affecting a growing number of children and adults, with incidence rates increasing over the past 60 years. In many large U.S. cohort studies, obesity has shown to be a possible risk factor for pancreatic cancer among adult men and women who were asked their weight at various ages, 18, adult, current, and 40. This study will assess the association between high body mass index (BMI, kg/m²) and pancreatic cancer by using a case-controlled design and using data from the Pancreas Screening Study. Participants are adult males and females, recruited from 2005–present, from Southern California (Orange County) and have varying ages 30–89 (mean 66). Participants were recruited from the University of California, Irvine Medical Center patients who were seen for an endoscopic ultrasound and, if diagnosed with pancreatic cancer, confirmed in the California Cancer Registry. Results using Fisher’s Exact test indicated that there is a significant risk for developing pancreatic cancer for patients who were obese at age 20 (p<0.0016, Odds Ratio=4.3) compared to those who were not. Using Logistic Regression model and adjusting for sex and age, people who were obese at age 20 showed to be 6.6 times more likely to be diagnosed with pancreatic cancer than those who were not (OR=6.6, 95% Confidence Intervals (2.5-21.4). These results indicate that obesity in young adults can result in pancreatic cancer in later ages.

Role of Glutamate and Reciprocal Neuronal Projections Between the ARC and vlPAG during Long Lasting EA Inhibition of Reflex Blood Pressure Increase
Valentina Bonev
*Mentors: Peng Li & John Longhurst*

It has been demonstrated that electroacupuncture (EA) applied to the Jiangshi-Neiguan acupoints (P5-6) activates the arcuate nucleus (ARC) in the hypothalamus, which excites the ventrolateral periaqueductal gray (vlPAG) in the midbrain. This, in turn, inhibits the rostral ventral lateral medulla (rVLM), subsequently lowering the reflex induced blood pressure increase. We hypothesized that the long-lasting inhibition of EA on high blood pressure (BP) via activation of the excitatory reciprocal projections between the ARC and vlPAG, and glutamate is one of the related neurotransmitters. Experiments were performed in α-chloralose anesthetized cats where the splanchnic nerve or gallbladder was stimulated to induce a pressor reflex and excitation of sympathetic cardiovascular neurons in the rostral ventrolateral medulla. Then, EA was applied at P5-6. Kynurenic acid (KYN), a nonspecific glutamate receptor antagonist, 6-cyano-2,3-dihydroxy-7-nitro-quinoxaline (CNQX), a glutamate NMDA receptor antagonist, or aminophosphonovaleric acid (AP 5), a non-NMDA receptor antagonist were microinjected into the ARC or vlPAG while monitoring neuronal activity and change in mean blood pressure. Results showed that KYN blocked EA inhibition on the reflex increase of BP for twenty minutes. Microinjection of CNQX or AP 5 into the ARC blocked EA excitation on neuronal activity in the vlPAG, while microinjection of CNQX or AP 5 into the vlPAG also blocked EA excitation of the ARC neuronal response. The results indicate that the long lasting EA inhibition on high BP and sympathetic cardiovascular activity is related to the excitatory reciprocal projections between the ARC and vlPAG, and that glutamate is involved.

Executioner and Victim: The Moral Experience of Killing in the Military
Megan Braun
*Mentor: Carol Burke*

In the name of a shared cause or in the face of a real or perceived threat, war challenges the reluctance of humans to kill members of their own species. This study will investigate how soldiers learn to kill and how they experience the act of killing. It will look at the evolution of the military’s post-World War II basic training programs, paying particular attention to the use of simulators and video games in modern training. Employing an analysis of military documents, personal interviews, and modern virtual reality technology, this study will argue that the increased use of virtual reality in training produces more effective killers, but does so at a cost. By distancing soldiers from
the moral and physical consequences of their actions, it enables them to do things that they would otherwise shrink from. It’s the blip on the screen they eliminate, not the insurgent, his family, or his village. Virtual training, while cost effective and efficient, distorts the experience of combat. Ultimately, this study will examine how the new melding of the virtual and the real fosters moral ambiguity and emotional insensitivity for military personnel in combat.

A Comparison of the Efficacy of the ICLEI and RISA Organizations in Influencing Local Government Response to Climate Change
Max Broad
Mentor: David Feldman
As climate change has become a more prevalent aspect of the modern environmental movement, two groups have taken the lead in assisting local governments to create climate change policy: one is a non-governmental organization known as the International Council for Local Environmental Initiatives (ICLEI) and the other is a product of the federal government known as the Regional Integrated Science Assessment (RISA) of the National Oceanic and Atmospheric Administration. The former takes a policy oriented approach, whereas the latter conducts scientific research in order to convey results to policy makers. The purpose of my research was to compare and contrast the two organizations in order to determine which approach was more effective in influencing the climate change policies of city and county governments. To do this, outreach methods by each organization were inventoried in order to quantify how they interacted with local governments. Though this technique provided adequate results, it only detailed how the entities interacted, not the efficacy of their interaction. An improvement upon that method was the e-mail interviews that were conducted. Employees of local governments who had worked with either ICLEI or RISA were able to provide qualitative responses based on prepared questions. However, the interview model faced communication barriers as well as the need for refinement. That being said, further research would be required to conclusively state which organization more effectively influences local government policy. Optimally, this would be done by continuing the previously used interview methodology to qualitatively assess both ICLEI and RISA.

Wave Energy Rechargeable Electric Surfboard
Anthony Brock
Mentor: Farghalli Mohamed
Wave energy is a natural energy resource that can be collected and stored through recreational activities including surfing. Although previous studies have led to production of wave energy capturing devices, energy production from recreational ocean activities has not been fully developed. To address this we have designed a 10'8” surfboard with a DC motor in line with a propeller attached in place of a rear fin. We found that the motor allows for trolling out to the surf “line-up” where a surfer can “catch” a wave and use its energy to produce a current from the motor. The power produced by the motor is stored in the same battery used to power the motor during trolling. A prototype device is in production and physical testing to confirm predicted values has not been achieved as of April 10, 2009. Although energy production from a surfboard has been found to be obtainable, it is not a popular choice for surfers as it negatively affects the performance of the surfboard while riding waves due to increased drag from the motor and propeller.

Effects of Pranic Healing on In Vitro Radiated HeLa Cells
Michael Broukhim
Mentor: Joie Jones
The purpose of this study was to determine the effect of Pranic Healing in a laboratory setting. The effect was determined by observing the survival rates of gamma radiated HeLa cells in culture after receiving Pranic Healing either before or after radiation. The Pranic Healers performed their treatments on the HeLa cells at distances between 10 cm and 6,000 miles away from the cells, with the cells in either an “energetically clean” (some trials with both the healer and the HeLa cells were shielded from electromagnetic and nuclear energy) or “energetically dirty” space. The laboratory space was “energetically cleaned” by the Pranic Healer by removing “dirty energy” within the space and replacing it with “clean energy”. There was a significant difference in the HeLa cell survival rate between radiated cells and radiated cells subjected to Pranic Healing (p-value <0.001) in an “energetically clean” laboratory space. There was no significant increase in the HeLa cell survival rate from cells subjected to Pranic Healing in an “energetically unclean” laboratory space. Pranic Healing is not affected by electromagnetic/nuclear shielding and distance, and is capable of eliciting a significant healing effect only if the subject of the healing is in an “energetically clean” space. This study shows that the current Western scientific paradigm needs to be reformulated.

The Systemic Effects of Cytokine IL-6 in Sprague Dawley Rats and Endurance Exercise Assessed via Fatigue Test
Marinelle Camilon
Mentor: Gregory Adams
Thorough investigation of cytokine interleukin-6 (IL-6) continues because of its diverse function regarding inflammation. The measurement of pro-inflammatory IL-6 is an indicator of the severity and prognosis for patients with inflammatory diseases. Previous research found local IL-6 infusion on skeletal muscles in rapidly growing animals caused a decline in muscle growth. However exercise over-
trol with a pump filled with IL-6, and runner groups with the systemic infusion. Animal s were separated into four placed subcutaneously on the back of the animals created the systemic infusion. Animals were separated into four groups to analyze the IL-6 effects with exercise: sedentary normal control with a pump filled with vehicle, IL-6 control with a pump filled with IL-6, and runner groups with pumps filled with either vehicle or IL-6. Results showed trace amounts of IL-6 in the blood of the infused animals because of the limitation of the dose and rapid clearance from the body. A fatigue test revealed the IL-6 infused runners performed lower, possibly from developing less endurance with the drug. The conclusions drawn from the fatigue test are that running as an endurance exercise is beneficial and delays fatigue, and that IL-6 negatively affected running performance. Further research would be beneficial with systemic infusion of IL-6 because a greater understanding could lead to possible treatments of inflammatory diseases associated with IL-6.

And the Eyewitness Said “But, I Was Sure She Was a Brunette!”: Motivated False Memories for Specific Event Detail in the Absence and Presence of Misinformation

Troy Campbell
Mentors: Peter Ditto & Elizabeth Loftus

This study examined if false memories for specific event detail could be created by a motivation to support a positive self concept and how false memory rates would be affected by the absence and presence of misinformation. In Session 1, undergraduate participants met a blonde research assistant and took a test allegedly measuring future success. In Session 2, all participants privately received the same poor test result. In Session 2, the “project supervisor” also informed participants that they may have had a blonde or dark brunette research assistant. In the motivation conditions, the research indicated that if the participants had the dark brunette research assistant (which no participants had) this may explain away the bad score because the dark brunette’s sessions are scoring “abnormally low.” As predicted, those in the motivation only condition had higher rates of false memories for having been in session with a dark brunette research assistant (as measured by a study evaluation at the conclusion of Session 2) than those in the control condition. The motivation only condition also had slightly lower false memory rates than misinformation only (when the “project supervisor” indicated he believed participants had the dark brunette). Those in the motivation and misinformation combination condition had the highest false memories rates. These results suggest that motivation can create false memories for a specific event detail in the absence of any misinformation and shows the powerful combination misinformation plus motivation can have in the development of a self-serving false memory. This study suggests important policy considerations for eyewitness testimony and exhibits to new extents how the self serving bias might affect human memory.

Exploring Contemporary Dance Technique in California
Jay Carlon
Mentor: Loretta Livingston

Dance is a constantly transforming art form that speaks of human truths and parallel universes. Ever-changing and ever-thriving, dance communicates various contemporaries and periods by movement. After my first year as an undergraduate student in the Dance Department at UCI, I have been introduced to new techniques, approaches and atmospheres relating to dance. In search of how dance styles in California vary, I have discovered that the difference in environment in a dance school or training program is influenced by multiple factors: location/region, age groups, and composition/technique styles. In the summer of 2008, I had the opportunity to dance at multiple workshops, including the LEVYdance Summer Intensive, Shen Wei Dance Arts (West Coast) Workshop, and the Backhausdance Summer Intensive. All of these schools invited new ideas and approaches to how choreographic works and technical styles are produced. Having a contemporary fashion in common, location and age group seemed to be the leading factor in the maturity and content of the programs and schools.

Investigating Improvisation and Collaboration in Dance Performance
Jay Carlon
Mentor: Lisa Naugle

After years of being told what to do and how to do it, I discovered improvisational dance. As a choreographer, I have squandered hours of trying to discover where movement derives. We (including you, myself, and everyone we know) improvise daily: when our daily routine falls off track, a reaction to spill coffee, swerving to detour in the road to avoid a traffic jam. Improvisation is the premise of movement. Collaboration is the premise of social interaction. Together, these enable us to walk, interact, move, and develop as individuals who are able to successfully work alone and with others. As an artist in the field of Dance, learning the importance of being present in improvisation and applying to working collaboratively is foundational. In my recent trip to Spain, I trained and performed in unconventional spaces amid unconventional mediums with composers and dancers I had never worked with before or met until the day of performance. Generating fruitful ideas and future projects, this experience has sprouted an infinite
volume of potential in what improvisation and collaboration can fabricate.

**The Crisis without Crisis Management in Nonprofit Organizations**

Elaine Cartas  
*Mentor:* George Meier

Although projects are well planned, managers tend to operate in a “fire-fighting mode” when unexpected changes in scope occur. Fire fighting mode refers to the reactive operating style of a manager by exclusively focusing on day-to-day problems at the cost of proactive execution of the project plan. A proven method to this end is the application of the basic tenets of project management. Although there has been research on project management among corporations, not much research currently exists on nonprofit organizations. Due to America’s severe economic crisis, nonprofit organizations must be prepared to deal with various disruptions that might threaten projects, which will in turn affect organizations. The purpose of this research is to evaluate the effectiveness of a nonprofit’s use or application of these tenets by determining the causes of project managers’ tendency to fall into a fire-fighting mode, which greatly reduces their efficiency. I am embedded into a project at an Orange County nonprofit organization, where I will observe and shadow a project manager while documenting their modus operandi. Based on my observations, project management is not effectively implemented due to budget and time constraints. This results in nonprofit organizations functioning on a reactive instead of a proactive mode, which does not allow organizations to grow. This decreases worker satisfaction and motivation. As a result, nonprofit organizations must realize the need for effective project management skills that will decrease nonprofit organizations’ need to fight fires.

**Effects of Localized Surface Charge on Silicon Nanowire Sensitivity**

Monica Castaneda  
*Mentor:* Regina Ragan

Nanowires are a new structural form of materials with an interesting electrical property: due to their high surface area to volume ratio, lateral conductance is highly sensitive to variations of surface charge. A dominant material in electronics, silicon, can readily be chemically treated to become responsive to certain chemicals and its electrical properties altered by doping. With these combined properties, silicon nanowires could be used as sensors in medical diagnostic applications to identify biomolecules. Past studies have tested the sensitivity of silicon nanowires’ conductance in response to variations of surface charge between two metal leads. Unfortunately, the effect of surface defects on the silicon nanowires’ conductance and therefore sensor performance is not understood and may be critical in fabricating reproducible devices. Scanning gate microscopy uses a charged tip to map the surface charge variations along the length of the silicon nanowire. Through the use of scanning gate microscopy and Kelvin probe force microscopy, it may become possible to identify the role of defects in silicon nanowire conductance and, thereby, quantify how these will affect device performance. With science playing an increasingly larger role in the field of health, a need for reliable and accessible sensors is very important, requiring a better understanding of how to build robust systems.

**Exploring the Role of Calmodulin-Dependent Kinase II in Long Term Potentiation**

Abhishek Chadha  
*Mentor:* Christine Gall

Long term potentiation (LTP) is a physiological phenomenon widely believed to underlie learning and memory, although its mechanism is not fully understood. Calmodulin-dependent kinase II (CaMKII) is a multi-subunit enzyme thought to play a crucial role in LTP. Previously, our laboratory developed a novel technique for quantifying levels of immunoreactive (IR) elements localized inside the postsynaptic region. We applied this method to our investigation of phosphorylated (p) and total CaMKII and have successfully identified p- and total-CaMKII immunoreactive (IR) elements localized in postsynaptic, dendritic spines and present sparsely throughout the hippocampus. Parallel Western blot studies point to an increase in pCaMKII levels in adult rat hippocampal slices following chemical LTP as compared to control slices, which implies that CaMKII phosphorylation is tied to LTP induction. Western blot studies demonstrate the relevance of CaMKII to LTP on a global level, and our successful colocalization studies will allow us to argue for the relevance of CaMKII to LTP on a synaptic level. Future work will further investigate the latter by quantifying postsynaptic levels of p- and total-CaMKII IR elements following LTP-inducing afferent stimulation.

**Mixed Messages: The Representation of Mental Illness in the Media**

Vicki Chan  
*Mentor:* Joy Pixley

The alarming prevalence of mental illness in our society today means that many young people will either experience it themselves or have a friend or family member who has mental health problems. They may be confused about how to recognize these problems and how to best respond to them. This calls for a focus on what messages young adults are receiving about mental illness, such as those found in popular magazines. The purpose of this study is to explore how mental illness and treatment options are portrayed in...
popular media and whether or not there are any gender differences between male and female magazines. The study involves content coding in which a coding schema is established for each magazine article based on key concepts, terms, and indicators of mental health and illness. A total of 228 magazine articles were coded from the years 1995–2005. Of the 228 articles, only 128 articles were valid mental health articles. The study may reveal differences in the messages popular media is sending young adults about how to recognize the symptoms of mental illness and how to respond to it. The study could have implications for intervention programs aimed at this age group in future studies.

Analysis of Carbon and Energy Footprints for Wastewater Biosolids Disposal Options
Allen Chau
Mentor: Diego Rosso
Biosolids, the final product of wastewater sludge digestion, are nutrient-rich non-reactive bacterial residues combined with non-digestible matter. When wastewater is treated biologically, sewage is fed to bacterial biomass, which is continuously sent to a digester for stabilization and biogas energy recovery, finally producing biosolids. One of the most important areas for wastewater managers is to employ a cost-effective solution to dispose biosolids while being environmentally responsible. Biosolids, being nutrient-rich and virtually pathogen-free, can safely be recycled and applied as fertilizer. Local governments make the decision whether to dispose of the biosolids in land farms as soil amendment, in landfills, or in incinerators. The options of choice in Southern California are land farming and landfill burial. Incineration is typically performed where landfills or farmland are not available, or where extended winter periods prevent land application. The goal of this research is to calculate and compare the carbon and energy footprints of the three most common biosolids disposal options that will ultimately assist wastewater treatment plants in reducing their biosolids carbon footprint. To calculate the C-footprint of each disposal option, I analyzed all the processes that directly and indirectly emit greenhouse gases. Accruing carbon credits to reduce the carbon footprint was possible with landfilling and land application of biosolids. My study shows that the net carbon footprint of landfills biosolids is -6.64e-02 metric ton of CO₂ equivalent (MTCO₂Eq) per tonne biosolids. The net C-footprint of land applications resulted in -1.03 MTCO₂Eq. The net C-footprint for incineration is 0.1 MTCO₂Eq.

Women in the Labor Market: How Age at First Birth Affects Earnings and Educational Attainment
Belen Chavez
Mentor: Marigee Bacolod
This research experiment concerns the timing of a woman’s first birth and the impact it has on her earnings, her educational attainment, and her labor market participation by her late twenties. Different timings of first birth are considered: those pregnancies that occur during the high school years, ages 14–18, and those pregnancies that occur during the college years, ages 19–25. Miscarriage was used as an instrumental variable to help establish causal effects with the assumption that a miscarriage is a random biological event and that women who miscarry exhibit similar traits to women who have children. By having two groups of women—those who had a miscarriage and those who carried their pregnancy to term—I was able to compare the timing of first birth directly. Theory suggests that since a miscarriage does not cause an “interruption” in a woman’s life as does a child, then a woman who miscarry will be more likely to attain higher education, work, and have higher income. However, the data used from the National Longitudinal Surveys of Youth 1979 and the regressions performed show no statistical significance and suggest that the educational attainment between these two groups of women remains around the same twelfth grade level. The implication is that the timing of first birth does not matter, meaning that these women who were in different situations end up being equally successful. Perhaps, then, current campaigns aimed at preventing teenage pregnancy may be misallocating their resources.

Competition as a Motivating Factor of Sports Participation
Angela Cheng
Mentor: Margaret Schneider
Obesity, especially among youths, has become nervously prevalent in the U.S. The motivations behind sports participation become important because physical activity can benefit adolescents’ psychological, emotional, and physical health. This study focuses on the drive for competition and its relationship with physical activity participation and physical fitness. Past research on competition and sports participation has drawn a strong relationship between competition and interest & enjoyment, but the link between competition and physical activity is still ambiguous. Differences in competitive disposition according to gender have also been observed and need to be further explored and confirmed. As an addition to an NIH-funded study on mood and exercise, a Sports Orientation Questionnaire (SOQ) was distributed to a sample of 68 high school freshmen. The SOQ was designed to identify dispositions of General Competitiveness and also to discriminate between Win-Oriented and Goal-Oriented Competitiveness.
T-tests, regressions, and correlations were conducted to analyze the associations between competitive disposition, gender, and various measures of physical activity and physical fitness. Results revealed significant relationships between gender and General Competitiveness and Win-Oriented Competitiveness. Males were more competitive and more motivated by the desire to win than females, whereas goal-oriented competition was not related to gender. After controlling for gender, cardiovascular fitness (peak VO2), was significantly related to General and Win-Oriented Competitiveness. Males were more competitive and more motivated by the desire to win than females, whereas goal-oriented competition was not related to gender. After controlling for gender, cardiovascular fitness (peak VO2), was significantly related to General and Win-Oriented Competitiveness but only moderately correlated with Goal-Oriented. All competition measures were positively correlated with organized sports participation.

Oxidative Damage Pathways and Actors Mediating Neurodegeneration
David Cheng
Mentor: John Weiss
The formation of the mitochondrial permeability transition pore (mPTP) following mitochondrial depolarization, measured by ΔΨ, is thought to be the major contributor to Zn2+ induced mitochondrial injury. In the assembly of a functional transition pore complex, cyclophilin D plays a crucial role: cyclophilin D is the component of the transition pore that allows the influx of cytosolic molecules such as Ca2+ and Zn2+ into the mitochondrial matrix. Following the formation of the permeability transition pore, mitochondrial membrane permeability increases and pro-apoptotic proteins such as cytochrome c, an intermediate in apoptosis, and AIF, apoptosis inducing factor, are released, leading to the progression of apoptosis. Recently, the cyclophilin D knockout mouse model was developed. This model could potentially aid in our understanding of the role of cyclophilin D and mitochondria in the cascade of events leading to apoptotic cell death, and will be a major tool for this project.

A Pan HIV-1 Proteomic Chip
Vivian Chinn
Mentor: David Camerini
We constructed a pan HIV-1 proteomic chip for the analysis of anti-HIV humoral immune responses. The chip can be used to subtype HIV infections and to examine the diversity of anti-HIV antibodies in HIV patients or vaccination subjects. The pan HIV-1 proteomic chip displays all proteins and several protein fragments from the major HIV-1 subtypes, A1, A2, B, C, and D, on a nitrocellulose coated slide. The first-generation chip was probed with HIV-Ig (pooled anti-HIV immunoglobulin) and IV-Ig (immunoglobulin from HIV-negative subjects). Specific reactivity was observed for most of the proteins present on the chip using HIV-Ig (70 out of 77), indicating that the proteins were successfully created and present in a conformation conducive to antibody recognition. The potential usefulness indicated by the first-generation proteomic chip has prompted us to begin creating a second-generation chip that will include many more proteins than the first-generation chip to provide a more complete picture of the antibody response. To date we have finished the amplification (86%) and cloning (83%) of the majority of the proteins needed to present a complete set of clades A through D HIV-1 proteins on the second-generation chip.

Too Interconnected to Fail: A Study of Federal Government Bailouts in the United States
Lori Chiu
Mentor: Mark Petracca
Theodore Lowi’s research on the nature of the federal government’s authority over the national economy defines the United States as being suspended in a state of permanent receivership. Permanent receivership is defined as a state in which the federal government underwrites the stability of institutions that play a significant role within the community. Research indicates that the business functions of large financial and non-financial corporations can have an enormous impact on civilian jobs and on the national economy through domestic and international business transactions. Lowi’s theory on the state of permanent receivership led to his 1979 prediction that institutions that are viewed by society as too interconnected or too big to fail will be bailed out by the federal government through the use of policies such as underwriting, cash infusions, and loan guarantees. The main goal of this study was to examine historical cases of federal government bailouts to determine the factors taken into account when making bailout decisions. The secondary goal of this study was to determine the various tools and policies the government uses in corporate bailout situations and identify the key decision makers in this process. Case studies of government bailouts indicated that the federal government has mainly bailed out large corporations on the brink of bankruptcy whose failure would result in a negative impact on society and the national economy. These results provide general support for Lowi’s prediction that the federal government tends to bail out those corporations it deems “too interconnected to fail.”

Modernist Literature and Derrida: Forming a Relationship
Elaine Chou
Mentors: Ellen Burt & Richard Godden
From my knowledge of modernist authors and deconstructionist theory, I noticed a parallel relationship between language used from “inside” modernist literature and language analyzed from “outside” literature, namely Jacques Derrida’s theories; in both usages, form appeared privileged over content yet content remained nonetheless indicative of form. I wanted to understand what notions (of language, existence and purpose) dominated English-speaking
writers of the 1920s and how these presaged the philosophy of a French theorist forty years later. Although texts have been published on particular pieces of modernist literature and Derrida, comprehensive study has never been conducted as to the nature of such a relationship and reasons for its existence. I therefore delved into the context of deconstruction, beginning with Paul de Man and ending in close analysis of Derrida’s essays, in order to discover whether Derrida’s philosophy could explain and complicate the approaches to language by modernist authors. After analyzing Derrida in relation to Joyce’s Ulysses, T.S. Eliot’s “The Waste Land,” and Faulkner’s The Sound and the Fury (representative texts of modernist experimental writing), I discovered that deconstructionist theory need not be a “breaking down” of literature only; indeed, Derrida’s ideas not only explicated the experimental forms of these writers, but also vindicated their original purposes. The underlying structure and foundations that created these modernist texts became articulated in Derrida’s philosophy: both deconstruction and modernist literature strive to understand language as not just a vehicle of meaning, but as meaning itself.

Expression of Novel Human β-Defensins and the Characterization of their Antibacterial Activities

Bryan Chow

Mentor: David Camerini

The increasing occurrence of multidrug-resistant pathogens, such as Staphylococcus aureus, prompts us to investigate the antimicrobial properties of novel human β-defensins (HBD). Secreted by a variety of epithelial cells, these cationic peptides are an integral part of the innate immune system. The human genome includes 28 genes that correspond to uncharacterized β-defensins. In this study, we successfully produced recombinant HBD-18 and HBD-26. In addition, our findings revealed that chemically synthesized HBD-23 and HBD-29 possess antibacterial properties, while HBD-27 does not. Such peptides may prove effective in developing novel strategies for antimicrobial therapies.

Perceptions of Social Support among Caucasians, Asians and Latinos

Christine Chu

Mentors: Belinda Campos, Eric Knowles & Roxane Silver

Research on cultural influences on social support has focused on East-West differences. This study extends upon that work by examining perceptions of social support types among Caucasians, Asians, and Latinos in the U.S. Among Caucasians, social support from family and friends can be beneficial to health when it does not diminish the self. Emerging research with Asian populations shows consistent benefit from perceived social support but a greater reluctance to seek it relative to Caucasians. Latinos, however, are more likely to endorse explicit social support-seeking. Participants in this research completed an online survey that measured their perceptions of support seeking and support giving. Results indicate that Asian Americans and Latino Americans, two interdependent cultures, vary in their perceptions of social support. Therefore, it appears that heretofore unacknowledged nuances may exist between the two ethnic groups that are important to study.

Spoken

Gina Chun

Mentor: Fatimah Rony

Spoken, an autobiographical short film, creates a sense of drama and documentary in one. I cast my grandmother and myself to create an authentic sense of realism. Spoken is about a Korean-American woman, Gina. In a one-day interaction, we see not only the responsibilities Gina has towards her grandmother but also her grandmother’s disapproval of her choice in becoming a filmmaker. I feel that having my grandmother in a film about us was a confrontation I had to face in front of the camera. I asked the sole person who is against my making films to be in my film. I want the audience to think about how this film was made when, through a voiceover, it is obvious that she is very much against making this film. The film is not a documentary because all the scenes were staged and I directed in front of the camera. A new way of directing that I explored felt like a casual interview but directed towards the conversation and ending I wanted. The film, in a sense, is documentary because I did not know exactly what my grandmother would say and she was acting as herself. I wanted to show what many Korean or Asian Americans experience when they choose a career path that their family disapproves of. This film not only pertains to Asian Americans but also to many of us who choose to do what we want and not what our parents want.

Structural Analysis of Tetrahymena thermophila Tubulin

Lawton Chung

Mentor: Naomi Morrissette

Many anti-parasitic compounds have highly toxic side-effects, leading to a need to discover novel therapeutics. Compounds such as the dinitroaniline oryzalin disrupt microtubules in protozoa and plants with minimal toxic side-effects on the host cells. Toxoplasma gondii, a parasite that is sensitive to oryzalin, has been of interest due to its role as a model system for other apicomplexans/parasites. However, since T. gondii tubulin is not efficient to purify in bulk, a related ciliate, Tetrahymena thermophila is used. T. thermophila has a greater concentration of tubulin than T. gondii per cell and is sensitive to oryzalin. A current compu-
The goal of this study is to determine if thrombospondin-4 (TSP4) is a major contributing factor to the behavioral hypersensitivity to light touch (alldynia) in mice after L5/L6 spinal nerve ligation. It is believed through previous experiments that thrombospondin-4 is likely involved in creating more synapses at the spinal cord after peripheral nerve injury, which contributes to alldynia. We tested the hypothesis by performing spinal nerve ligations on homozygous thrombospondin-4 knockout mice and their wild type counterparts, and testing their behavioral sensitivity to von Frey Filaments every week to see if the absence of TSP4 induction by injury led to diminished alldynia in the KO mice. We also injected the TSP4 knockout mice with TSP4 protein intrathecally after spinal nerve ligation to see if this treatment could restore the alldynia phenotype in the KO mice. Our research found that spinal nerve ligated TSP4 knockout mice experienced less alldynia than their wild type littermates, and partially gained alldynia when
Tetraspanin CD81 and HIV Assembly
Victor Cortez
Mentor: Donald Forthal

The pathology of human immunodeficiency virus (HIV) has made it one of the most researched viruses, yet a high mutation rate along with the destruction of immune cells have made current treatments ineffective or impractical. This has led to a growing interest in the role of cellular components, which do not rapidly mutate, in viral replication and as possible sites of inhibition. Tetraspanins are cell surface proteins characterized by four transmembrane domains, conserved cysteine residues, and the ability to dynamically interact with other proteins to form tetraspanin enriched microdomains (TEM). TEM act as platforms with important immune functions such as migration, signaling and activation. Specifically, the tetraspanins CD9, CD63, CD81, and CD82 have been shown to associate with HIV gag and env proteins as well as cellular proteins found incorporated in HIV particles such as HLA II and ICAM-1 and the high density lipids characteristic of the HIV envelope. We thus proposed the hypothesis that tetraspanins act as organizers of viral and cellular components necessary for the production of HIV particles. To test this hypothesis, 8E5/LAV cells, a CD4+ line with one integrated copy of the HIV genome, were transfected with siRNA to knockdown CD81 expression and HIV production was quantified using p24 ELISA. These experiments will help elucidate the molecular mechanisms by which HIV assembles and provide insight into the possibility of tetraspanins being used as therapeutic targets.

Effects of Indocyanine Green in Combination with 755 nm Laser on Mouse Microvasculature
Carlos Cossio
Mentor: Kristen Kelly

Currently, pulsed dye laser (PDL) is the modality of choice in treating port-wine stains (PWS), which are vascular birthmarks. However, blanching from PDL is not consistently persistent, results are variable, and therapy can be painful. Photodynamic therapy (PDT) incorporates a photosensitizing chemical that, when activated by a light source of particular wavelength, will undergo a photochemical process resulting in tissue damage. PDT is currently used and has been shown to be effective in tumor therapy. For clinical feasibility the photosensitizer should metabolize relatively quickly to avoid prolonged patient sensitivity to light. As such, we investigated the efficacy of the photosensitizer indocyanine green (ICG), known to metabolize within minutes. ICG was injected into mice previously fitted with dorsal window chambers. Subsequently, mice were irradiated with Gentlelase 755 nm laser at radiant exposures of 30 and 40 J/cm². Treated areas were imaged using laser speckle imaging (LSI) and vascular response was assessed over a 14-day period. A speckle flow index (SFI) was used to quantify changes in relative blood flow velocities throughout the region of interest, where a lower SFI is associated with lower flow velocity. At 30 J/cm² chronic shutdown of blood flow was not accomplished, reperfusion occurring typically by day 7. Persistent vascular shutdown was produced using 40 J/cm². Control subjects irradiated at 40 J/cm² without ICG did not show a similar response, while controls irradiated at 50 J/cm² showed persistent vascular shutdown. There is clearly an enhanced effect with the administration of ICG in conjunction with 755nm Gentlelase 40 J/cm².

Mia Cromarty
Mentor: Cecelia Lynch

With the growth of conflicts throughout the world, the issue of children involved in armed conflict is gaining more public attention. This is accompanied by the growth of international humanitarian laws that focus on protecting children’s rights. The most recent international law that attempts to prevent children from being recruited as child soldiers is the Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict (OP-CRC), adopted by the UN General Assembly in 2000. Article I (OP-CRC) states that “State Parties shall take all feasible measures to ensure that members of their armed forces who have not attained the age of 18 years do not take a direct part in hostilities.” This provision increases the minimum age set by Article 38 of the CRC from 15 to 18 years. Although this Protocol can be seen as progress, there are significant problems with the Optional Protocol that reflect the deficiencies contained in the CRC. These faults have prevented it from effectively being implemented. The Optional Protocol uses contradictory and weak language within the text, reflects problematic power configurations of States and non-State entities, and forces State Parties to assume a majority of the responsibility for all parties involved in conflict in regards to the recruitment and use of children because it is difficult to enforce and monitor on an international level.

Student Activism: Politics and Cultural Identity
Jaimelynne Cruz
Mentor: David Meyer

Does initial participation in a social movement lead participants to continued involvement in social movements or in politics in general? There is a debate within the scholarly literature. McAdam suggests sustained activism leads to activism over a life course. Others say the impact of par-
participation in movement activity depends on why an individual chooses to participate in the event and how they interpret their participation. I used the annual JFAV March (in support of Filipino Veterans) to examine the motivations and the impact of initial participation of the participants who participated in the march. I conducted two waves of interviews with the participants. The first interview was done immediately after the march and the second was conducted months after the event. I wanted to know how the students interpreted their participation in the event and how their involvement affected their development. I found most of the students reported that the event did not affect their political outlook, largely because they viewed the march as a cultural event rather than a political event. In future studies, scholars should pay more attention to the initial political context of the movement.

Use, Diversion, and Nonmedical Use of Prescription Stimulant Medication among Undergraduate Students
Xochitl Cubero
Mentor: Tim Wigal
This study investigated the characteristics related to the use, diversion, and nonmedical use of prescription stimulant medication intended to treat ADHD among undergraduate students at the University of California, Irvine. Data was collected for 191 undergraduate students by distribution of an anonymous survey in large settings of students for analysis. Five percent of student respondents reported having a prescription for stimulant medication and using it as directed. However, sixteen percent of student respondents reported using them for nonmedical reasons. Significant associations between fraternity/sorority membership and use of other illicit substances were found between nonmedical use of prescription stimulants. In accordance with previous studies, the results suggest that the nonmedical use and diversion of prescription stimulants warrants concern and necessitates a great collective effort by campus health services, physicians, parents, and students for intervention.

The Potential Rejuvenating Properties of Rhodiola rosea on Drosophila melanogaster
Christopher Dagher
Mentor: Mahtab Jafari
Rhodiola rosea, a promising herbal extract, has previously been shown to have anti-aging properties due to its proposed anti-oxidant and adaptogenic qualities. While demonstrating its efficacy on extending lifespan in newly hatched Drosophila melanogaster, its effects on aged fruit flies remain unknown. Past studies have shown a significant increase in lifespan in aged Caenorhabditis elegans, which raises the question of whether parallel findings can be observed in Drosophila melanogaster. It is hypothesized that 25 mg/mL Rhodiola rosea supplemented to aged fruit flies will decrease mortality and deter the deleterious side effects that cause aging. A lifespan assay was carried out to determine Rhodiola rosea’s ability to decrease mortality, and a locomotion assay was performed to indicate whether health span was affected in doing so. While a median extension in lifespan is observed in both sexes, the data suggests that it comes at the expense of locomotion impairment in females.

Does Parental Smoking Increase Anger Reports in Adolescents?
Meril Dagher
Mentor: Larry Jamner
In a 2008 study by Huijbregts and colleagues on parental smoking, parental antisocial behavior, and early childhood aggression, researchers concluded that children of heavy smokers were at an increased risk of expressing high physical aggression. The aim of the study was to determine if adolescents whose parents report smoking in the household over the course of the adolescent’s lifetime have significantly more reports of momentary anger than adolescents whose parents did not smoke. Diary reports from Project MASH (Monitoring Adolescent Stress and Health), originally collected by Dr. Larry Jamner and colleagues, were analyzed in this study. Diaries were completed every 30 minutes over a four day span, twice a year, for four years. They provide a range of detailed measurements of mood and behavior across several time periods, allowing research participants to report on symptoms/behaviors close to the time of the experience. Adolescents were split into two groups based on parents’ reports of being a “nonsmoker” or “smoker.” There was a significant relationship between adolescents’ trait hostility and aggression and exposure to smoke while the adolescent’s mother was pregnant with him/her. Results also indicate increased intensity of diary reports of anger, anxiety, and stress among adolescents who smoke, but no outstanding correlation was seen between adolescent reports of anger and parental smoking status. Adolescent smokers also demonstrated higher trait hostility and aggression, but did not report much negative affect. Implications of these findings will be discussed.

Megachurch Membership: A Comparison of Recruitment and Retention Strategies Used by Megachurches
Kyle Dahl
Mentor: David Snow
This research investigates membership in various megachurch and megachurch affiliated satellite campuses. Data for this project has been collected through a combination of participant observation and ethnographic interviews. The goal of this study is to expand upon how megachurches remain attractive to new and old members.
by exploring how recruitment and retention of members is achieved. More specifically, this project focuses on the variety of strategies these organizations use to recruit and retain many different types of individuals. Preliminary data suggest that these organizations are successful in keeping members through a combination of three factors: building effective ties through social functions, creating availability of locations, and providing a variety of tailored small groups.

Physiological and Psychological Responses: Latinos in Socially Evaluate Settings
Cindy De La Cruz
Mentor: Sally Dickerson

Previous research has shown that ethnic minority group related stressors such as ethnic discrimination, stereotype threat, and own-group conformity pressure are associated with low self-worth. In response to performance evaluation by others, Latinos may show larger decreases in self evaluation in general as a response to background experience of minority-status stressors, which in turn may lead to a lower self evaluation of performance. This lowered sense of self-worth may lead to a decreased ability to cope in social situations. This study examines whether there is a difference in how Latino versus Caucasian participants rate themselves before and after a social-evaluative stressor (via pre-task and post-task questionnaires). I hypothesize that Latino participants will rate their performance more poorly than the Caucasian participants and Latinos will show higher levels of cortisol secretions. The findings from this study may have important implications regarding the Latino population and their responses to certain social settings, as well as health implications. It is critical to monitor these health complications to create preventative measures and focus more on the impact of social stressors on daily living. The purpose of this study was to examine whether individuals who identify as Latino would show different physiological and psychological responses to a social evaluative stressor task compared to Caucasian participants. Caucasians and Latinos showed similar emotional responses to the speech task. However, showed divergent cortisol responses, Latino participants showed exaggerated cortisol reactivity compared to Caucasians. We found group differences on cortisol responses but not on psychological responses; therefore, there was a disjoint between psychological and physiological responses. Further, greater stress responses and, in particular, drops in self evaluation might particularly explain these findings.
produced undifferentiated reflectance values approximating 8,000 vs. 12,000 for healthy tissues. Preliminary data suggests that the use of in vivo diffuse reflectance spectroscopy with gold nanoparticles at the optimum time of 30 minutes permits detection of neoplasia and differentiation between different stages of oral pathology.

**PCR Detection of Vibrio parahaemolyticus in Marine Recreational Waters of Southern California**

**Gregory Dickinson**

**Mentor:** Sunny Jiang

*Vibrios* are important human pathogens found in coastal waters. More specifically, *Vibrio parahaemolyticus* is one of the most common *Vibrios* associated with bacterial infection in the United States. The occurrence of *Vibrio* has been investigated in marine waters in many parts of the world. In conjunction with the Southern California Coastal Water Research Project, we sampled two California marine recreational beaches at Doheny State Beach and Avalon, Catalina Island to determine the frequency and distribution of *Vibrio parahaemolyticus* species and toxic genes. Bacteria were collected onto 0.45 µm pore-size membrane filters and placed in an enrichment media selective for *Vibrio* growth. Bacterial genomic DNA was then extracted and analyzed by PCR for species and toxin gene markers. Of 66 samples from the Doheny Beach 27.3% were positive for *V. parahaemolyticus*, and one sample (1.5%) was positive for the *V. parahaemolyticus* toxin gene. Of the 96 samples from Avalon Harbor 69.8% were positive for *V. parahaemolyticus*, and 5.2% were positive for the *V. parahaemolyticus* toxin gene. Detection of the *V. parahaemolyticus* genetic marker was significantly more frequent at Avalon.

**Development of Thin Films of Pyrite via a Chemical Vapor Deposition Process**

**Derrick Diego**

**Mentor:** Matthew Law

This presentation presents a varied chemical vapor deposition process of developing thin films of pyrite (FeS2), which may ultimately be used as a significantly cheaper, more efficient, and environmentally safe photovoltaic cell. Chemical vapor deposition uses chemical reactions in the vapor phase that eventually form a solid film on a substrate. The production of pyrite by CVD is expected to yield products with excellent control of stoichiometry, phase purity and surface cleanliness compared to alternative methods. The synthesis of pyrite is determined by selecting specific precursors (iron and sulfur) and altering environmental conditions such as temperature and air flow. Once pyrite is properly developed the ultimate goals is to develop conductive pyrite nanowires with tunable lengths and diameters for use in solar cells. Synthesizing nanowires will be achieved by placing a monolayer of gold on top of a silicon substrate so that nucleation will occur once the monolayer of gold becomes supersaturated. The morphology, composition and crystallinity of the products will be analyzed by X-ray diffraction, electron microscopy, and optical spectroscopy. The goal of the project is to develop conductive pyrite nanowires with tunable lengths and diameters for use in solar cells. Our studies indicated the possibility of engineering an inexpensive and more vastly efficient material capable of generating electricity from solar radiation.

**Investigation of a Possible Link Between Photochemical Magnetotaxis and Geotaxis in Fruit Flies, Drosophila melanogaster**

**Gabriel Dilanji**

**Mentor:** Thorsten Ritz

Fruit flies have been reported to show extreme geotactic responses, and laboratory selection experiments have shown that this complex behavioral trait has a genetic basis. Recently, cDNA microarray analyses identified an involvement of cryptochrome in geotactic responses, but the mechanistic basis for the involvement of this gene remains unknown. Given that geotaxis and magnetotaxis are linked in magnetotactic bacteria and that cryptochrome has been implicated in photochemical magnetotaxis, it is an intriguing possibility that photochemical magnetotaxis might provide the mechanistic basis for geotaxis in fruit flies. We have constructed a Hirsch-Type Geotaxis maze to test this link in Drosophila melanogaster. Thus far our results have not been consistent with standard geotaxis maze experiments.

**Estimation of Energy Sector Regression Model and Performance Forecasting**

**Xiao Ding**

**Mentor:** Hong-kai Zhao

This paper mainly focuses on the Vector Auto Regression model (VAR) by using some of the factors that have significant influence on the performance of Energy Sector Indices, including crude oil price, market index, and energy index historical pricing. Are there any patterns between crude oil price and energy indices performances? Can the energy sector beat the market in the long run? We will examine the above questions in the following fashion: first, a fundamental analysis of energy sector will be conducted. Then we will build the regression model based on some of the key factors from fundamental analysis using VAR. To insure the robustness of the test result and the common basis of comparison, all related models are re-estimated with more than 10 years of data. In the third part, more predictors will be added to further compare forecasting errors. The model with the lowest average prediction error is considered to be the best forecasting model.
Comparison of Endoglucanase (Eg1) Expression from Saccharomyces cerevisiae and Pichia pastoris
Oanh Dinh
*Mentor*: Nancy Da Silva

Cellulases are a group of enzymes that act synergistically to cleave polymeric cellulose into monomeric sugar units (glucose). A major potential application for cellulases is in the hydrolysis of biomass cellulose for the production of ethanol as a renewable biofuel. The endoglucanase (Eg1) from the thermophilic fungus Thermoascus aurantiacus is a thermostable cellulase that facilitates complete cleavage of β-1,4-glycosidic bonds to release cello-oligosaccharides from complex crystalline cellulose. Previous studies in the lab have shown recombinant Eg1 to be efficiently secreted in active form from the yeast *Pichia pastoris* when one copy of the gene is integrated into the chromosomes. The primary purpose of this project is to express Eg1 using a plasmid-based system in *Saccharomyces cerevisiae*, and to compare levels of synthesis and secretion for the two yeast species. My study has involved multiple cloning strategies to insert the Eg1 gene downstream of the strong *PGK* promoter in two autonomously replicating yeast vectors (CEN/ARS and 2µ). These trials and subsequent sequencing results have revealed that the gene coding for Eg1 is toxic to *Escherichia coli*. I thus shifted to a direct “recombineering” approach where two linearized DNA fragments, one for the Eg1 and one for the yeast vector, are transformed simultaneously into *S. cerevisiae*, allowing the yeast to ligate and replicate the full-length plasmid. This approach eliminates the use of *E. coli* and avoids the apparent toxicity/mutation issues. Current work focuses on completion of the constructs and evaluation of active Eg1 synthesis using AZCL-HE plates and a DNS assay. These studies will determine the level of expression and activity of Eg1 using *S. cerevisiae*, and provide a comparison with the *P. pastoris* system.

**Government Policy: Does Government Spending Reduce the Amount of Bank Failures?**
Sean Dowings
*Mentor*: Gary Richardson

In the year 2006, the United States’ housing bubble collapsed, sending owners of sub prime securities into turmoil. Because most of the sub prime securities were held by large well-known banks, the collapse led to millions of bank defaults leading to a financial system that was on the verge of failure. The last time a financial crisis was seen on this magnitude was in the 1930s during the first years of the Great Depression. During this time period, the government implemented several programs to aid the economy. I seek to see if the amount of money spent by the government, namely through programs such as the RFC, had an effect on the amount of bank failures. This topic extends into our current crisis because similar programs are being implemented and the number of banking failures is growing. Knowing what policies worked best can hopefully shed some light on what will be effective in the future.

**The Effect of *Rhodiola rosea* on SIR Activity**
Ai-Quyen Duong
*Mentors*: Mahtab Jafari & Samuel Schriner

The herbal extract *Rhodiola rosea* was recently reported to extend life span in the fruit fly *Drosophila melanogaster*, though its mode of action is currently unknown. To explore its mechanism, I inquired as to whether *R. rosea* may act by activating a group of NAD+ -dependent protein deacetylases known as the sirtuins or SIR proteins. Increased activity of these proteins has been shown to extend life span in a broad range of species, including yeast, worms, flies, and fish. Based on the life span extension exhibited in flies by either *R. rosea* supplementation or elevation of SIR activity, I hypothesized that *R. rosea* would elevate SIR activity in the fly. Contrary to this, *R. rosea* extract was found to inhibit human SIRT1 activity *in vitro*. In addition, *R. rosea* appeared to reduce NAD+ levels in the fly, which could potentially decrease SIR activities *in vivo*. Finally, I investigated expression levels of three glycolytic enzymes, as these have been shown to be down-regulated in response to SIR over-expression. I found no evidence that *R. rosea* supplementation down-regulated glycolysis, again inconsistent with the hypothesized elevation of SIR activity. Taken together, these findings suggest that *R. rosea* does not act through a SIR-dependent mechanism.

Hoa Duong
*Mentor*: Patrick Morgan

Decentralization is typically the advice given to developing countries by international organizations, such as the World Bank and the International Monetary Fund (IMF). To stimulate sustained economic growth, it is argued that the state must limit its role in society and the economy. My project studies the political economy of decentralization in the post-1986 period in Vietnam (an era characterized as *Doi Moi*, meaning “renovation”). Using the examples of successful countries in East Asia (Japan, South Korea, Taiwan, and Singapore) as a reference for analysis, I conclude that a strong administrative capacity is required for long-term economic development. All of these countries had strong national governments (they were competent and politically strong) that could accomplish what was necessary for economic development. Powerful bureaucracies and leadership allowed each state to do what was necessary to keep growth going. In Vietnam, findings indicate that inadequacies in state administration (relating to corruption
The leading cause of infant mortality and morbidity in the United States is preterm birth. Since there are many different factors that can lead to preterm birth, it is difficult to pinpoint the major reasons for the occurrence. Lately, there has been an increased interest in how neighborhood socioeconomic characteristics and the discrepancy between community and individual socioeconomic status (SES) affect birth outcomes. However, the results of these studies have been inconsistent. To address this question, I have collected information from the Census 2000 Data on social and economic characteristics of the neighborhoods of 507 pregnant women to determine whether adverse birth outcomes are linked to community characteristics. In addition, personal maternal characteristics (e.g. income, education) were collected from Dr. Pathik D. Wadhwa's previous NIH funded projects, which will allow investigating the association between individual SES and preterm birth/low birth weight. The focus of my research is important because, if there is sufficient evidence that certain neighborhood communities and socio-economic inequality can affect birth outcomes, then the results will help better solve and define causes for adverse birth outcomes. Currently, my mentors and I are running statistical analyses on the data that has been collected. My study can lead to more specific research and potential interventions to lower the rate of adverse birth outcomes through neighborhood level prevention. If there is a way to address the occurrence of adverse birth outcomes as a community problem rather than on a case-by-case basis, valuable resources such as time, money, and manpower will be put to better use.

Becoming a Healthcare Professional: Identifying the Key Barriers Among Underserved Students in Orange County
Matin Ebneshahrashoob
Mentor: Behnoosh Afghani
The disparity in educational attainment among underserved students in Orange County, California presents future workforce challenges within the healthcare sector that are precipitated by Orange County’s aging population. A need exists to identify the barriers to educational advancement, and to determine the factors that discourage underserved students from pursuing a healthcare-related career. Questionnaires regarding educational barriers and attitudes were distributed to students who attended healthcare professions workshops administered by the Center for Future Health Professionals at UC Irvine. The response rate was 100%. Of a total of 63 students surveyed, the majority (68%) were of Hispanic origin. Students cited a lack of financial support, lack of emotional support, and increasing competition as the three largest barriers to continuing education. More than one-fourth of the students indicated that the high costs of tuition discouraged them from entering the healthcare field. Our preliminary results call for measures, such as mentorship programs, which increase student morale by providing support and which inspire students to achieve higher levels of education towards a future career in healthcare. Continued outreach will create greater educational achievement parity, decrease the workforce burdens on the healthcare industry, and insure the long-term health and well-being of the community.

Impacts of Photo-Excited NO2 on Air Pollution Control Strategies in the South Coast Air Basin of California
Joseph Ensberg
Mentor: Donald Dabdub
A new path for hydroxyl radical formation via photo-excitation of nitrogen dioxide (NO2) and the reaction of photo-excited NO2 with water is evaluated using the UCI-CIT model for the South Coast Air Basin of California (SoCAB). Impacts of this new chemical mechanism on ozone and particulate matter formation are quantified by simulating a two-day summer episode. In addition, sensitivity simulations are conducted to evaluate the uncertainty in the rate of reaction of photo-excited NO2 with water reported in the literature. Results indicate that the addition of photo-excited NO2 chemistry increases peak 1-hour average ozone concentrations by up to 15 ppb. Also, the new mechanism leads to increases in particulate matter concentrations of up to 8%. The importance of this new mechanism is then evaluated in the context of pollution control strategies. A series of simulations are conducted to generate isopleths for ozone and particulate matter concentrations, varying baseline nitrogen oxides (NOx) and volatile organic compounds emissions. The results show that including NO2 photo-excitation increases the sensitivity of ozone concentration to changes in NOx emissions. Namely, increasing NOx when NO2 photo-excitation is included leads to an increase in ozone concentration of up to 15 ppb higher than a case without photo-excited NO2. The addition of this new chemistry stresses the need for NOx emission controls, and it discourages the belief that...
increasing NO<sub>X</sub> emissions could combat peak ozone concentrations in some areas of the SoCAB.

**Latina/o Students' College Adjustment and Cultural Congruity Process: A Psychosociocultural Analysis**

*Barbara Escobar*

**Mentor:** Jeanett Castellanos

Latina/os are the fastest growing U.S. racial and ethnic minority group, comprising 32.8 million, or 14.5% of the total United States population. Given the population growth, it is reasonable to assume that Latina/os would have a substantial attendance in the educational system. However, Latina/os education rates suggest that students are leaving the educational pipeline early and not entering or enrolling in college. More importantly, research suggests that Latina/o experiences are embedded with feelings of normlessness, marginalization, and cultural incongruity. Specifically, Latina/o students do not feel validated throughout their educational experiences and report being disconnected from their environment. Given the role of university environment, campus climate, and student integration on persistence, this study examines the cultural congruity process for Latina/o college students. Through an exploratory qualitative (interview) design, implementing the psychosociocultural theoretical framework, the study examines how Latina/o students navigate culture in a university setting. The snowball stratified sample of participants consisted of 25 Latina/o undergraduate students, a representation of five per class level. Preliminary findings will contribute to the overall understanding of how Latina/o students experience college life at a four-year institution within a cultural perspective. Implications for research and practice will assist university officials and faculty to better serve Latina/o students in feeling more connected to the university and the campus environment.

**Mechanisms of Age-Associated Plasmacytoid Dendritic Cell Dysfunction**

*Marc Esposo*

**Mentor:** Anshu Agrawal

Plasmacytoid dendritic cells (PDCs) are a subset of dendritic cell that secrete the cytokine Interferon-alpha, which plays an essential role in responding to bacterial and viral infections. Studies have linked lowered IFN-alpha secretion in aged individuals with increased susceptibility to disease, but the specific molecules and signaling mechanisms involved are not well understood. To address this question, PDCs from young and old individuals were exposed to CpG and influenza (stimuli that activate PDCs and induce the secretion of IFN-alpha). Activation status of signaling molecules, Interferon regulatory factor-7 (IRF-7) and Nuclear Factor kappa b (NFkB), known to be essential for production of IFN-alpha, was determined using flow cytometry. This study found that aged individuals showed less activation of IRF-7, and NF-kB in comparison to young individuals when subjected to bacterial and viral stimuli. Such findings indicate that impaired function of these molecules may account for the decreased IFN-alpha secretion observed in the aging community.

**Factors that Limit University Eligibility in Urban and Suburban Areas**

*Maricella Evangelista*

**Mentor:** Louis DeSipio

The racial and ethnic groups that are most affected by inefficient schooling are minorities. According to the California Department of Education, Latinos and African-Americans have the lowest graduation rate in comparison to other racial groups. Over 3 million Latinos enrolled in California’s public schools, accounting for nearly half of K–12 public school systems. Historically, Latinos have been highly concentrated in certain regions. The two school sites that I am researching are Oxnard High School and Arroyo Valley High School, both schools with predominately Latino populations. This study examines the relationships between class size, geographic location, and counseling resources in public high schools and how they relate to university eligibility rates. The study uses an ethnographic and qualitative approach to examine the possible differences between urban and suburban high schools. By examining three independent variables—class size, geographic location, and counseling resources—this study may give new insight that will benefit not only future research but also the U.S. Department of Education’s mission of equal opportunity for every individual.

**Nitric Oxide Mechanotransduction in Response to an Impaired Glycocalyx**

*Jamie Evora*

**Mentor:** Elliot Botvinick

Endothelial cells are vital players in maintaining vascular homeostasis. Endothelial nitric oxide production serves as a relaxing factor for smooth muscle cells, leading to blood vessel dilation and a decrease in blood pressure. It has been proven that nitric oxide is released from the endothelium through a variety of shear stresses. The endothelial surface layer is composed of various polysaccharides that make up the glycocalyx. The endothelial glycocalyx is composed of various hydrogels made of assorted glycoproteins, terminal sialic acids, and proteoglycans with associated glycosaminoglycan side chains. Previous experiments have shown that a degraded glycocalyx impairs endothelial nitric oxide production. This study uses internal strain measurements with fluorescent measurements of mechanotransduction with response to tangential and normal stresses through the use of fluorescently marked cells and laser tweezers. Bovine aortic endothelial cells (BAEC) were cultured and fluorescently marked with an NO fluorescent...
and evaluated with MicroPET imaging. To compare this uptake is being characterized. $^{18}$F-Mefway as observed in the MicroPET images. The chemical nature of the uptake in rodents possibly due to faster metabolism, but this defluorination has been observed as minimal in our previous nonhuman primate scans. Use of disulfiram, in order to minimize metabolism, is being considered in rodent studies. Further work remains for the use of $^{18}$F-$\text{trans}$-Mefway as a tool for measuring changes in serotonin receptor concentrations or availability under different brain states.

**Detection of Antibodies Specific to HSV1 and HSV2 Proteins in HSV1(+) and HSV2(+) Patient Serum by Western Blot Analysis**

Payam Falatoonzadeh

*Mentors:* Lbachir BenMohamed & Gargi Dasgupta

Western Blot is a powerful technique to detect serum antibodies using a very small amount of protein expressed in most of the cells and tissues. The goal of my project was to detect human antibodies specific to viral proteins in patient serum infected with herpes simplex virus type 1 and 2 (HSV1 and HSV2). Rabbit skin cells (RS), the host cells for HSV1 and HSV2, were separately infected with HSV1 (strain McKrae) and HSV2 (strain 333). Non-infected RS cells served as the negative control. Lysates from infected and non-infected cells were prepared and their total protein concentration was determined by the Bio-Rad protein assay. The lysates were separated on SDS-PAGE, transferred to PVDF membrane and probed with patient sera as the primary antibody. The membrane was further probed with Horse Radish Peroxidase (HRP) conjugated anti human IgG-Fc as secondary antibody. Finally the membrane was treated with HRP substrate using ECL Plus Western blot detection kit. Proteins were detected by exposing the membrane to Kodak X-ray film. I was able to detect the expression of six proteins of MW ranging from ~100 KD to ~ 40 KD in HSV1 infected patient sera but not able to detect any protein in HSV2 infected patient sera. The failure of detecting any protein in HSV2 infected patient sera could be due to poor infection of RS cells by HSV2 and weak antibody content of the HSV2 infected patient sera. This assay will help to discriminate HSV1 and HSV2 herpes infections in humans without having pathologic disease.

**Expression and Purification of Matrilysin**

Colin Fellows

*Mentor:* Rachel Martin

As part of the matrix metalloproteinase family, matrilysin (MMP-7) acts on proteins on the cell membrane surface and participates in wound healing and connective tissue organization. In addition to its normal function, matrilysin is known to be produced overabundantly in human cancer tissues and play a role in cancer progression. Insight into the binding of matrilysin to substrates may provide opportunities to develop potential cancer treatments. This
knowledge can be acquired with solid-state nuclear magnetic resonance spectroscopy, which has been performed successfully on other, similar membrane proteins. I have developed methods to express matrilysin in E. coli and purify it from the resulting inclusion bodies; these techniques will be used on isotopically-labeled samples to study with advanced NMR techniques.

**Latina/o Educational Micro-Successes: A Case Study**

Cristina Flores  
*Mentor: Jeanett Castellanos*

Although Latina/os are the largest growing minority in the United States, their population growth is not reflective in their educational attainment rates. Although previous research studies have explored the phenomenon of Latina/o students’ retention in higher education researchers have failed to examine the micro-steps in the retention process leading to Latina/o persistence. Using the Psychosociocultural framework, this study explores the hourly, monthly, and quarterly successes of Latina/o students that contribute to their educational success. The study uses the redefined concept of success to include Latina/o students’ immediate or micro steps building toward academic persistence and while taking into consideration their academic satisfaction and motivation to pursue a post-secondary degree. A qualitative procedure of a case study on a Latina woman and inclusion of primary documents—such as journal entries and photographs that relate to students’ psychological validation, social networks and cultural affirmation—were used to explore the micro-successes contributing to Latina/o students’ success. Preliminary findings suggest that micro-successes are critical to Latina/o students’ overall academic success. The study helps practitioners re-evaluate the definition of Latina/o educational success while providing evidence of incremental practices implemented by Latina/o students throughout their educational journeys. The microscopic evaluation of Latina/o undergraduate success presents a groundbreaking discovery that unveils unexplored areas in retention. Results aided the construction of a scale to measure Latina/o students’ micro-success.

**Behavior of Ovarian Surface Epithelial Cells in Nrf2-Deficient Mice in the Presence of Benzo(a)pyrene**

Victoria Flores  
*Mentor: Ulrike Luderer*

Ovarian cancers that arise from the ovarian surface epithelium (OSE) are the fourth leading causer of female cancer mortality. Development of epithelial ovarian cancers (EOC) has been linked the depletion of germ cells in women. Other research has shown that ovarian exposure to benzo(a)pyrene (BaP) induces the depletion of germ cells in the ovaries. BaP is a polycyclic aromatic hydrocarbon present in the human environment that is carried in such things as cigarette smoke and diesel exhaust. It may be the case that BaP is involved in the development of EOC by effects that accumulate throughout a woman’s life. An Nrf2 knockout (KO) mouse-model lacks the transcription factor that would regulate transcription of genes that are used to detoxify the body of BaP. In this study we tested the hypothesis that Nrf2 KO mice are more susceptible to the BaP-induced proliferation and apoptosis in the OSE. We found that the genotype had no effect on changes in the OSE, but we did see that with increased dosage of BaP there was a trend towards a decreased presence of proliferation, indicated by PCNA immunostaining, in the OSE.

**Hippocampal Corticotropin Releasing Hormone Contributes to the Adverse Consequences of Early-Life Stress**

Kimberly Fok  
*Mentor: Tallie Z. Baram*

Chronic stress during the critical stages of brain development in the rat pup leads to alterations in the hypothalamic-pituitary-adrenal (HPA) axis, specifically, increased release of corticotropin releasing hormone (CRH). Excessive CRH signaling may contribute to impairments in stress reactivity and learning and memory in adulthood. How the effects of chronic early life stress (ES) caused by CRH are maintained throughout life is still unknown. The goal of this study is to determine if CRH is released in excess in the hippocampus after early life stress on postnatal day 16 (P16) rats; and whether Hippocampal glucocorticoid receptors (GR) are involved in the adaptive mechanisms of early life stress on hippocampal function by quantifying GR expression in adult rats at 4 months and 12 months of age. There was a significant increase in CRH positive cells (CRH+) in the CA1 and CA3a region of the hippocampus, and no significant differences in 4-month and 12-month old rat GR expression. Elevation of hippocampal CRH in the ES immature rat leads to the possibility that the negative effects of early chronic stress are due to high levels of the hormone being maintained throughout life. Also, GR may not be involved in the adaptive mechanisms of early life stress on hippocampal function.

**Successful Integrated Water Resource Management: A Case Study of One Water District in Southern California**

Sarah Foley  
*Mentor: David Feldman*

Current constraints on Southern California’s water supply (statewide drought and reductions in water import allocations) demand rapid adaptations by water service providers. Integrated water resource management (IWRM) lends itself to adaptation but is not often implemented to its full potential. One water district (the District) in Southern Cali-
Neurotrophins Increase Mouse Embryonic Stem Cell Proliferation  
Ashley Fong  
**Mentor:** Leslie Lock

Embryonic stem cells are able to self-renew and generate any cell type of the body. Growth factors are known to have significant effects on cell proliferation, differentiation, and survival. To determine the role of a family of growth factors, the neurotrophins (NTs), on the proliferation and survival of mouse embryonic stem (mES) cells, the expression of the NTs was assayed using RT-PCR and immunocytochemistry. Further, the effects of NTs on mES cell growth and proliferation was determined by generating growth curves and immunostaining with an antibody that recognizes mitotic cells. The NTs are expressed by mES cells and promote their proliferation.

Using Pseudoclassical Potentials to Study Dynamics and Thermodynamics of Quantum Liquids  
Laura Fredrickson  
**Mentor:** Vladimir Mandelshtam

We investigate the possibility of mapping the dynamics of a quantum N-body system to that of a classical N-body system. The latter evolves according to Newton’s equations of motion, albeit through a pseudoclassical potential that was derived in a different study using a quantum mechanical method, applied to a smaller system. Thus, both the accuracy of quantum mechanics and the simplicity of classical mechanical simulations could be retained and computing properties of much larger quantum systems would become feasible. We consider bulk neon, in which quantum effects are not negligible. Employing the pseudoclassical potential in the molecular dynamics method, the diffusion coefficient of neon is computed at a variety of thermodynamic states between 12.0 and 30 K. The pseudoclassical diffusion coefficients are then compared to those of the classical Lennard-Jones liquid and to existing experimental data. The results show that in the high-temperature limit the pseudoclassical system does in fact behave classically; however, in the low-temperature limit insufficient existing experimental data (below 25 K) hindered any definite conclusions being drawn about the success of the pseudoclassical system in modeling the true experimental quantum system beyond concluding that the general shape of the diffusion curve and the relation between the classical and pseudoclassical systems was as expected.

The Harkis: France's Betrayal of its Muslim Veterans  
Alexandra Fries  
**Mentor:** William Schonfeld

The Harkis are Muslims indigenous to Algeria, who chose to fight the FLN alongside the French in the Algerian War of Independence (1954–1962). At the war’s end, considering themselves French and additionally in need of asylum, the Harkis attempted to emigrate to France. Many were rejected and subsequently massacred in Algeria. For the ones who did make it to France, their welcome was far from what had been expected, given that they were not only veterans but also possessed French citizenship. The Harkis desired assimilation, the immigration policy promoted by the French Republican model, yet they were treated as outsiders, isolated in concentration camps upon their arrival. On the other hand, other Muslim immigrants have been chastised for their tendency towards integration and maintenance of their foreign cultural norms. This research covers the treatment of the Harkis and of North African Muslim immigrants in general in the areas of employment, housing, athletics, and entertainment, and French society as a whole. It analyzes the reasons and implications for similarities and differences between these groups, focusing on why the Harkis have been treated unjustly given their historic loyalty and desire to be considered French not only legally, but also socially.

Analysis of the Effects of the Postmortem Interval Time on the Functionality of Neurotransmitter Receptors of the Rat Brain  
Nathaniel Fung  
**Mentors:** Agenor Limon-Ruiz & Ricardo Miledi

The microtransplantation of human receptors from frozen brain tissues to frog oocytes is a powerful new method to study brain diseases like Alzheimer’s, Epilepsy, and Autism. However, there is little information on the effect of the postmortem interval—time lapse from death until the tissue is frozen—on the function of the brain neurotransmitter receptors. Since this information is important for brain studies, this project aims to determine, first, the time that a rat brain can be kept unfrozen while still retaining neurotransmitter receptors amenable to functional characterization; and second, the effect of the temperature before the tissue is frozen on the function of the receptors. By means of electrophysiological experiments, we studied the activity of Glutamate and GABA receptors, the main excitatory
and inhibitory neurotransmitters in the central nervous system. We have found that despite a substantial decrease in functional neurotransmitter receptors when the brain is kept at room temperature, it is still possible to record receptor-induced currents after more than 24 hours postmortem. Furthermore, the degradation of receptors is importantly slowed down if the brain is kept at 4 °C. In the latter condition, it is possible to microtransplant functional receptors from brains with postmortem intervals of more than 3 days. Although more experiments are needed to confirm and expand these results, it is already clear that rat brain GABA and glutamate receptors are still functional after more than 1 day postmortem at ca. 21 °C.

**Strain Sensitive Array for the Study of Muscle Surface Mechanics**

Raymond Fung  
*Mentor: William Tang*

Excessive strain exerted on muscles in the body will lead to injury that can be difficult to recover from. Strain gauges can be used to determine the amount of strain different activities can place on soft tissues and are a key tool for studying biomechanics and effectiveness of physical therapy regimens. Unfortunately, current strain gauges are too large or inaccurate to be useful. More importantly, traditional strain gauges will not survive strains in excess of 2%, while muscles can be strained by as much as 30%. Thus our laboratory is developing a micro implantable strain gauge that can be used for studying soft tissue strains. The sensing principle is based on the use of materials that exhibit piezoresistivity, a well known phenomenon that offers the advantages of simple detection and easy instrumentation. The changes in resistance, which can be read with Wheatstone bridge circuits, can then represent the amount of strain that a certain element may experience. Many materials are piezoresistive, but the material that will be used must also be biocompatible, retain elasticity up to 30% strain, and be simple to produce. Poly-pyrole (PPy) is a material that could possibly be used for this device but is still a difficult material to manufacture. The resistivity, thickness, and quality are critical to the resultant characteristics of the material. Our studies have indicated that increasing the applied current in the electrochemical deposition increases the thickness of the thin PPy layer, but causes a considerable drop in quality. Ongoing work to further characterize the deposition process and the methodology on optimizing the material performance will be discussed.

**Survival of Borrelia hermsii and Borrelia burgdorferi in Response to UV Irradiation**

Sarah Gahng  
*Mentor: Alan Barbour*

I compared the survivability of Lyme disease agent *Borrelia burgdorferi* and relapsing fever agent *Borrelia hermsii* to ultraviolet (UV) irradiation. Differences in susceptibility to UV irradiation could indicate potential host or genetic differences that may allow one *Borrelia* species to survive at higher levels of UV exposure in their natural environments. *B. burgdorferi* and *B. hermsii* cultures were exposed to UV doses ranging from 0 joules to 32 joules and were serially diluted by tenfold in microtiter plates. Survival was determined by changes in the medium’s indicator and by microscopy. The number of surviving cells was estimated by using the most probable number method. Overall, the Lyme disease bacterium survived at higher strengths of UV irradiation than did the relapsing fever bacterium.

**Lamination of the Active Layer of an Inverted Bulk-Heterojunction Organic Photovoltaic Device**

Sahil Gandhi  
*Mentors: Phil Collins & Nikos Kopidakis*

Scientists have used several photovoltaic materials and methods to convert sunlight to energy, beginning with silicon as early as the 1950s. The goal of experimenting with novel materials has been to increase efficiency while reducing cost in order to make photovoltaics economically competitive with conventional sources of electricity. Scientists have reached the power conversion efficiency level of 42.8% using multijunction devices based on III-V semiconductors, but the cost is prohibitive. Scientists are exploring the use of cheaper materials and novel deposition conditions that avoid intensive vacuum and high temperature processing steps. One promising new technology is Organic Photovoltaics (OPV). Based on organic polymers and small molecules that can be processed in solution and deposited onto solar cells with methods like spraying or inkjet printing, OPVs offer the potential for drastic reduction in manufacturing cost that may offset the losses from the reduced efficiency (currently at about 6%). A number of different fabrication methods are currently being explored for OPV. One is the direct lamination of two parts to fabricate the complete device. In this project, we laminate the active layer of an inverted bulk-heterojunction organic photovoltaic device. Our active layer consists of the conductive polymer poly(3-hexylthiophene) and the fullerene Phenyl-C61-Butyric-Acid-Methyl Ester. Through successful lamination, we can chemically or thermally modify one part of our device without affecting the other parts. We can also improve the morphological characteristics and the interface properties between the active layer and the electrodes and other layers. While these efforts are still in their preliminary stages, if successful they could ultimately...
provide a viable device fabrication method that allows unprecedented control over the various components and improves the current flow and the overall efficiency of our device.

**Latina Coping Strategies and Well-Being in Higher Education: A Psychosocialcultural Perspective**

Crystal Garcia  
*Mentor:* Jeanett Castellanos

In response to the low number of Latinas attaining their Bachelors’ Degree and the many stressors they encounter in college, this study will investigate Latina university students coping strategies and their psychological well-being through a psychosocialcultural perspective. In addition, this study will find which coping strategies are most useful in maintaining their well-being in order to continue their university success. This study will use a qualitative approach in which a total of eight Latina undergraduate students (four super seniors, four seniors) will be interviewed. Based on the results of this study the different coping strategies used will help aid other Latinas maintain their psychological well-being to continue their path in higher education.

**Thelonious Monk: Contributions of a Jazz Innovator**

James Garriston  
*Mentor:* Gerald Pinter

Thelonious Monk exhibits a distinctive developmental logic, call-and-response, and riff-based playing that evolved improvisation and composition within the confines of a bebop and post-bop idiom. The improvised evolution of themes in his pieces combined with a strict sense of rhythm and minimalist use of notes reinvents melodic conventions by combining blues tradition with classical modernism. I applied these techniques to a self-recorded audition tape to submit to the Thelonious Monk Institute of Jazz Competition for Saxophones. Through this medium I learned how to mic a jazz quartet. The different types of microphones (ribbon, dynamic, capacitor (condenser)) combined with the pickup patterns (omnidirectional, figure eight, and directional (cardiod)) and microphone placement affect the sound quality by picking up the various frequencies of the instrument in different balances and the degree of spillover of different instruments into other microphones. After the recording process I learned how to mix the track information into a professional sounding recording. This includes how to adjust the levels and degree of stereo of each track, fade the tracks into and out of solos and at the beginning and ending of the song, and how to manipulate inconsistencies in the performance to create a cleaner sound. The last part of my project included the development of my skills as a flautist. Using private lessons and audio examples from Hubert Laws and Steve Kujala, I learned how to manipulate my embouchure to create a proper flute sound in multiple registers. Each of these elements is essential in the development of my skills as a professional musician. By adding these skills to my available repertoire I am creating a more desirable product, which increases my work opportunities.

**Rhodiola rosea Increased Resistance to ROS in Drosophila Melanogaster**

Maral Gazarjran  
*Mentor:* Mahtab Jafari

The Free Radical Theory of Aging proposes that an accumulation of damage caused by free radicals results in the aging process. In addition, free radicals may lead to the development of various age-related diseases, including Parkinson’s disease, Cardiovascular Disease, and Alzheimer’s disease. Antioxidants, which are molecules that may slow down or prevent oxidation of other molecules, have recently become popularized in the media due to their theorized anti-aging effects. One such antioxidant is *Rhodiola rosea,* a powerful botanical that has proven to increase lifespan significantly in *Drosophila melanogaster.* In addition to an increase in lifespan, no adverse effects on the central nervous system, fecundity, or metabolic rate have been observed in *Rhodiola rosea* treated flies. Due to these promising results, I decided to research the stress resistance of *Rhodiola rosea* fed flies when exposed to free radical generators, such as Paraquat, Fe-NTA and Hydrogen Peroxide. Each of these free radical generators generates a different type of free radical. Paraquat is a potent superoxide generator hydrogen peroxide breaks down into a hydroxide radical and Fe-NTA generates hydroxide radicals. The hypothesis being tested in this experiment is that *Rhodiola rosea* is able to extend life span due to its antioxidant properties, then it should also be able to protect fruit flies from oxidative stress by either directly terminating the oxidation reactions carried out by free radicals or by enhancing the organism’s ability to resist oxidative stress.

**Decontaminating the Cosmological 21 cm Signal**

Paul Gebhart  
*Mentor:* Asantha Cooray

This experiment is to determine what results can be expected for the 21 cm line experiments planned for the radio telescopes’ Square Kilometre Array and Low Frequency Array. A simulation of the cosmological signal in the relevant frequency range, about 50 to 200 MHz, was constructed from simulated data of a 21 cm line model, interpolated data of Milky Way synchrotron, a simulated map of extragalactic radio sources, and Gaussian noise based on the parameters of SKA and LOFAR. We are attempting to determine how to separate the 21 cm signal from the foreground signal and whether the residual after removal is too noisy to degrade the matter power spectrum of the cosmological 21 cm line signal.
**Pressure Control System for Use in Diffuse Optical Tomography**

Michael Ghijsen  
*Mentor: Gultekin Gulsen*

Diffuse Optical Tomography (DOT) is an emerging non-invasive imaging modality. One of the promising applications of DOT is the early detection of breast cancer. In general, fiber optic probes are used to deliver laser light to tissue and collect the reflected/transmitted signals from the tissue. It has recently been shown that the fiber probe contact pressure affects the measurements and can potentially be used as a contrast mechanism. We have already developed a combined magnetic resonance imaging (MRI) and DOT system (MR-DOT). This project seeks to create a fully computer controlled system that can manipulate the pressure on the fiber-optic probes of the DOT apparatus, using MR compatible non-magnetic hydraulic components. This system will allow users to control the pressure on each probe using a software program running on a computer that is located outside of the MRI. So far, the most critical components have been constructed, including a prototype hydraulic line, two multiplexing and demultiplexing control circuit boards, a linear actuator control, and a pressure monitoring software code.

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**Investigation of Foam Flow Through the Analysis of Bubble Raft Characteristics in an Oscillatory Trough**

Andrew Gibas  
*Mentor: Michael Dennin*

Foams, made up of a gas and a liquid, are an important field of research in condensed matter physics because of their solid and liquid-like behavior. The problem with foams is how to describe their characteristics and properties when they are able to act like two different states of matter. During my research, I conducted an experiment on a foam bubble raft in which I applied shear stress to one side with an oscillating plate against a fixed wall on the other. The goal of my research was to gather data and analyze the foam’s square root average velocity as a function of distance from the stationary barrier with different fixed amplitudes and frequencies. From the data that I have accumulated, I was able to successfully plot graphs that showed the transition from a liquid to a solid and compile videos where it is easy to see the T1 events, the mechanism that the foam undergoes to relieve stress and creates the flow that gives it fluid-like behavior. From my research, I found that there is enough recurring behavior to formulate an equation that shows the relation of velocity, as a function of distance from the stationary barrier, with frequency and amplitude.

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**Examining Effects of Probation Officer Attitudes on Probationer Recidivism**

Benjamin Gillig  
*Mentor: Jennifer Skeem*

The personal values and orientation of probation and parole officers toward community supervision have been shown to affect offenders’ risk of recidivism even more strongly than the program of supervision being applied. Officer orientation may have particularly salient effects on probationers with mental disorder (PMDs), who have pronounced supervision needs and are at increased risk for failure on supervision. Using a sample of 359 PMDs and their supervising probation officers, we examined the relationship between officers’ personal orientation toward supervision and PMDs’ likelihood of arrest and probation revocation in the context of both traditional and specialty probation supervision. Results indicate differential effects between sites for PO attitudes on criminal justice outcomes: PMDs at the specialty site whose officers were oriented toward reintegration/rehabilitation were more likely to have their probation revoked; while outcomes for PMDs at the traditional site were not related to their officers’ attitudes. Results and discussion explore the need for continued research.

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**Root Hair Growth in Arabidopsis thaliana**

Maxim Gilula  
*Mentor: Sarah Eichhorn*

In this project, we investigate the growth of root hairs in *Arabidopsis Thaliana*. Root hairs are finger-like extensions of the root found on many plants, where they maximize the surface area of a root over which the plant can absorb water and nutrients. The goal of the project is to try to quantify the shape of root hair tips and the growth velocity of the hairs. This information is to be used in a biomechanical model for root hair growth, from which we hope to isolate the purely mechanical aspects of the pressure-driven, elastic tip growth from the gene expression factors in the cell wall structure. We used Maple and MATLAB computer programs to analyze pictures of the root hairs, took data plots of the root hairs with “ImageJ,” and used Microsoft Excel to graph velocities of root hair growth. After the points were taken by “ImageJ,” Maple was used to translate and rotate the root hair shapes into more appropriate coordinates—the origin. MATLAB was used to plot the coordinates and estimate what kind of mathematical shape the data plots were closest to. Our hypothesis was proven correct: the tip shape was closest to a half circle. The conclusion was that this occurs because a half sphere has the most surface area to volume ratio, allowing the plant to absorb the most nutrients without using as much of its own energy. Also, findings include that too much Hoagland solution was as useless as too little when it came to plant root hair growth. This means that it was as useless
to plant growth itself. The biomechanical model for the events that occur, given the solution and competition for solution by other root hairs, is still in progress.

Energy and Conflict in the South Caucasus
Aleksan Giragosian
Mentor: Deborah Avant
In the early 1990s, following the breakup of the Soviet Union, ethno-political conflicts erupted in Karabakh, South Ossetia, and Abkhazia. In all three cases separatists were militarily successful in establishing independent states. The post-conflict era has been characterized by a period of relative peace and stability as the countries of Azerbaijan and Georgia have been too weak to reassert their authority over the separatist regions. The goal of this study is to determine if the exportation of oil and natural gas from the Caspian Basin have had a politically destabilizing effect on the three ethno-political conflicts of the South Caucasus. I begin with the premise that specific factors led to the cessation of violence, which ultimately established a period of relative peace and stability in the region. I then examine how the exportation of oil and natural gas has affected these factors. I find that the exportation of oil and natural gas have significantly diminished the pacifying effect of the factors that led to the cessation of violence. As a result, a shift in the balance of power is taking place in favor of both Azerbaijan and Georgia at the expense of Karabakh, South Ossetia, and Abkhazia. Thus, the shift in the balance of power has a politically destabilizing effect on the three ethno-political conflicts, making the resumption of violence more likely.

DNA Topology Mediates Early Gene Transcription in Chlamydia trachomatis
Luis Gomez Villalobos
Mentor: Ming Tan
Chlamydia trachomatis is an obligate intracellular pathogen with an unusual biphasic developmental cycle. Chlamydial transcriptional activity throughout the developmental cycle has revealed a temporal gene expression in the early, mid and late stages of development. The mechanism for stage-specific expression of genes during early development has not been well documented. It is known that chlamydial DNA supercoiling is altered during the developmental cycle. We hypothesize that DNA supercoiling may be a mechanism for the transcriptional regulation of early gene expression. Due to a lack of a genetic system in Chlamydia, we chose to test this hypothesis using an in vitro approach. Using in vitro topoisomerase reactions, we generated plasmids of various superhelical densities containing the promoter region of an early chlamydial gene cloned into a transcriptional template. We assessed for ability of biochemically purified chlamydial RNA polymerase to transcribe the promoter using in vitro transcription reactions. Our lab has previously used the same approach to study mid and late chlamydial gene promoters, which display a differential response to changes in DNA supercoiling. Our study revealed that transcription from the early promoter orf3 showed an increase in transcriptional activity concomitant with increasing levels of DNA superhelical density. We conclude that alteration of DNA topology is another mechanism for the transcriptional regulation of early gene expression in C. trachomatis. Understanding gene regulation during the developmental cycle of Chlamydia will help us elucidate how this pathogen controls its genes to cause disease.

Forepaw Grip Strength Assessment in Female Phosphodiesterase 9A Knockout Mice after a Cervical Spinal Cord Injury
Michael Gonzalez
Mentor: Oswald Steward
Increasing cyclic nucleotides has been shown to promote neural regeneration. Thus, we hypothesized that deletion of the cyclic guanosine monophosphate (cGMP)-specific Phosphodiesterase 9A (PDE9A) gene will lead to an increased cGMP production in PDE9A-expressing pyramidal neurons of the corticospinal tract (CST), a tract thought to be involved in arm and hand function, and that this increased cGMP will lead to an enhanced neural regeneration and the recovery of grip strength after a spinal cord injury. Fifty-five female mice were used in this study; 25 PDE9A homogenous knockout, 25 heterozygous knockout and five wild-type female mice. After a lateral hemisection spinal cord injury at the 5th cervical vertebral level (C5) individual forepaw grip strength was assessed for 30 days post injury (dpi) using the Grip Strength Meter (GSM). Grip strength prior to the injury between the left and right forepaws was not significantly different. However, after the injury, grip strength was abolished in the right forepaw (ipsilateral to the injury). After seven dpi, there was some grip strength recovery in all three genotypes; however, these recoveries were not statistically significant. More studies are needed to produce confounding data that deletion of the PDE9A gene promotes neuron outgrowth in-vivo and recovery of gripping function in transgenic animal models.

Breeding System Variability Over Short Geographic Distances in Isolated Populations of a Montane Species
Teresa Gray
Mentors: Ann Sakai & Stephen Weller
Incompatibility relationships were investigated in a tristyous population of Oxlalis alpina located in the Gallofo Mountains in Arizona. With typical tristyous incompatibility relations, each of the three floral morphs can donate pollen in equivalent proportions, leading to an equal distribution of short, mid and long-styled morphs in populations. Varying degrees of modification of incompatibility may occur in populations of O. alpina, leading to preferen-
tional pollination between the short- and long-styled morphs at the expense of the mid-styled morph. Surveys of morph frequencies in multiple populations of *O. alpina* have demonstrated that modified tristylous incompatibility is associated with reduced frequency of the mid-styled morph. Self-compatibility of the mid-styled morph may favor its retention within a population. A tristylos population of *O. alpina* from the Galiuro Mts. in Arizona was expected to have highly modified incompatibility because of its location in an area dominated by distylous *O. alpina*. As predicted, the Galiuro population had substantially modified tristylos incompatibility, based on analysis of mean seed production comparing legitimate and illegitimate crosses. Also as expected, the mid-styled morph was able to self-fertilize, which may contribute to the retention of this morph in populations, despite modified tristylos incompatibility.

**Conjunction and Disjunction Fallacies in Prediction Markets**
Emily Grothe  
*Mentor:* Michael Lee

Prediction markets provide a mechanism for using groups of people to determine the probability of events. We ask whether these probability estimates for logically related events exhibit the irrationalities often found in individual judgments. In particular, we explore combinations of markets that provide tests of classic conjunction and disjunction fallacies. Across a number of markets, asking about a wide variety of events, we find a few interesting violations of probability theory, but mostly rational adherence. We discuss our exploratory analyses in terms of the relationship between group and individual probability estimation, and the effectiveness of prediction markets.

**Predicting Educational Attainment across Gender and Ethnicities**
Leslie Gutierrez  
*Mentor:* Jutta Heckhausen

Research shows that Latino students report lower educational attainment compared to Asian, African American, and Caucasian students. This study aims to identify the protective and risk factors that enable versus inhibit academic success in Latina students. As a quantitative design, the sample size consisted of 1,082 high students from the Los Angeles Unified School District who were annually surveyed for five years. Multinomial and logistical regression analyses were performed on these multi-ethnic sample high-school seniors. Relevant facilitative and inhibitive factors fall into three groups: personal motivational factors, socioeconomic status, and traditional gender roles. The findings indicate that grades and the students’ educational expectations are highly significant predictors of educational attainment across all ethnic groups, more so for Latinos and Caucasians. In addition, parental warmth and parental education were significant positive predictors of educational attainment for Caucasian, but not for Latina/o students. No gender differences among the Latino population were significant. The findings underscore the decisive role of academic capacity and motivating expectations for promoting favorable educational attainments.

**The Effect of Nicotinic Acetylcholine Receptor Antagonists Prior to Chronic Nicotine Pretreatment on Acquisition of Cocaine Self-Administration**
David Hadiprodjo  
*Mentor:* James Belluzzi

Adolescence has been characterized as a sensitive period for the initiation of drug use. Previous studies have found that chronic nicotine pretreatment in adolescent rats enhances cocaine self-administration. This study aims to identify the nicotinic acetylcholine receptor (nAChR) responsible for this nicotine pretreatment enhancement of cocaine self-administration using specific and non-specific nAChR antagonists that target α4β2 and/or α7 nAChR subtypes. To test this, adolescent rats at postnatal (P) day 28 were given nAChR antagonists (mecamylamine, DHβE, or MLA) or saline prior to each chronic nicotine pretreatment for four days. At P32, rats were allowed to self-administer cocaine in a single 2-hr session. Overall, nicotine-pretreated rats showed significantly increased cocaine intake compared to other treatment groups (p < 0.01). Pretreatment with nAChR antagonists blocked this effect. These findings provide evidence for the involvement of both nAChR subtypes in nicotine pretreatment enhancement of subsequent drug reward.

**Non-Suicidal Self Injury among Asian-American Undergraduates**
Christopher Hagan  
*Mentor:* Elizabeth Loftus

The prevalence of Non-Suicidal Self Injury (NSSI) is unknown among minority populations, especially Asian-American populations. This study is the first to address this gap by investigating the prevalence of these mental health problems in an ethnically diverse undergraduate population. Subjects completed a series of online questionnaires and assessments that evaluated various facets of their personality and their experiences (if any) with NSSI (i.e. cutting or burning themselves). Results are expected to clarify the association of NSSI with individual factors such as depression, eating disorders, suicide attempts, and the experience of pain during the NSSI. Identification of the prevalence of these issues has important implications for treatment and policy for this understudied population. Untreated, NSSI can cause permanent scarring, and accidents can lead to life threatening injuries; the severity of long term psychological effects is currently unknown.