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## 2014 URSCA Abstracts

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## **2014 URSCA Abstracts**

### **Alyssa Acosta**

#### **Emotional Labor: An Analysis of Male and Female Police Officers Within the San Gabriel Police Department**

There have been many studies conducted regarding the intensity, prevalence, sources, and effect of stress among police staff for both men and women. However, there has been little to no research that studies how emotional labor is more demanding than physical labor for male and female police officers. The demands of their emotional labor thus can cause adverse consequences such as stress, burnout, emotional exhaustion, dissonance, and family-work conflicts. Thus, the question being studied in this research project is: how do female and male police officers do emotional labor? The methodology used to conduct research was based on interviews, both face to face and telephone, of police officers from the San Gabriel Police Department that are of different races, genders, and ages. The questions asked were then used to interpret how the role of emotions are part of a police officer's labor in addition to the physical labor that are present in every task that males and females have to perform. From the ten interviews conducted, perceptions of the physical labor of policing attracted those to want to save the world from criminal offenders and help to contribute to the society. On the contrary, the interviewed police officers later realized the longer one stays the more difficult it becomes to balance the physical and emotional labor of the career. Preliminary results suggest that male and female officers handle emotions differently even when they go through the same emotional training of the job. In addition to their training, police officers should handle their emotions in a professional and calm manner because their department requires both females and males to hide their emotions versus expressing them in order to do their work effectively.

## **Philip Acosta and Duncan Ketel**

### *An Examination of the Effect of Restoration Practices on Coastal Sage Scrub*

Plant community restoration is an important tool for mitigating habitat loss due to past or present land use conversion. When restoration is required to mitigate habitat loss, specified targets for community cover are often mandated. Current restoration practices often involve the watering of restored areas in the first and sometimes subsequent summers to minimize mortality and improve the chances of meeting plant cover targets set out in the restoration plan. However, the effect of watering on allocation of resources to above and below ground growth and the effects of that allocation on the ability of plants to access water are not well understood. In the Summer of 2012, we investigated the effect of watering on restored areas of coastal sage scrub in the Puente Hills, at Arroyo Pescadero. The sites consisted of planted and watered areas, seeded and watered areas, and seeded, un-watered restored areas and lastly areas with native shrubs that were undisturbed which functioned as control sites. Three species were compared; White Sage, Purple Sage and Laurel Sumac. We hypothesized that individuals in non-restored areas would be under less water stress than individuals in restored areas, and we expected that individuals in the seeded un-watered restored area would be under less water stress than watered seed or watered planted areas. Water potentials and stomatal conductance were measured from three individuals in each site for each species. Control individuals had higher water potentials than individuals in watered restored areas. The non-watered restored areas also had higher water potentials than individuals in watered restored areas. Initial results of stomatal conductance found no significant difference between individuals in restored areas. However, nonrestored areas showed significantly higher levels of stomatal conductance than those found in restored areas. These findings indicate that the practice of watering may be problematic for long term success in restoration efforts.

## Nicholas Alcantar

### Chagas disease and the study of new era drugs on murine models

Trypanosoma cruzi is the intracellular protozoan that causes chagas disease or trypanosomiasis. It is a very serious issue in South and Central America with growing cases in the United States. In most common cases these parasitic euglenoid trypanosomes can occupy in mammals, wild or domestic including humans. The process of infection first starts when an infected triatomine insect vector or “kissing bug” takes a blood meal, releasing trypomastigotes in its feces near the site of the bite. The trypomastigotes will then enter the host through the open wound or any mucousal membranes such as the eyes. The host will then become infected and T. cruzi will take full advantage invading cells near the inoculation and spread to others such as macrophages, epithelial cells, muscle cells, and neurons. This disease is potentially fatal in humans and widely prevalent in animals, both wild and domestic. Currently 16 to 18 million people are infected with the disease and 14,000 people die annually. This disease has gone unseen and is called the “new aids” of our era because of its low detection of symptoms and high risk of infection. Because of the rise of T. cruzi and its ability to grow immune to medications quickly, new treatments must be discovered to eliminate the causing effect of Chagas disease. These new and existing treatments may be benznidazole and nifurtimox, antifungal azoles, and the highly engineered recombinant vaccines to enhance a more vigorous immune response. Each of these treatments are drastically efficient in curing the disease in murine models but each treatment had its own way in doing so. In addition, the focal point of this research underlines the role of parasitic persistence in the development of Chagas’ disease and reinforces the importance of T. cruzi elimination in order to decrease or prevent the development of severe chagasic cardiomyopathy which eventually leads to death.

## **Jeanette Arreola**

Dietary Adaptations of the Prehensile-tailed skink, *Corucia zebrata* (Scincidae) from the Solomon Islands, South Pacific

The viviparous, prehensile skink, *Corucia zebrata*, endemic to rainforests of the Solomon Islands is an herbivorous skink that subsists on the plant *Epipremnum aureum*. This popular houseplant contains calcium oxalate crystals, that are toxic when ingested in large amounts by humans and animals, leading to renal and liver failure, followed by death. We suspect the gut bacteria of *C. zebrata* might play some role in rendering calcium oxalate crystals harmless as newborns lick the feces of older skinks to acquire the bacteria. Using microbiological tests, we attempted to identify the bacteria and to elucidate the role it might play in allowing *C. zebrata* to flourish on this unique diet. At this time, we have identified two morphologically different gram-positive colonies of bacteria from fecal material of *C. zebrata*. We hypothesize they will belong to the Phylum Firmicutes which likely occurs in the microbiota of *C. zebrata*. The specific role of the bacterial flora played, if any, in rendering calcium oxalate crystals harmless to *C. zebrata* merits further investigation.

## **Bhumi Asher**

International Students at Whittier College: Is there a Sense of Belonging?

How international students adjust to the United States is important to their social and academic success. Students who arrive in the United States, having left their families behind, have to not only adjust to a new lifestyle, but also learn to become independent. Why do international students choose to come to the United States and how do they cope under pressure without their families in the same country? Most of the research

done today is survey-based, focusing on single ethnic groups rather than heterogeneous groups of students worldwide resulting in less understanding of their personal experience. To fill this gap in research, I gathered and conducted a total of 10 interviews with students from 9 different countries at Whittier College. The interviews resulted in responses consisting of students at Whittier College feeling a greater sense of self identity because of the small school Whittier is known to be. Early experiences in the States resulted in higher independence levels as well as students frequently changing schools or being brought up in a single parent house hold. In conclusion, the results show that students were willing to share their personal experiences, either positive or negative, and I was able to gain a deeper of their adjustment in America on a more personal level because of the qualitative interviews.

## **Kaitlyn Baldwin**

Effects of the organophosphate pesticides Chlorpyrifos and Diazinon on the regeneration capabilities of *Dugesia tigrina*

*Dugesia tigrina* is a flatworm of the phylum platyhelminthes, capable of carrying out full body regeneration. This regeneration is spurred by pluripotent stem cells called neoblasts, responsible for generating the new cells of blastemas, the regenerative outgrowths of wound sites. They are abundantly present in the mesenchyme and divide continuously, allowing the animal to regenerate an entirely new animal from a small body fragment. Planarians grow and shrink depending on food supply, able to scale their body plan within a 50-fold size range. Acetylcholine is a common neurotransmitter found in the central and peripheral nervous system. When acetylcholine is released from an axon terminal, it moves across the synaptic cleft to bind to a receptor on the other side of the synapse (on the post-synaptic membrane). In the peripheral nervous system, acetylcholine acts to control muscular contraction. The action of acetylcholine is stopped by an enzyme called acetylcholinesterase (AChE).

Organophosphates are a class of pesticides used for pest control. Several studies conducted in the last 10 years have linked organophosphate levels in human blood to a 50% increase in rates of Attention Deficit/Hyperactivity Disorder and other issues in children and adults. Organophosphates, being long-acting active site inhibitors of AChE were chosen for this study, as they cause a toxic build-up of Ach leading to convulsions, muscle tremors, nausea, and in chronic cases respiratory distress or death. The experimental objective was to measure how this build-up affects planarian regeneration by exposing them to varying strengths of Chlorpyrifos and Diazinon, two organophosphates, hypothesizing that abnormal regeneration was likely to occur. Planarians were observed for three weeks after being severed in two and exposed to water containing pesticide. Results suggested that organophosphates slowed regeneration and depending on the concentration caused a large percentage of deaths in the animal model, implicating that organophosphate use and rates of certain health issues are linked.

## **Lauren Barron**

### **Environmental Justice: An Analysis of Community Activism for Environmental Justice in the City of Commerce**

While the topic of predominantly minority and low-income community homes being located near environmentally hazardous facilities is not a new topic for research, there is a research gap of overlooking the City of Commerce community. I will not be looking at the normal trend of research of why hazardous waste facilities choose to operate by a community like the city of Commerce, but more so why the residents of the city of Commerce have chosen not to speak about this injustice. The constant heavy impacts from the industrial pollution, soot found on cars, and overall bad air quality occurring in their own backyards are heavily impacting the life span of residents. Why are not enough residents in this community creating political awareness and becoming community

activists? Through my research, I will be able to find the different reasons why or why not residents become activists. By conducting interviews with residents, employees, members of East Yard Communities for Environmental Justice, City of Commerce Council members and park employees who are and are not currently politically involved for environmental justice, I am measuring correlations between social and cultural capital, gender related opportunities, educational attainment, and high levels of community involvement from a young age. Though my interviews are not all completely done, I hope to finish with 20 interviews or more. My goal is to better understand how and why residents will/ will not take action to secure improvements in environmental quality by using their voices as a strong force that will fight for a healthy life.

## **Julian Bastida**

### **Southern California Heavy Metal: A Study of a Subculture**

The focus of this research is to analyze the subculture of Heavy Metal music in Southern California. Using an ethnographic approach, I ask: What and who is the SoCal Metal scene? Metal music in large part has had a negative image in mainstream society, often being considered too violent or aggressive. This study focuses on the elements of the music that make it a “scene” and how this subculture serves as a collective catharsis for the individuals that comprise it. My literature review takes a look at other studies conducted on a global and more historical scale of Metal music, yet none has been on more focused level in the U.S. My data gathered thus far consists of interviews with several musicians and personal observations of shows that I have performed/attended. I am currently set up for interviews with more musicians and promoters of shows in the Orange County area.

## **Alexandra Brain**

## The effects of music on stress, short-term memory, and working memory

Music, in more recent times, has been found to: provide stress relief, express emotion, and provide an escape from reality for some individuals. With these truths, there is the idea of the separation of noise versus music and the possible negative effects of music on the human body. Stress is also a factor affecting the body. It has both negative and positive effects, but stress causes major long-term damage to the individual. Memory is an integral part of everyday life, however when an individual is distracted, cannot focus, or is under too much stress, short-term and working memory suffer and are unable to provide completely accurate recall of experiences. Many people, from high school students to CEO's, incorporate music into their daily lives and because of this, a question arises in relation to the connections of music, stress, and memory. Does music provide stress relief, and can music have an effect on working and short-term memory? In this experiment, it is hypothesized that music will decrease the amount of stress on an individual and will inhibit the accuracy of short-term and working memory. The experiment looks at blood pressure as a form of the body's response to stress as well as short-term and working memory. These two types of memory were measured through the use of memory testing and distractor tasks. Each participant was placed in a group with 3 different genres of music: pop, classical, hard rock, and a control group with no music. Music was played throughout the experiment and memory testing. Following the collection of data, results were recorded and statistically analyzed. For those individuals in the pop music group, the data seems to suggest that there is a trend of significant reduction in blood pressure (BP) levels. Initially groups with music have also shown a slight reduction in BP when compared to the control group with no music. Further examination and testing is needed to confirm this trend. These results have been consistent with the original hypothesis and have provided additional insight into the connections between music, stress, and memory. Future studies that examine similar variables will be necessary to analyze the differences and similarities

between the populations. This study was limited to location and demographic of students; however, it has provided valuable information to the field of biology.

## **Thomas Brook**

### Effect of Sunscreen on Viability and Growth of Green Algae, *Dunaliella tertiolecta*

Growing awareness of the health risks associated with prolonged Ultraviolet (UV) exposure has dramatically increased the use of sunblock, especially in coastal regions. These sunblocks contain organic materials including engineered nanoparticles, such as Titanium Dioxide (TiO<sub>2</sub>) and Zinc Oxide (ZnO), which enter the coastal waters and introduce new chemical compounds to the marine system. Only recently have studies aimed at exposing the effects of these nanoparticles on coastal flora and fauna. We examined the population curve of marine Chlorophyte *Dunaliella tertiolecta* subjected to two commercial sunscreens in suspension, and then cultured on agar plates. We hypothesized that increasing levels of sunblock would inhibit algae growth, completely halting growth and inducing algae death at a certain threshold. We provided evidence that sunscreen hinders growth at concentrations less than 10g/L, and inhibits it completely above 15g/L, consistent with our hypothesis. The effect of sunblock has yet to be fully examined and may continue to quietly harm our marine environment under its current use.

## **Justin Carter**

### The Differences of Being Black and White in Professional Sports

The major professional sports leagues in America are consisted of Major League Baseball (MLB), the National Basketball Association (NBA), the

National Football League (NFL), and the National Hockey League (NHL). It has certainly been said that sports in America reflect the greater society as a whole. Many people may believe that racial discrimination and segregation is a problem that has ended at the time when slavery ended; but past research says otherwise. This raises the question, is there in fact racial discrimination still occurring in professional sports today? Evidence from the 1970's to the early 1990's shows that there was indeed racial discrimination and segregation in professional sports by the way of unequal employment opportunities and unequal payment of salaries, but this is very outdated data. I conducted my research by interviewing current professional athletes to gain insider knowledge from players that are playing at the professional level and measure discrimination to see if discrimination is occurring in this present era. From this I was able to create a qualitative analysis of the athletes' perceptions of racism in sports, this analysis is be very beneficial in comparing how athletes of different races perceive racism on the job. My findings from these interviews varied from the participants as they expressed that every players' view on racism is shaped on three central things; a player's perspective, stereotypes that they might have encountered in their lives, and their personal experiences in certain situations. Current quantitative findings show that there is in fact a substantial gap in "central" positions in the NFL and MLB. Central positions can be explained as head coaching positions in management, and the quarterback position among players, which favors white athletes. This gap shows that there is structural discrimination occurring in sports among those in decision making positions.

## **Michelle Chen**

Chinese + American = Chinese American

Nowadays there are more and more Chinese people immigrating to the United States every year and many Americans feel that Chinese immigrants should make a bigger effort to integrate themselves into

American culture. According to Peter Kwong, author of *The New Chinatown*, “many Americans believe that today’s Chinese immigrants should assimilate and make an effort to become ‘American.’ They should first learn the language, even if it means going to night school after a long day of work. They should appreciate hot dogs and understand baseball. They should interact with Americans instead of those from their own descent. Ethnic ghettos may exist, but they should be a transitional stage, serving as a home for newcomers until they learn English and adjust to the American culture” (Kwong, 23). My paper is about the blatant disregard for an immigrant’s right to identity, which has led to many misconceptions. Chinese immigrants are hardworking and self-sufficient, and it is their right to keep their culture, even when they are in a foreign nation unaccepting of their traditions. In fact, it is very commendable that the Chinese want to maintain their culture and tradition as well as their strong sense of unity. Working hard for the next generation, Chinese immigrants do not apply for handouts. The children of these immigrants see their parents working so hard to achieve the American Dream, this pushing them to work hard in school despite their language deficiencies. Additionally, this leads to them setting up their own governments and protections, since no American police force or government officials are willing to work in Chinatown. The message I want to send out is that we cannot change history, but we can learn from our mistakes and try to improve from them.

## **Kristen Chikami and Clarissa Burquez**

The Effects of Two Telomerase Activators Derived from the Astragalus Root, TA-65 and HTA, in Human T Cells

Telomeres are structures of nucleic acid repeats at the ends of chromosomes that protect the genetic information carried within the chromosome. As cells repeatedly go through the cell cycle, the telomeres shorten with each division. The gradual shortening of telomeres has been

correlated with aging and increased chances of contracting diseases. Cells divide until their telomeres reach a critical length that prevents further rounds of cell division, entering a state of cellular senescence. To delay senescence, cells make use of the enzyme, telomerase. Telomerase lengthens the telomeres by adding TTAGGG repeats to the existing telomeres. Previous research has shown that extracts from the *Astragalus membranaceus* root can increase telomerase activity in T cells. In this study, two telomerase activators derived from the *Astragalus* root, TA-65 and HTA, were tested to determine their effects on telomerase activity, the pathway used for activation, and replicative capacity in human CD4 and CD8 T cells from 6 healthy donors. T cells were treated with TA-65 or HTA and compared to the control group of T cells. The enzymatic activity of telomerase was measured using a telomeric repeat amplification protocol (TRAP) assay. Results showed that TA-65, but not HTA showed a significant increase in telomerase activity by 1.3 to 3.3-fold as compared to the control in the 6 donors. TA-65 also significantly increased the proliferative capacity of the T cells after primary and secondary stimulations. Treatment with pathway inhibitors suggested that TA-65 uses the MAPK pathway to activate telomerase. These findings show the importance of testing different telomerase activating compounds for their effects on telomerase activity and suggest that TA-65 is a possible method of treatment to delay the onset of aging in human T cells by increasing their levels of telomerase activity.

## **Kristan Cleveland**

### **Overproduction of Free Fatty Acids in *Escherichia coli***

The rapid depletion in fossil fuels reflects a growing need for the production of renewable and sustainable large-scale fuels. Synthesis of free fatty acids in *Escherichia coli* represents an ideal strategy for converting sugars to biofuels due to its large metabolic knowledge base and ease in manipulation. Fatty acids produced by *E. coli* are energy rich with a low

solubility in water, and because of this, it can be argued that they are the most useful precursor to the production of a sustainable biofuel. This study shows that the introduction of thioesterase, an acyl-acyl carrier protein synthesized from *Umbellularia californica*, into an engineered strain of *E. coli* allows for overproduction of fatty acids. As reduction to fatty esters and alkenes ensues, the generation of readily used biofuel is feasible. After extraction and purification, GC/MS analysis quantified the fatty acid synthesis from cultures of overproducing and non-overproducing strains of *E. coli*.

## **Meghan Couch-Edwards**

“What it Means to Be an ‘American’: Non-White Perspectives on a Redefinition of US Culture

Recent studies on the demographics of the United States show a dramatic shift in the amount of non-Hispanic whites that comprise the country. Whereas in 1960, whites made up around 85% of the population, it is predicted that in 2050 it will shrink to less than 50% (Taylor and Cohn). As previous research focuses on the assimilation process of immigrants and how their language and identity have been affected in a new culture, there has been little research done on how non-white, US-born citizens culturally identify. A new definition of US culture, as well as what it means to be an “American”, is necessary. How do second and third generation US citizens self-identify culturally and racially in the United States? What aspects of their family’s culture continue in the US and how has that been facilitated or hindered? This research uses qualitative interviews with non-white Whittier College students ages 18-23 to gain an understanding of this ethnic and cultural shift. The majority of the respondents believe that it is possible to simultaneously be a part of both cultures at once, even if there is a discrepancy between their family’s original culture and how they place themselves in US society.

## **Ian Cromwell**

### **Surgical Interventions for Damage or Disorders to the Lumbar Spine: An Examination of Current Techniques and Materials**

Until recently, spinal procedures were not commonly performed due to the complications and pain associated with the procedures. New procedural methods and tools have made it possible to recover from these highly invasive spinal surgeries and live with less pain and better functionality. Several articles were reviewed to determine the advantages and disadvantages of certain spinal procedures. The two primary methods observed were the spinal fusion surgery and the disc replacement. Both were found to have quite similar effects in most areas. The overall pain reduction, functionality, and recovery was slightly higher for disc replacement surgeries, but any significance was minimal or excluded. The major problem seen with fusions was a domino effect resulting from lack of motility that causes adjacent discs to degrade causing pain and usually requiring further surgeries. Similarly, the disc replacement causes excess motility that can move the adjacent discs beyond normal functionality and cause damage to the intervertebral discs. The use of both techniques is called a hybrid surgery and can successfully counteract the disadvantages of either procedure on its own. The alternative to this hybrid method is a dynamic rod surgery that supports and spaces the vertebrae with a polypropylene rod allowing motility while retaining its structural integrity.

## **David de Leon**

### **Challenges Faced by Female Athletes (Physical/Mental Obstacles and Social Influences on Women Athletes)**

As women athletes are starting to gain more attention and recognition, society begins to create an ideal image of what a professional woman

athlete should look like. The media has portrayed this image as a fit athlete who is simultaneously capable of succeeding at their sport and displaying their femininity. These advertisements have caused athletes to chase this ideal image and emulate the star athletes of today. Thus, some athletes deal with issues regarding their identity as well as their body image and can suffer lasting effects such as bulimia or anorexia. Research has shown that female collegiate athletes are in a constant struggle to reconcile being a woman with being an athlete. This research documents the struggles women athletes go through today, the effect the media has on the public, and the cultural understanding of what it means to be feminine. I plan on using in depth interviews with collegiate woman athletes varying from Division 1 as well as Division 3 athletes. The interviews from these individuals will come from an array of sports like swimming, track and field, basketball, water polo, soccer, volleyball, and lacrosse. These individuals will give me a better understanding of some of the issues women athletes face in college as well as their self-identification regarding femininity. My initial findings so far have contrasted previous research regarding the mass media's effect on women athletes, but much of the other aspects or struggles that female athletes go through even today have matched previous research findings.

## **Breann De Santiago**

### **The Effects of Soy-derived Phytoestrogens on the Innate Immune System of *Caenorhabditis elegans***

Nutraceuticals, such as phytoestrogens, are plant-derived substances that are thought to have many benefits that improve human health.

Phytoestrogens are estrogen like molecules that have been shown to decrease reactive oxygen species (ROS), decrease oxidative damage, and improve immunity in both animal and human cells. Studies have also shown a correlation with improved life span. The nematode animal model, *Caenorhabditis elegans* (*C. elegans*) is an excellent model for

research investigating interactions between host and pathogen, as they have a short life span and possess an innate immune system (mediated through the DAF-2 Insulin-like pathway) that is homologous to some advanced organisms. In this study, we investigated the effect of phytoestrogens (daidzein, genistein, or genistein/daidzein) on innate immunity using the wild type N2 strains and three mutant strains (AKT-1, DAF-16, and AGE-1) found to affect the DAF-2 Insulin-like pathway. The various strains were treated with phytoestrogens from the first stage of development until they reached the 2-day old adult stage, at which time they were immunologically challenged with the bacterial pathogen (*Pseudomonas aeruginosa*) and monitored for mortality over an 80-hour period. Our preliminary findings show that phytoestrogen treated wildtype N2 strain showed a statistically significant reduced mortality when treated with daidzein, AKT-1 mutants had a statistically significant reduced mortality, and the AGE-1 mutants showed a statistically reduced mortality when treated with the phytoestrogen genistein. There was no statistically significant difference observed for the DAF-16 mutant strain. Taken together, our results indicate phytoestrogen administration to *C. elegans* is correlated with an improved immunity when challenged with pathogenic bacteria and that this improvement might be mediated through the DAF-2 Insulin-like pathway.

## **Alyssa Fluss**

### **A Potential Explanation for Invasion of Riparian Fynbos by *Acacia mearnsii* in the Western Cape of South Africa**

In the Western Cape of South Africa, *Acacia mearnsii* is an invasive alien plant species capable of transforming riparian forests into near monocultures. Previous studies on adult individuals suggest that *A. mearnsii* reduces surface water availability (Dye et al, 2001) as a result of high transpiration rates, and may be more drought tolerant than native species (Crous et al, 2012). But these studies do not explain how *A.*

*mearnsii* successfully invades. Our study builds on previous work that compared hydraulic properties of seedlings of *A. mearnsii*, and a native species, *Brabejum stellatifolium* (Martinez et al, 2013). Results of this study suggested that seedlings of *A. mearnsii* have greater xylem specific conductivity, and consequently may outcompete *B. stellatifolium* for water. During January of 2014, we measured diurnal rates of photosynthesis, pre-dawn and mid-day water potential, and xylem conductivity on five pairs of *A. mearnsii* and *B. stellatifolium* seedlings along the Holsloot River to expand the scope of the previous study and address the question of whether *A. mearnsii* outcompetes *B. stellatifolium* by decreasing water availability or outcompetes *B. stellatifolium* as a result of a higher xylem specific conductivity supporting higher rates of photosynthesis. Midday water potentials, an indicator of water stress, did not differ significantly between *A. mearnsii* and *B. stellatifolium* (-2.58MPa and -2.88MPa respectively), but *A. mearnsii* had significantly lower pre-dawn water potentials (-0.58 MPa compared to -0.34 MPa;  $p < 0.01$ ). Xylem specific conductivity was significantly greater facilitating higher photosynthetic rates (6.49  $\mu\text{mol m}^{-2}\text{s}^{-1}$  compared to 4.35  $\mu\text{mol m}^{-2}\text{s}^{-1}$  for *A. mearnsii* and *B. stellatifolium* respectively), and *A. mearnsii* maintained higher photosynthetic rates over the entire course of the day. These results agree with the results of the previous study (Martinez et al, 2013), but suggest that competition between *A. mearnsii* and *B. stellatifolium* has less to do with *A. mearnsii* lowering water availability and more to do with greater xylem specific conductivity supporting higher photosynthetic rates potentially increasing growth rates. Higher seedling growth rates for *A. mearnsii* would reduce light availability for native species and may explain why *A. mearnsii* is able to dominate riparian fynbos communities once it has colonized following flood or fire—common agents of disturbance in riparian fynbos. Our results suggest Working for Water, a program designed to provide jobs to remove *A. mearnsii* adults in invaded streams should expand its focus to removal of seedlings following disturbance.

## **Joseph Gabriel**

### *Avocado oil and its Effects on Oxidative Stress and Aging*

Oxidative stress is the imbalance between the production of free radicals and the organism's ability to combat their harmful effects through the use of antioxidants, which have been shown to detoxify and neutralize free radicals. Without having antioxidants to help combat in oxidative stress the accumulation of the free radicals can lead to damage of cellular components that can result in harmful pathophysiological conditions. In particular, avocado oil contains many antioxidant chemicals such as Vitamins A, C, D, E, polyunsaturated fats, and beta-carotene, which on their own have been shown to effectively decrease oxidative stress and damage. With such high amounts of antioxidant chemicals, we hypothesize that organic avocado oil would help improve overall health-lifespan of organisms. Therefore, in this study we explored the effects of two organic avocado oils on the lifespan of the nematode *Caenorhabditis elegans* (*C. elegans*). Briefly, a dose response over 20 days was conducted on two organic avocado oils, Bella Vado avocado oil (B), and Swanson Avocado oil (A). Two concentrations were tested 1:1 (50%) and a 1:4 (25%). Our results showed that at a concentration of 25% oil A did better than oil B and control. Showing that there could be a possible relationship between oil A and increase in lifespan. Future efforts will explore if Oil A at a 25% concentration can also increase resistance to oxidative stress.

## **Alyssa Garcia**

### *A Meta-analysis on the Global Decline of Amphibians*

The global decline of amphibians has become an issue that herpetologists have become concerned with over recent years. Various factors that have been stated to be major causes of the decline include chytrid fungus, the pet trade, introduction of exotic species, habitat loss, UV-B radiation, and

climate change. Amphibians have long been utilized in scientific research and in education, but with a massive decline in their population, the world may not benefit from their use. Consequently, it is important to improve conservation efforts to prevent the decline of rare species that could be critical for scientific investigation, environmental indicators, or as animal models. Human development has increased exponentially due to the explosion of the human population. For this reason, we conducted a meta-analysis to determine if habitat loss was the most recurring factor assessed by scientific literature. We tested this hypothesis by collecting studies that focused on particular factors that were stated to be the main causes for the devastating decline, searching the JSTOR database to identify papers used in the analyses of the population decline using combinations of keywords: amphibian, decline, factors, importance, or medicine, and identifying 40 peer-reviewed articles that provided a statement of the factor most responsible for the worldwide decline of amphibians. The trend showed that chytrid fungus was the most recurring factor and habitat loss was one of the least occurring factors discussed. An increase in disease among amphibians could lead to mass extinction, whereas habitat loss can be controlled with increased conservation efforts and can become less of a threat.

## **Juan Garcia**

### **Evaluation of developmental and long-term effects of chlorpyrifos in PC-12 cells**

Chlorpyrifos is a widely used organophosphate pesticide that inhibits the enzyme acetylcholinesterase preventing the degradation of the neurotransmitter acetylcholine. Therefore, neurons responding to the acetylcholine, cholinergic neurons, will be hyperstimulated. The resulting hyperstimulation of cholinergic neurons affects their development, function, and survival. In this study we used a rat pheochromocytoma (PC-12) cell line to examine the effects of chlorpyrifos on developing

cholinergic neurons. Nerve growth factor stimulates the differentiation of PC-12 cells into neurons with a cholinergic phenotype. Results represent at least three independent trials with six replicates (n=18). Dose-dependent cell death was observed for PC-12 cells exposed to chlorpyrifos during differentiation. Results also indicate that PC-12 cells were more sensitive to chlorpyrifos during mid-late stages of differentiation than earlier stages at a time when mature synapses are forming. Surprisingly, long-term exposure to chlorpyrifos at sub-lethal concentrations beginning at differentiation decreased their susceptibility to hydrogen peroxide-induced oxidative stress. These results indicate that cholinergic hyperstimulation adversely affects neurons during differentiation but may be protective against oxidative stress in mature neurons.

## **Kimberly Gray**

### *Patron-Client Relations in Jamaica: The Changing Role of the Don*

Patron-client relations among impoverished urban communities in Jamaica have seen a shift in the past two decades. Clientelist relationships were formerly between Members of Parliament and the urban poor--mediated by local bosses called "Dons." However, the MP has suffered a loss of power in these neighborhoods. The Don, who formerly lay aside the MP in power and influence has surpassed the MP. The literature studying patron-client relationships in Jamaica focuses primarily on the relationship of the MP to the community. This focus, however, is inadequate. Residents of garrison communities appear to have a particular allegiance and reverence towards their respective Dons. As such, I hope to answer the question: what factors contribute to the allegiance the urban

poor feel towards their Don? In order to understand the patron-client relationships in these neighborhoods I have conducted four interviews with former residents as well as Members of Parliament. Early data collection indicates that terror plays a role in the commitment persons have to the don in their community. Furthermore, it is the personal relationships with the Don's henchmen that better explain the loyalty persons have to their neighborhood and, by extension, the Don.

## **Jonathan Gregg**

### **The Effects of Chlorpyrifos-oxon on Calcium Channel and Neurotransmitter Receptor Gene Expression in *Danio rerio***

Organophosphate pesticides (OPs) are used throughout the world for agricultural pest control. OPs have been implicated in negative health effects across multiple different species - including humans - due to their functional inhibition of acetylcholinesterase and subsequent hyper-activation of cholinergic neurons. In humans, cholinergic neuronal cell death has been implicated in neurological diseases, including Alzheimer's disease. However, understanding the effects of OPs on specific neurotransmitter receptors and calcium channel protein gene expression during development could reveal potential mechanisms for increased susceptibility to neurodegeneration. Here we exposed zebrafish (*Danio rerio*) embryos to a sub-lethal dose, 2  $\mu$ M, of chlorpyrifos-oxon and we isolated RNA from embryos collected at 6, 12, 18, 24, 30, 36, 48, and 72 hours post-fertilization. RT-PCR was performed to amplify DNA for  $\alpha 7$  nicotinic acetylcholine receptor ( $\alpha 7$  AChR), dopamine receptor subunits DRD2A and DRD2B, and calcium channel subunits CACNA1C and CACNB2. For all transcripts, a significant down regulation in mRNA expression was seen at 48 hours post-fertilization. Developmentally, this corresponds to the end of organogenesis and may indicate a developmentally sensitive time point. However, further work is needed to understand the significance of this result.

## **Mikel Guereca**

What Is Your Race? (Select One or More): Examining Race in Relation to Space in Mexican Segregated Schools.

Who is an American citizen? Does eating bread instead of tortillas make you an American? In Southern California circa the early 1900s, eating bread would have made you more American than eating tortillas and beans. My project is not about food, but the racism and segregation numerous Mexican immigrants faced entering the United States. Specifically, my project encompasses schools built to segregate Mexican students and “Americanize” them. Many of these schools were dubbed “Americanization” schools because they promoted American values, including eating bread instead of tortillas. One of the first schools built was the South Raymond School, in Pasadena. The school was constructed because Anglo parents wanted to separate their white children from Mexican children. A decision made clearly because of race. This informal segregation became the basis for several Mexican segregated schools to be planned and built in southern California. My project uses a transnational framework to identify Mexican students’ attitudes toward the segregated schools and how Anglo Americans identified Mexican Americans. Using interviews, newspapers, diaries, school board minutes, teacher’s curriculums, and Mexican consulate memos, I will demonstrate the struggle between Anglos and Mexicans, and Americanization programs and the Mexican Consulate. Just as Americanization programs built schools, so too did the Mexican Consulate to promote a Mexican identity. This struggle between Anglos and Mexicans, or Americanization schools and Mexican Consulate schools shows the fluidity and malleability of Southern California and Mexican Americans.

## **Dennis Harris and Jolene Paige**

Bacterial Inhibition of Select Alternative Medications

Extracts of 4 different over the counter alternative medications were tested against 3 strains of bacteria. The compounds, Goldenseal, Goldenseal and Echinacea, Propolis, and Neem Leaf, all have antibacterial properties in nature. Goldenseal contains multiple alkaloids, such as berberine, hydrastine, and canadine, propolis contains flavonoids such as galangin and hydroxycinnamic acids, and Neem leaves contain nimbin, nimbinin, and nimbidin. These compounds were tested against a typical antibiotic, streptomycin. To determine the effectiveness of each substance, extracts of differing concentrations were made using 70% ethanol and DMSO. These extracts were then tested on *Streptococcus pyogenes*, *Pseudomonas aeruginosa*, and *Bacillus megaterium* using the disk diffusion method. Results indicate that these compounds all differing levels of effectiveness on each type of bacteria, however they all inhibited gram positive bacteria more than the gram negative. Despite the apparent inhibition by these compounds, none were able to reach the effectiveness of streptomycin at similar concentrations.

## **Isaiah Hernandez**

The Effects of Substance Use on Whittier College Students Wellbeing: Does Use Increase or Decrease from Freshman to Senior Year?

College is a period when young people begin to distinguish themselves from their parents and develop their own identity. However, with this newfound autonomy comes greater expectations and more responsibilities which often require those entering adulthood to make some fundamental changes in the way they interact with the world. According to previous research, if college students are not adequately prepared to meet these challenges, the results can often manifest themselves in negative ways--namely, drug and alcohol use. This study examines the effects of substance use on Whittier College students' overall wellbeing by measuring the

negative impact that substance use has on a student's academic performance and social life. Also, this study measures the change in frequency and quantity of use as students progress through college (freshman to senior year). 100 surveys were distributed to Whittier College students in order to assess specific negative consequences of use, frequency and quantity of use in an average week over the last year, class level, and primary drinking motives. In accordance to my initial hypothesis, the rate of use and negative consequences associated with use were higher among freshman than seniors. Overall, frequency and quantity of use tended to decrease as one progressed through college. However, some findings indicate that a number of junior and senior participants continued to use as much or more than they did when they were freshman. These findings suggest that students who are 21 may also be an important target group for prevention and intervention efforts along with incoming freshmen, who are typically under the age of 21. The purpose of this research is to understand the specific substance use patterns and habits of Whittier College students. By analyzing these specific habits, more precise and effective prevention and intervention efforts can be developed.

## **Michael Hoskins**

### **Getting to School: A Review of the Literature on the Factors that Lead to Enrollment in College**

The focus of this literature review is the on factors that help high-school students go to college, as well as the potential dangers while on the road to college that can deter students from going to college. Researchers pay attention to how high schools help students get to college and if there are any other influences such as socioeconomic status (SES), family problems, job expectations, or cultural diversity that impact whether students go to college. The focus of this paper is to target the problems that seem to persist on the path to college for many students so that we can find a way

around them. While the literature reviewed does not have all the answers to these problems it brings a certain light to the problem so that future college-bound students may become more aware of the challenges they face on the road to college. Within this literature contains how well the high school system within both public and private high schools have significantly changed to help its students try and graduate from high school and lead them down the path to college. However, with data I collected from preceding qualitative and quantitative studies conducted by researchers as to high-school completion and college acceptance; some students don't see the path to college or even graduating high school within their grasp. In conducting my research, I would set up a qualitative interview with students from public or private high schools that have graduated or did not earn their diplomas. Students with or without college intention would also be included in the interview process. My overall objective is to comprehend what their experiences were like in high school and how their school helped them or hinder them from seeking higher education

## **Carolanne Hyakuno**

Understanding the Biracial Disadvantage: “One who lives in two worlds, in both of which he is more or less of a stranger” (Robert Park, 1928)

The literature on biracialism generally states that those individuals with diverse identities are more likely to have negative experiences, which will lead to feelings of isolation in society. These feelings of isolation are said to be attributed to a lack of ‘belonging’; biracial individuals are unable to be classified into racial categories, like their monoracial peers thus placing them as minorities within minorities. My research question is: how are biracial experiences affected by environment, education, parents and labeling from peers? To see the differences in how these factors affect

biracial experiences, I interviewed 15 individuals--including half Japanese people who have lived in and outside of Japan and Whittier College students who grew up in the United States. Through qualitative interviews with these 15 biracial individuals, 8 of which were half Japanese and 7 of which are from Whittier College, I have found that this does not seem to be the case. Not only do these individuals have positive experiences, but they also have pride in their diverse identities. While some participants admitted that being biracial as a child meant isolation and discomfort in social situations, all are now proud of their diverse identities, although this pride came with age and later self-acceptance. This can be explained through the overall acceptance of diversity since the 2000 census, which allowed individuals to identify with more than one ethnicity. The interviews indicated two polar kinds of experiences between those who are half Japanese and have lived in Japan, and students here in Southern California. These differences brought to light the importance of issues such as phenotype labeling, parental heritage and culture. All participants so far have stated that society has become more accepting of diverse racial identities but that they are still subject to labeling and racial stereotypes. While these are negative aspects of being biracial, the overall attitude towards their situation suggests that earlier literature on biracialism is outdated and incorrect.

## **Andrew Jimenez**

### Testing ADDLs toxicity by pre-exposure to Chlorpyrifos

Chlorpyrifos is an organophosphate pesticide that is widely used to control insect pests in the agriculture. It acts to inhibit acetylcholinesterase causing hyper-activation of cholinergic synapses in both target and non-target organisms. Since cholinergic neurons are particularly sensitive to damage in neurodegenerative diseases, such as Alzheimer's, we have investigated whether exposure to chlorpyrifos may increase the susceptibility of cholinergic neurons to amyloid  $\beta$ -protein induced cell

death. Firstly, we determined the concentration dependence of chlorpyrifos toxicity in differentiated PC-12 cells. We then exposed differentiating PC-12 cells to sub-lethal concentrations, 25 $\mu$ M, of chlorpyrifos over 4 days. At day 4, Amyloid  $\beta$ -derived diffusible ligands (ADDLs), the toxic aggregates causing neuronal cell death in Alzheimer's disease, were added to the cells and toxicity was assessed after overnight incubation using the MTS assay. This data will provide insight into the potential risks associated with the pesticides in our food.

## **Elizabeth Jimenez**

### **The Efficacy of Acne Moisturizers Against Staphylococcus Epidermidis**

Acne is a prevalent skin condition experienced by most individuals, particularly in their adolescent years. Three major factors contribute to this condition, the enlargement of the sebaceous glands, along with the increased production of sebum and lastly the infection of these glands. There is no specific cause that has been identified; however, research has identified two major bacteria that have shown correlation with the condition. These two bacteria include Propionibacterium acnes and Staphylococcus epidermidis. These two bacteria strains form part of a human's normal face micro flora, in which they are meant to protect human skin from invasion of foreign bacteria and pathogens. However, they can also infect the sebaceous glands and cause an inflammatory response, or pimples. Today there are hundreds of treatments on the market that all suggest having some efficacy against acne, though not all have been compared simultaneously. In this study we utilized three different moisturizers varying in price ranges, Clean and Clear Dual Action, Murad Skin Perfecting Lotion and Shiseido IBUKI Refining Moisturizer Enriched and tested to see which moisturizer had a higher efficacy against Staphylococcus epidermidis. Staphylococcus epidermidis was grown in lawns in TSA agar plates and 7 small filter paper circles were placed in each of the plates with their respective moisturizer. We

performed three separate trials. Our results indicated that Murad Skin Perfecting lotion was the best inhibitor of bacteria growth based on the diameter of the inhibition zone around the filter discs, with an average diameter of .53cm. Despite the greater efficacy of the Murad moisturizer compared to the other treatments, after performing a Ttest it was revealed that our results were not statistically significant. However, our studies could lead to other future studies which could study more in depth the efficacy of Murad Skin Perfecting Lotion against acne.

## **Melissa Manzanares**

### **Feminists and Feminism in the News: A Content Analysis of the Fox News Channel and MSNBC**

Several scholars have examined mainstream media's representations of the feminist movement and have analyzed how the news media frames feminism. This work seeks to build upon this research to provide a more complete understanding of what stories the news media tells about feminists and feminism. In particular, this work examines how both the Fox News Channel and MSNBC represent the feminist movement via a quantitative content analysis of 6 months of news transcripts (August 2012-January 2013). This period was selected as it provides coverage of how both channels represented feminists and feminism during the 2012 presidential election starting from before the Republican National Convention and until after the inauguration of President Obama. Results have supported my hypothesis that Fox News Channel would represent feminists and feminism as more negative than MSNBC. Support for my second hypothesis that MSNBC would provide more positive, neutral, and ambiguous coverage was partially supported, as not all results were shown to be statistically significant.

## **Julia Marino**

## Examining the Relationship Between New Urbanist Theory and Implementation: A Case Study of Downtown Brea

Since the early 1980s, the New Urbanist and Smart Growth design movements have been gaining momentum in the urban planning field as combatants to the growing environmental issue of suburban sprawl. These anti-sprawl movements promote walkable, mixed-use neighborhoods containing a range of housing types and public transportation options. A small but growing number of studies are beginning to test the various claims of these movements in urban planning, such as their supposed positive effects on public health, residential diversity, and community life. Downtown Brea, a 60-acre high-end retail, entertainment, and residential complex completed in October 2000, has been recognized by the California Downtown Association, the National Association of Housing and Redevelopment, and the EPA as a Smart Growth success that created a needed sense of place and a healthy mix of uses amongst the monotony of classically suburban Orange County. This case study examines the relationship between policy, planning, and town design principles set by the Congress for the New Urbanism in its charter, and the real-life outcome of these principles when planted particularly amidst a suburban sprawl dominated region such as Orange County. A qualitative evaluation of those who share space in Downtown Brea tests claims of the New Urbanism on enhanced community life. A survey of downtown residents and collection of in-depth interviews with city officials and businesses suggest that residents of the Downtown Brea redevelopment area are as organically related to their community and its amenities as the Congress for the New Urbanism would have intended, but some key planning principles that would generate residential diversity in race and income are missing. Findings from this study help identify gaps in our understanding of the relationship between the Smart Growth or New Urbanist planning principles for a vibrant, thriving community and how the implementation of those principles plays out amidst a sprawl-dominated region such as Orange County.

## **Francis Maxwell**

### **The Reification of Race and Gender through Advertising: A Look at Viewer Perceptions**

Research has demonstrated that advertisements continue to portray stereotypical images surrounding race and gender, acting as a form of reification; however, few researchers have looked beyond this to understand the perceptions of both consumer and executive producers who are said to incorporate racial and gendered stereotypes into their marketing campaigns. My research asks in what way do contemporary advertisements reify racial and gendered stereotypes through viewer perception. Elaborating on previous research that highlighted the difference in racial representation and demonstration of stereotypical views in advertisements, I gauge the view of those involved in the development and evaluate the knowledge of their role in the reification process, before going on to explore the perceptions of the consumer. In depth interviews were conducted with current advertising executives, in which they were asked to explain their demographic background and perceptions concerning minority representation within the field, before responding to six example images that demonstrated stereotypical views associated with race and gender. I then gathered information concerning consumer views and compared their perception change to that of the advertising executives. Approximately 30 surveys were distributed amongst college students between the age of 18-24. Like the executives, they were asked to respond to the same six images and respond based on how it affected their views. In the final stage of my research, I carried out interviews with approximately 8 of the respondents, representing White, Hispanic, Asian and African American groups, both male and female, and asked them to elaborate on their answers from the survey. My findings suggest that the executives accept the incorporation of stereotypes, they simply portray what the data already suggests. With this they admit a lack

of minority representation amongst their advertising team, which suggests a correlation with what Bonnila-Silva calls ‘White Habitus’.

## **Marissa Meyer**

### Administration of Multivitamin Cold and Flu Remedies on *Caenorhabditis elegans*

Every year when the winter season comes around, drugstores experience an increase in purchases from the medicine aisle for conditions such as the common cold and flu. Despite much advancement in biomedical science & technology, there is no “magic bullet” to cure these seasonal illnesses and boost the immune system all at once. Hence, many people have put more and more trust into holistic and natural remedies, consisting of vitamins and other nutritional prophylactic supplements, as studies have shown the ability of vitamins, such as vitamin A and C, to reduce oxidative stress; which was correlated with an increase in cell viability and health. Some of the more recent trending brands are Airborne® and Emergen-C®, along with a wide variety of generic brands. Therefore, the focus of this study is to investigate the effectiveness of Airborne®, Emergen-C®, and Wellness Fizz to reduced oxidative stress and increase physiological health of the nematode animal model, *Caenorhabditis elegans* (*C. elegans*). Briefly, a variety of physiological experiments were conducted such as longevity/health span, acute and temporary oxidative stress response, and fertility assays. Each experiment was repeated 3-5 times, with each group containing 100 worms per treatment or control. Our preliminary findings demonstrated that while there was an observable trend in increased overall physiological health and reduced oxidative stress, these trends did not reach statistical significance. These results suggest that administration of multivitamin prophylactic supplements to *C. elegans* do not correlate with physiological health benefits.

## **Brytnee Miller**

## The Last Free Place in America: Slab City and How They Found What Society Lost

Since the 1960s, Slab City has been home to a wide variety of individuals illegally squatting on an abandoned military base out in the desert of Eastern California. Along the way the Slabs picked up the reputation for being the “last free place in America”. Freedom is a very broad word and can take on many meanings, but what is it about Slab City that promotes freedom? And how is that sense of freedom sustained amongst the many differing types of people? Squatter communities typically result from a revolt against social norms and laws that constrict and marginalize the poor. This is also apparent in the counter-culture as well, the phenomenon of running away from what society deems as normal and revolting through rebellion of those norms. Slab City also lacks basic amenities that qualify America as civilized, which makes them stand out as a more primitive community. Through a series of interviews and participatory observations I get a glimpse into the lives of the people who make Slab City their home and how they are able to function outside of American ideals, while also looking at the irony of an abandoned military base turned squatter haven. While there are a small number of year rounders, my findings show that most of the people are simply passing through for the season. Contrary to popular terms of freedom, meaning free things, Slab City promotes a freedom to be yourself; “we’re all here because we’re not all there.” The residents of Slab City are not free from government assistance or electronics in totality, it is not a utopian movement away from technology, but a movement towards more sustainable options such as solar panels and bicycles. Slab City is a utopia in its own sense, promoting music, freedom of oneself, and sustainable measures in the middle of one of America’s harshest climates.

**Bianca Mitchell**

## Regional Brain Activation with Exposure of a Putative Pheromone in order to Determine a Functional VNO in Humans

Pheromones play an important role for chemosignal communication inducing further behavioral and physiological responses. Due to the multiple correlations between humans and animal effects from pheromones such as synchronized menstrual cycles amongst roommates and increased female LH levels in response to male sweat, pheromone research remains active. Because of the Vomeronasal Organ (VNO) plays such a crucial role in animal's chemosignal communication, the effect of pheromones on humans is highly questioned. This stems from the belief that the human VNO is nonfunctioning after birth due to factors regarding differing epithelial tissue from a functioning VNO, as well as inadequate gene coding necessary for pheromone signal transduction. Recent findings of links between functioning VNO receptor families of mice and humans lead us to the conclusion that the VNO plays a functional role in chemosignal communication for humans

## **Kelcey Negus**

### “The Prevention of Genocide: Global Solutions for a Global Issue

As our world becomes increasingly globalized, the international community must address certain issues that plague our world today. Genocide in particular has become a global issue that many nations have signed on to prevent and punish. Although the world promised “never again” after the horrific events of the Holocaust, countless genocides have since occurred and continue to ravage our global community. This global issue calls for global solutions that all nations must take seriously to prevent future atrocities. Through my paper I explore ways in which one can truly prevent future genocides: the world must stop the overuse and the underuse of the word “genocide,” demand that the US participate in and support the International Criminal Court, allow human rights

organizations a seat at the decision-making table, and encourage culturally sensitive education.

## **Nouvella O'Bryant**

### **Understanding Colorblind Racism: Through the Eyes of Black Men**

Racism is constantly debated in today's society. Many claim that we live in a colorblind society, a culture beyond race, a place where racism is invisible or completely nonexistent, but this simply is not true.

Researchers argue that the "color-line" does indeed exist and is so deeply embedded into today's society that most whites fail to recognize how they reap the benefits of privilege while others, specifically black men, are socially chastised because of their race. Black men perceive themselves one way, but are simultaneously perceived by others in a different way. So how do black male college students perceive racism in America today? Is it something that still affects them, or has it died out as some would claim? In order to collect data, I plan on doing about fifteen interviews with black male college students of various ages and socioeconomic backgrounds. So far, my results show that black male college students do indeed perceive racism, but it is of a subtle form, more on the lines of color-blind racism than the overt forms of the past. This connects back to the research already done on racism specifically color-blind racism and the perceptions of this concept. Many claim that racism is nonexistent in America today, but a black male would never make this assertion. My research shows that black male college students do indeed perceive racism, and not only do they perceive racism, but they think about it daily, usually several times a day depending on what they perceive. The rationale behind this research is specifically studying black male perceptions regarding racism, a subject which not much research has been conducted on.

## **Robert Oliver**

## Effects of Windward and Leeward Conditions on *Gomphocarpus cancellatus* in the Strandveld Community of the Western Cape of South Africa

Mediterranean Type Ecosystems (MTE) are characterized by mild winter and summer drought. There are five Mediterranean climate regions that make up five percent of the planet's total surface and are considered biodiversity hotspots due to their contribution to the planet's overall species richness. Summer droughts in Mediterranean regions require plant species found there to have a variety of adaptations in order to respond to low water availability. The plant community typical of coastal areas of the Western Cape of South Africa is known as strandveld. This plant community covers the beaches along the Western Cape and has adapted to living in alkaline, calcareous soil that consists of limestone. In the Western Cape coastal environments, hills create windward and leeward areas that can result in different levels of water availability. Onshore breezes in the windward areas may increase water availability due to the presence of fog whereas leeward areas may have a decrease in water availability due to the lack of fog. The purpose of this study was to research whether there were substantial differences in water availability between windward and leeward regions in strandveld by examining the response to summer drought in *Gomphocarpus cancellatus*, a dominant shrub species in the coastal shrub community of Jacobsbaai, South Africa. Previous studies have shown that increased water availability increases water potential, leaf specific mass and carbon assimilation due to the fact that more water availability allows plant stomata to remain open longer. We measured water potentials, leaf specific mass, and carbon assimilation at three sites: leeward, the top of the hill (intermediate), and windward. Water potential and leaf specific mass of individuals on the windward side were higher than those in the leeward and intermediate sites. This community is under pressure because limestone is a key component of cement, and there are plans to mine the strandveld. After mining, the community must be restored. Our study suggests that restoration practices must be targeted to microclimates. A "one size fits all" approach may not

be successful because restoration in these windward and leeward microclimates will face different challenges when it comes to practices that will maximize survivorship during the summer drought.

## **Jolene Paige and David Bourgaize**

### **Goldenseal/Echinacea Extracts vs. Pharmaceutical Antibiotics in the Growth Inhibition of Pathogenic Bacteria**

Pharmaceutical antibiotics are a growing concern for doctors and pharmaceutical developers due to the adaptation abilities pathogenic bacteria can utilize to avoid fatal responses to standard antibiotic prescriptions. Looking into the possibilities of alternate antibiotic substitutes such as goldenseal, which have been thought to naturally kill pathogenic bacteria, can provide us with an alternative to pharmaceutical antibiotics or a starting point for the development of new plant-based antibiotics. A possible component of goldenseal that is suspected to be the active ingredient in its antibacterial properties is berberine, which we hope to extract in our samples. We tested the effects that goldenseal extracts of ethanol and DMSO had on the growth of different pathogenic bacteria at different concentrations with inhibition disc suspensions on growing bacterial lawns. We compared our results with the results of amounts of visible growth inhibition done by streptomycin, a common pharmaceutical antibiotic used to treat bacterial infection. The inhibition of bacterial growth by the extracted components of goldenseal shows possible starting points for the development of alternative bacterial infection treatments that have previously developed antibiotic resistance.

## **John Paul Paniagua**

## Removed from Where They Can Be Dangerous: The Spanish Policy and Practice of Indigenous Exile from Northern New Spain, 1700-1800

Between 1773 and 1816, a total of over 3,000 Apache peoples were forcibly removed from their lands in the American Southwest and sent to Mexico City where the Viceroy of New Spain would distribute them as house servants or exile them to a life of labor in Cuba. The journey was arduous, of the 3,000 known to have been sent south, approximately 1,500 survived the journey to Mexico City and even less made it to Havana. Spanning the mid eighteenth to early nineteenth centuries, this study is a political history of the policy and practice of exiling Apache peoples and a cultural history of the manner in which the “Apaches”— a diverse set of autonomous nations— were constructed to be the official enemy of the Spanish crown on the far northern frontier. Using a mixture of archival and published colonial documents ranging from receipts and reports, to royal instructions and other correspondence, the paper shows the progression of the policy and its manifestation on the fringes of empire. By weaving these documents together, the paper seeks to illustrate the Apache experience among the broader history of forced migrations and to more deeply understand the contingencies which made the exile of Apache prisoners of war possible. Noteworthy discussions include the shifting landscape of Spain’s presidio system, the disorganized contours Spanish-Apache policy on the northern frontier, the Apache experience on their journey south, and their variegated means of escape. The research is done within colonial borderlands history, but also contributes to our understanding of Atlantic and Latin American history as well.

**Brian Phung and Hyesoo Kim**

## Evaluation of Antifungal Herbs on Filamentous Fungi Using a Rapid Screening Technique

Phytochemicals have been studied as antifungal agents due to the growing resistance of fungi to current medications. The demand of these reagents has increased due to the rising in number of immune-deficient patients worldwide. Current methods for screening antifungal herbs involve the lengthy CLSI method (M38-A2). Here we used a novel rapid screening technique to evaluate the inhibition of filamentous fungal growth by Bayberry Root, Elecampane, Goldenrod, and Wood Betony. Filamentous fungi were grown on potato dextrose agar plates and ground in Delbecco Medium with Fetal Bovine Serum. The slurry was filtered using a #1 Whatman filter and used for testing with the various herb preparations. Herbs were extracted with methanol, filtered, rotoevaporated, and then diluted in DMSO. Initial transmittance at 625 nm was taken after preparation and subsequent readings were taken hourly after overnight incubation at 37°C. Bayberry Root, Elecampane, Goldenrod, and Wood Betony yielded inhibition percentages of  $32.1 \pm 3.7$ ,  $47.1 \pm 7.9$ ,  $34.5 \pm 15.8$ , and  $10.0 \pm 4.7$  respectively, at 50% growth of the control fungal preparation. These data demonstrate that our herb preparations show significant inhibition of fungal growth and this study will be expanded to include related filamentous fungi as well as additional herbs.

## Jacob Porter

### Meta-analysis Comparing the Efficacy of Newer Approaches to the Treatment of Acne vulgaris

Acne vulgaris affects nearly 80% of individuals at some time between the ages of 12 and 24 years. It is defined as a disease of the pilosebaceous unit, including abnormal sebum production, follicular epithelial desquamation, bacterial proliferation, and inflammation. This multifactorial pathogenesis of acne causes implications when treatments are considered. No one compound has been shown to effectively treat multiple types of acne. This

has caused the rise of popularity in combination therapies, which have been shown effective in treating acne in many studies. Our objective was to evaluate the efficacy through meta-analysis of three combination therapies in overall acne lesion reduction of both inflammatory and noninflammatory lesions. These therapies include benzoyl peroxide with salicylic acid, benzoyl peroxide with clindamycin, and benzoyl peroxide with adapalene. We also compared the results of the single compound benzoyl peroxide with the combination therapies to observe evidence proposing the increased efficacy of combination therapies. Our analysis showed that combination therapies were more effective in reducing acne lesions compared to benzoyl peroxide's therapy, and that adapalene with benzoyl peroxide appeared the most effective out of the other combination therapies.

## **Amer Rashid**

### Untitled Project

Since the Treaty of Westphalia, the concept of national sovereignty has reigned supreme international law. This idea creates an extreme amount of tension when issues of humanitarian violations require nation-states to intervene into the personal sovereign business of other nation-states, creating circumstances in which the people of the world have to watch as heinous humanitarian rights violations plague any particular region in any given time. After analysis on internationally agreed upon definitions of sovereignty, humanitarian intervention, and the crime of genocide as case study, an argument suggesting that sovereignty is in fact conditional for the sake of humanitarian intervention is made. Thus, a way for the international community to begin to eventually predict potential vast humanitarian crimes like genocide, begin prevention through the implementation of conditional sovereignty, and finally protecting the citizens of the international community.

## David Raygoza

### Quantitative Easing and Manufacturing Industry-Level Output

What factors impact industry-level output in the United States? During the 2008 Financial Crisis, the FED enacted a series of bond buy-backs, known as Quantitative Easing (QE), to stimulate the U.S. economy. As short-term rates are near zero, the FED purchased longer-term treasuries to keep low, or influence the rates to remain low. QE also consisted of the FED purchasing risky assets and securities such as mortgaged-backed securities in an attempt to create more liquidity in the market and rescue the economy from further distress. Generally speaking, QE increases the money supply, resulting in downward pressure on interest rates and, thus, stimulates economic activity by encouraging increased investment and interest-sensitive consumption. While interest rates are low, theory and empirical evidence allows assumption of possible effects of QE: 1) Firms will find it attractive (unattractive), to borrow, (not borrow) at low rates (high rates), and therefore increase (decrease) investment, resulting in an increase, or (decrease) in the total value of shipments, and 2) As interest rates fall, investors may find it more attractive to take their funds to other countries with higher yields. The potential shift in capital flows from one country to another country will be a possible contributing factor to the decrease in the value of the U.S. dollar. This change in currency value can possibly cause industry-level imports and exports to fluctuate in the long-run, therefore influencing industry output once markets eventually adjust and respond to economic activity. I analyze factors that affect industry-level output in the U.S., and more recently, the magnitude of QE after the financial crisis on industry output. I utilize past research on QE and general monetary policy. I observe the predicted changes on the value of shipments for U.S. industries with QE. I also analyze factors that may alter investment decisions, resulting in changes to the total value of shipments by accessing the Federal Reserve Economic Database (FRED), for the interest rates, the consumer confidence index, and capacity utilization rate

data. Results show that QE boosted industry output during the first few years of QE. Findings indicate that further research in the specific area should be considered.

## **Miranda Raymond**

### **Examining Effects of Organophosphate Insecticides on Organisms**

Organophosphate pesticides act through the inhibition of Acetylcholinesterase (AChE). Acetylcholinesterase degrades acetylcholine in the cholinergic synapses. As a neurotransmitter, acetylcholine plays a very important role in muscle contractions and movements.

Organophosphate pesticides work by targeting the central nervous system of insects which leads to their paralysis and death. Humans are exposed to these organophosphates due to residues on our food and products for residential pest control. This meta-analysis looks at patterns seen in the exposure of organisms to three common organophosphates which include chlorpyrifos, diazinon, and dichlorvos. The organisms researched include mice, *Xenopus*, zebrafish, and the nematode *C. elegans*. Chlorpyrifos, seemingly being the most toxic of the three, often caused severe defects in development in *Xenopus* and zebrafish and caused organisms to have a significant decrease in neuromuscular activity. Other effects seen include a decrease in serotonin and dopamine levels, delayed response to touch, and at high levels of exposure, paralysis leading to death. Together, these data indicate that it is important to understand the biological effects of these pesticides.

## **Brandon Rista and Vicki Mercado**

### **Investigating the physiological differences between invasive *Acacia mearnsii* and native *Brabejum stellatifolium* in a riparian fynbos ecosystem**

The fynbos biome in the Western Cape of South Africa is one of the five known Mediterranean climate-based regions on the planet, known for its

richness in biodiversity. Riparian fynbos zones have been impacted by the invasion of alien vegetation with efforts of restoration in place to try and reestablish native species. Invasive species are a large threat to native biodiversity. The purpose of this study was to investigate the physiological differences between native *Brabejum stellatifolium* species and invasive Australian *Acacia mearnsii* in Dwarsberg, South Africa and to identify the mechanism through which invasion takes place. Previous studies have shown *A. mearnsii* adults to have higher drought tolerance compared to native *B. stellatifolium*. Measurements were taken of photosynthesis, water potential, leaf mass, and leaf area for locations where native *B. stellatifolium* was in close proximity to *A. mearnsii* and *B. stellatifolium* in sites that did not have invasive species in close proximity. *B. stellatifolium* growing without *A. mearnsii* in close proximity showed higher water potentials and rates of carbon assimilation, suggesting that *A. mearnsii* may be reducing water availability and increasing water stress for *B. stellatifolium* growing in closer proximities. Rates of carbon assimilation for *B. stellatifolium* in close proximities to *A. mearnsii* were shown to decrease not only due to the reduction of water availability but also because of decreased light availability due to shading. Decreased leaf mass and surface areas in the leaves of the *B. stellatifolium* growing near *A. mearnsii* reflect the same trend. These results strengthen the argument that overall growth and development of native *B. stellatifolium* are negatively affected, the closer the proximity to invasive *A. mearnsii*. More research is needed in order to fully understand the effects invasive species have on other native plants within fynbos riparian zones for clearer and conclusive results to help guide government action toward regulating the strategies for fynbos ecosystem restoration.

## **Samantha Rodriguez**

Exploring the physiological effects of the fruit, *Morinda citrifolia* (noni) on the nematode *Caenorhabditis elegans*

Modern day diets among the general population may lack many essential nutrients that are imperative to good health. Many individuals seek out nutritional supplements to help them attain and maintain good health. For this reason, much attention has been drawn to the health benefits of nutraceuticals, plant derived molecules. In particular, the tropical plant *Morinda citrifolia* (Noni) has been shown to have antitumor, antioxidant, anticancer, and immunomodulatory properties when administered in the form of fresh fruit or fermented juice by both in vitro and in vivo studies. In this study we explore the effects of Noni administration on fertility, longevity, oxidative stress and metabolism in the nematode animal model *Caenorhabditis elegans* (*C. elegans*). We hypothesize that Noni exposure to nematodes will correlate with increased health benefits, such as improved longevity and increased resistance against oxidative stress. Briefly, nematodes were administered Noni in their regular OP50 diet or OP50 alone as a control and assessed for physiological health by testing its impact on fertility, longevity, and oxidative stress resistance. Fertility was assessed using both egg production and the egg-laying rate, longevity was assessed scoring for survival over a period of 35 days. Oxidative stress was estimated by studying acute and temporary oxidative stress exposure. Temporary oxidative stress was evaluated by pretreating nematodes with or without Noni and exposing the nematodes to Juglone; an inducer of oxidative stress for a 24-hour period and subsequently scoring for survival over a 20-day period. Acute Oxidative stress was measured by pretreating nematodes with or without Noni, followed by a lethal dose of Juglone then scoring for survival every 30 minutes for 4 hours. Our preliminary results indicate that while a low dose of Noni (5.75 mg/mL) does not

impact fertility, its administration is associated with a statistical increase in longevity. Noni administration also showed an initial statistical increase in the ability of *C. elegans* to resist temporary oxidative stress, although the increase was not maintained over time. Lastly, the administration of Noni did not statistically show an increase in the ability of the nematodes to resist acute oxidative stress, however a clear increase in survival of nematodes treated with Noni was observed. These results suggest that the effects of Noni are promising and require additional exploration, such as effects on immunity. Furthermore, the results of our study lend added support demonstrating the health benefits of Noni supplements.

## **Julie Sanchez**

Le non-dit dans *Les Triplettes de Belleville* (2003)/Dialogue without Words in *The Triplets of Belleville* (2003)

Can a movie convey a compelling story completely without words? I argue that director Sylvain Chomet succeeds at just that in his 2003 silent French animated movie *The Triplets of Belleville*. My presentation will examine how Chomet's film displays expert storytelling utilizing an array of cinematic devices other than speech. First, I will analyze how the pantomime and strategically chosen musical selections work in tandem to grasp at the emotional core of the film, which tells the story of an old woman searching for her kidnapped grandson. I will also examine how the inclusion of a family at the heart of the film adds emotional weight to the otherwise satirical tone of the film. Secondly, I will discuss how the choice to tell this story through animation allows Chomet to powerfully satirize modern French social trends through the characters' actions and appearances, in the absence of speech. Finally, I will examine how the film reflects France's struggle to define what it means to be French in the age of globalization. The titular Triplets and the main character, Madame Souza, represent the "Old France," while the town of Belleville represents the mysterious "New." The women's struggle and ultimate triumph

demonstrate belief in the primacy of the old ways. The film itself constitutes a meeting of the old (silent movies) with the new (computer-enhanced, hand-drawn animation.) My paper argues that in utilizing “the unspoken,” Chomet presents viewers a more effective critique of globalization that is deeply nuanced not through the dialogue, but rather through cinematic technique and, thus, makes for a more visceral cinematic experience.

## **Elizabeth Sánchez**

La Double-Vie De Lilia dans “Satin Rouge” (2002)

In Raja Amari’s 2002 film “Satin Rouge,” Lilia, a young widow, struggles to find a balance between her life as a reserved, respectable mother and the freedom of expression her love of bellydancing could offer. The purpose of this paper is to show how an Arabic woman manages to reconcile her traditional upbringing with her extroverted image of herself. In this paper, I will explore the presence of doubles in the film, as a representation of the dichotomy of Lilia’s life. These dichotomies reflect the division of her identity. Second, I will look at the role of the mirror as a persistent image and how the director uses it as a symbol of transition in Lilia’s life. The mirror also allows Lilia to see the manifestation of her interior feminine spirit on her exterior appearance. Lastly, I will consider Lilia’s daughter’s wedding as symbolic of the unification of her two identities. This in turn allows her to find a balance between being a modern, «femme libérée» and still identify with her traditional background.

## **Hayden Schmidt**

The in vivo and in vitro Efficacy of a Novel Oxime Reactivator of Zebrafish acetylcholinesterase Following Inhibition by Organophosphates

Organophosphates (OPs) are ubiquitous compounds that covalently bind to the active site of acetylcholinesterase (AChE), the enzyme that degrades

acetylcholine at the cholinergic synapse, causing physiological dysfunction systems and in severe cases death. Currently, the oxime 2-PAM is used as a standard treatment for OP poisoning, but it does not effectively penetrate the blood brain barrier. A promising candidate to replace 2-PAM is the novel oxime RS-194B. However, little has been done to compare the two in vivo. First, we evaluated the suitability of the zebrafish (*Danio rerio*) model system for in vivo tests by comparing the oxime reactivation and reversible inhibition kinetics with recombinant human AChE to zebrafish AChE isolated from tissue homogenates. Data revealed that zebrafish AChE demonstrated similar reactivation kinetics to human AChE, but binding affinity of the oximes to substrate-bound enzyme differed. Overall, 2-PAM was more efficient in vitro than RS-194B for both enzymes. In contrast, in vivo studies indicated that RS-194B was more effective than 2-PAM at rescuing zebrafish embryos from OP-induced increases in spontaneous movements. We believe that these data suggest that RS-194B is a promising OP antidote, and that zebrafish can be an effective pharmacological model for evaluating future OP antidotes.

## **Jenna Schonfeld**

### **The Nonprofit Entity – Strategies to Enhance Organizational Effectiveness**

Nonprofit organizations (NPO) serve a vital role in today's society, bridging the gap between the government and the private sector. In many ways NPOs are considered to be a safety net for a vibrant democratic society. Thus, NPO have to maintain cutting edge strategies to be efficient and effective with the limited dollars they receive. What business strategies demonstrate to be most effective in a nonprofit world? I arrive at this research question due to my recent fieldwork experience with a well-known NPO, The Special Olympics. The literature reviewed has shown that evaluations are a consistent component of ensuring quality programs and services for NPO. The Special Olympics are constantly utilizing feedback as a crucial component of organizational growth and

during my time spent within the organization, I was able to observe the evaluation process first hand. Taking on the role as an evaluation lead for the 2013 Fall Games held in Fountain Valley, CA I assisted in distributing a formatted evaluation survey for various participants of the two-day event. Post event I was responsible for transcribing the responses into a written report, which is presented in this study as a key element of effectiveness. To retrieve a larger and more diverse sample size, I created an online survey based on the key elements of organizational effectiveness that were found to be consistent in previous research done on this topic. The survey was distributed via survey monkey to staff members from the Special Olympics as well as employees and volunteers of other NPO that I had the opportunity connect with. The cohesive findings presented in this study analyze the importance of recognizing effectiveness in the nonprofit sector.

## **Carlee Shults**

### **Place-Making in Sociobiological Networks: Stakeholders' Responses to the Asian Longhorned Beetle in Worcester, MA**

In response to the discovery of the non-native Asian Longhorned Beetle (ALB) in 2008, the United States Department of Agriculture implemented eradication strategies in Worcester, Massachusetts, and the surrounding towns, in order to preserve the hardwood forests of New England. This research highlights the importance of drawing connections between multi-scalar and positioned perceptions of this eradication, moving beyond invasion biology to paint a more holistic picture of the introduction and interactions with the “invasive” species. Informed by the concept of place-making, or situating lived experiences with material culture, social networks, and policy, this presentation investigates how nature and culture coincide in the lives of stakeholders affected by the nonnative insect. Place-making illustrates the intricate connections between humans and the environment in Worcester, MA, as the local

environment comes alive through stakeholders' interactions with and perceptions of it. Through in-depth interviews with policy makers and town officials, and focus groups conducted with residents in highly impacted areas, the complex navigation between local and expert knowledge of trees, as well as complexities in the circulation of information, gives insight into stakeholders' understandings of their homes and environmental communities, promoting an approach for future prevention of nonnative species that legitimizes the knowledge of an entire community.

## **Shavontae Simpson and Jacob Arango**

Exploring the Relationship between Hand Hygiene Practices among College Students and the Rates of Common Communicable Diseases at a Liberal Arts College

Several studies have demonstrated the role of hand hygiene as a preventative measure for infectious diseases in confined spaces. The purpose of this study was to determine the hand hygiene practices among a liberal arts college community and identify bacteria found in restrooms, in order to analyze their relationship to the rates of common communicable diseases. 94 hand hygiene observations were made in the women's restrooms in 4 different buildings on campus considered to have the most foot traffic. The men's restrooms displayed 122 hand hygiene observations in the same buildings. Two bacteria samples were collected from the three most touched surfaces in each restroom before and after disinfection. The largest colony was selected; gram stained and identified using EnteroPluri-Test. Case numbers for infectious diseases and agents were gathered from the Student Health Center and used to calculate incidence and prevalence rates. Out of the 94 observations 79% of the women performed some form of hand hygiene; 11% washed their hands with water only, and 89% washed their hands with water and soap. Whereas out of the 122 hand hygiene observations 44% of men performed

a form of hand hygiene practice; which consisted of 50% of the men washing their hands with soap and water. The Cold (nasopharyngitis, rhinopharyngitis) had the highest prevalence rate of 6.9%. This study demonstrated a higher than expected use of hand hygiene among women on a liberal arts campus and a low rate of the common cold. This study also demonstrated an almost equivalent ratio of men who washed their hands with water as opposed to water and soap, which agreed with our hypothesis that men would show a low compliance level to hand sanitizing practices.

## **Shavontae Simpson and Jeanette Kwasino**

### **Determining Biodiversity in South Africa: The Impact of Limestone on Strandveld Species Diversity and Species Density**

The Western Cape of South Africa is one of the world's species diversity hotspots. Strandveld or Strandveld Fynbos occurs along the coast and is rich in endemic species which are predominately succulent species that produce spectacular spring flower displays. Conservation of Strandveld is a priority due to the demand for limestone for cement. The presence of limestone acts as a neutralizer for acidic soils and may impact water availability as well. Removal of limestone as a result of mining is likely to complicate successful restoration of this plant community. In this study we observed the species diversity and species density and investigated community structure using three native species: *Euphorbia mauritanica*, *Euphorbia burmannii*, and *Afrolimon capense*. Limestone in our study area either occurred as an aggregated outcrop, or as a patch of dis-aggregated limestone rocks. We examined a total of ten 5x5 m plots in five natural/ aggregated limestone areas and five unnatural/ dis-aggregated limestone areas where all three of the native plants used for community structure analysis were present. The total number of individuals for each species within the plots was recorded. We also identified the three nearest neighbors to our three native focal species in all of the plots. Species

diversity and species density were calculated for all plots. Of the 35 species encountered nine had more individuals on aggregated plots vs. dis-aggregated plots and eight had more species on dis-aggregated plots vs. aggregated plots. There was no difference in species diversity among the aggregated and dis-aggregated plots. Nearest neighbor analysis is still underway. Our results suggest that restoration using dis-aggregated limestone may result in decreased species diversity, since roughly 25% of the species in our study had reduced density in the dis-aggregated plots. The removal of limestone outcrops by mining for cement may permanently alter the species composition of Strandveld, suggesting that reserves, not restoration are a better approach for mitigation of mining damage.

## **Gage Smith**

### **Integrating the U.S. Army**

This is a review of the literature on the history of the integration of women and African Americans and now lesbians and gay men into the United States Army. The low rates of minorities and women serving in the Army and serving in the capacity of officers has led policy makers to implement strategies and policies that aim to better incorporate these groups of people into the Army. In considering the importance of building a diverse Army, it is first necessary to take into consideration four factors (1) the nation has diverse adversaries that span broad regions, cultures, and genders. (2) The Army is an emissary of the nation, and an agent of democracy abroad. (3) The Army is deeply connected to other political institutions, and private organizations. High-ranking leaders in the Army have close relationships with politicians that help to shape U.S. foreign policies. (4) Serving in the military more broadly has been historically associated as a means of legitimizing citizenship. In order that the United States Army remain a viable deterrent of enemy aggression, as well as, an agent of democracy abroad, and represent the voice of minorities in

shaping foreign policy it is necessary for the institution to be as diverse as the issues it deals with.

## **Claribel Solorio**

### Biomechanical Comparison of Elite and Intercollegiate Female Long-distance Runners

The biomechanics of two female long-distance runners were analyzed: one intercollegiate runner and one elite runner. The Dartfish Software Program allowed for the identification of joint position and joint degree movement at various phases of the running cycle. It was known that the intercollegiate athlete suffered from patellofemoral pain syndrome (PFPS), while the elite runner had no chronic knee pain. Current knowledge about the causes of PFPS suggests that specific faulty mechanics contribute to the development of this overuse injury. Specifically, Ferberer, Hreljac, and Kendall (2009) identified overuse injuries as constant application of small forces which eventually cause enough damage to result in an injury. This experiment identified faulty mechanics of each individual by comparing each individual's biomechanics to the ideal running form. In particular, the stance phase and the acceleration position of the knee gave the greatest insight about faulty mechanics. In 1979, Broer Zernicke, stated that when the foot is about to make contact with the ground, the ankle joint should be close to its neutral 90 degree position, the hip should be flexed about 30 degrees, and the knee should be flexed about 20 degrees. It was determined that the intercollegiate athlete had an ankle position of 85.8°, with a hip flexion of 13.5°, and knee flexion of 16.7°. On the other hand, the elite runner had an ankle position of 90.7°, hip flexion of 39.4°, and knee flexion of 16.6°. According to Johnson (2007), excessive

trunk extension during knee extension activities causes an increase in contact forces in the patellofemoral joint. Additionally, knee acceleration was assessed as a possible cause of injury. The intercollegiate athlete's peak knee acceleration was 22.05 m/s<sup>2</sup>, while the elite athlete's peak acceleration was 27.87 m/s<sup>2</sup>. Broer & Zernicke (1979) emphasize the importance of increased knee flexion during the acceleration phase of the swing phase since greater flexion allows for greater knee extension to occur. This greater knee extension will in turn allow the individuals to have a greater propulsion force when pushing off from the stance phase, suggesting greater efficiency. Lack of efficiency will cause faster onset of muscle fatigue, leading to longer periods of improper patellar movements due to the muscles inability to stabilize the patellofemoral joint. This analysis suggests that the intercollegiate athlete's knee ache can be caused by faulty mechanics due to overextension of the hip and a lack of efficiency.

## **Candida Toribio**

### **Monoterpenes Toxicity against House Dust Mites: meta-analysis**

Various studies suggest the reduction in house dust mites (HDM) is imperative for reducing allergic and asthmatic symptoms, especially in people with atopic disorders. Previous studies have found the monoterpene constituents of the *Mentha* essential oil species to have acaricidal effects against HDM. This meta-analysis aimed to find a relationship between carvone and other monoterpenes found in *Mentha spicata* (Spearmint) that might provide a synergistic effect on toxicity against HDM. The databases PubMed and Elsevier Science were searched for relevant literature. Percent compositions and LD50/LC50 values were analyzed for correlations. Seven studies included GC-MS analysis that identified carvone as a major constituent of Spearmint, while only two studies included toxicity effects of Spearmint or carvone on at least one of two species of HDM. No significant correlations could be made from the

limited data available; therefore, more studies are needed to highlight the acaricidal effects of monoterpenes in Spearmint against HDM.

## **Justin Uribe**

Insights on the mechanism of melanomagenesis in *Xiphophorus* hybrids & the effectiveness of astaxanthin against free radical activity

*Xiphophorus* hybrid melanoma is a devastating cancer that is the result of genetic mutations. The metastatic nature of melanoma offers poor prognosis and usually results in palliative care due to ineffective treatment against the cancer. Using the *Xiphophorus* hybrid melanoma model we wanted to determine if the carotenoid known as astaxanthin had any anticancer properties against melanoma and if it had antioxidant capabilities of scavenging for free radicals. During a 100-day trial *Xiphophorus* hybrids supplemented with 500mg/lb of astaxanthin & blood worms showed the highest decrease in melanoma growth (macromelanophores), and an increase in reproductive activity and sample size longevity. We tested antioxidant activity of 10.83% astaxanthin oleresin against ascorbic acid as a control sample. The reducing power and DPPH radical scavenging activity of astaxanthin was shown to be lower than ascorbic acid (Vitamin C).

## **Rebecca Valdivia**

Toxin II from the sea anemone *Anemonia sulcata* as an alternative to chemical pesticides

Modern chemical insecticide use has been shown to promote resistance to the chemicals in pests over time as well as raises concerns for extended exposure to these chemicals for humans. Natural sources for insecticides rely on natural mechanisms to control pests. They are a possible alternative that can potentially target the pests specifically, potentially end the development of resistance, while causing less harm to humans who are exposed to it. The primary objective of this experiment was to test the toxicity of toxin II from the sea anemone *Anemonia sulcata*. Sea anemones have various polypeptide toxins in their venom including toxins that target the activation of insect specific voltage gated sodium channels. The specified toxin was tested on wild type *Drosophila melanogaster* by diluting fly medium with toxin in five concentrations ranging from 30  $\mu\text{M}$  to 3 mM. We did two replicate tubes per each concentration of toxin. We predicted that this venom would be strong enough that when ingested orally, would be potent enough to permeate through the stomach lining of the insect and successfully exterminate it by targeting specific voltage gated sodium channels. The venom was effectively fatal to the flies once a concentration threshold of 300  $\mu\text{M}$  was reached. These results suggest that further research performed on toxin II, as well other toxins found in sea anemones can be a step in the right direction towards a solution for the global pest problem.

## **Nikki Wester**

### Preventing Genocide in the 21st Century

After the establishment of international laws dealing with the prevention of and intervention in cases of genocide, numerous genocides have still developed. To effectively prevent genocides in the future, an early warning system using social media and satellites is required. Information can be collected through foreign embassies in the country or region where a potential conflict may arise and technology will play an increasingly larger role as social media, for example, can help bring human rights issues

to light. The use of satellites and programs such as Google Earth will be used as part of genocide prevention just as timely and forceful U.N. peacekeeping action, which will require clearly defined and articulated rules on what it can and cannot do.

## **Stacy Yamasaki**

### Untitled Project

Although intellectual property laws govern the majority of industries that thrive on innovation, there is one creative industry that refuses to require such strict regulation. Due to the fact that it displays such unique characteristics, the fashion industry can attribute its success to a lack of strong intellectual property protection. Unlike any other innovative industry, fashion appears to function effectively by regulating itself. Copying, the very act that copyright and patent laws wish to prevent, plays a key role in the fashion world. Without the ability to draw inspiration from other products, designers would be unable to freely create what they desire. Many consumers would lose access to the latest trends as affordable items are often based on high-quality expensive products. In reality, trends keep the fashion industry going as old creations disappear and new ideas come to life. Designers even freely give credit to their inspiration without the presence of such rigid intellectual property laws. Because the fashion industry has been met with such great success, it is possible that other creative industries may also profit from limited protection.