



URSCA

Student Scholarship & Research

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2018 URSCA Abstracts

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Sebastián Amarillas

Faculty Mentor: Erica Fradinger

The Effect of Body Position on Heart Rate and Blood Pressure Recovery

Understanding variables that impact cardiac output recovery post-exercise is important for competitive athletics, especially in sports that require short intense spurts of energy. Therefore, we investigated how body position can affect recovery from increased cardiac output due to exercise. Briefly, blood pressure (BP) and heart rate (HR) were measured for 18 participants to obtain baseline data. Then participants walked up four flights of stairs three times in a row and BP and HR were measured every 15 minutes until full recovery. During recovery, six participants were assigned to stand erect, six to sit, and six in a supine position. The data shows that participants recovering in the supine or seated position had the smallest recovery time, while the participants in standing positions have significantly longer recovery times (ANOVA; $p < 0.01$). The calculated change in CO was slightly higher in the standing group; however, it was not statistically significant (ANOVA; $p = 0.15$). Therefore, it appears that the standing position had a significant effect on recovery time and was independent of change in CO.

Nicole Arce

Faculty Mentor: Sylvia Vetrone

Effect of Astragalus Membranaceus on Multiple Myeloma and Jurkat Cell Viability

Astragalus membranaceus (AM) is a Chinese traditional herb which has been reported to have broad positive effects on many diseases. It has also

been used extensively as an adjuvant in cancer treatment and is being investigated with regards to its immune-stimulating properties. Studies suggest that astragalus radix, the root of AM, exerts an anticarcinogenic effect through activation of cytotoxic activity and the productions of cytokines. RPMI 8226 and Jurkat cells were treated with AM at different final concentrations (g/100 ml of water) of 8%, 6.25%, 3.13%, 1.56% and 0.78% and cell viability was calculated by staining cells with trypan blue. The average percent viability and T-tests were used to compare the results. All p-values were described by two-tailed analysis. $P < 0.05$ was considered statistically significant. Treatment at the 6.25% dosage, in the RPMI 8226 cells, had a lower cell viability with a p-value of 0.01, compared at a 95% confidence interval. In the Jurkat cells, treatment at both the 6.25% and 8% dosages had lower cell viabilities than the control with p-values < 0.05 . Results showed that there was a statistically significant lower cell viability when cultures are treated with a minimum dosage higher than 6.25% AM for both cultures.

Marisa Arvizu

Faculty Mentor: Anne Sebanc

Positive and Negative Factors Determining Educational Success

Educational success can lead to a multitude of opportunities, and make virtually anything achievable in life. Educational success, or academic achievement, is important to consider because all students should have an opportunity and the ability to become successful throughout their learning experiences in school. Academic achievement can be directly correlated with many protective factors such as parental support, environmental support, and positive peers, and risk factors such as lack of parental involvement and poor social environment. Poverty is the worst risk factor for academic achievement. Social support is the most important protective factor for promoting the educational success of children

growing up in poverty. In relation to social support, parental involvement is the number one way that allows socio-economic status to not have a negative effect on a child's academic achievement. This literature will explore the different protective and risk factors that can predict educational success.

Kamila Auls and Alina Bonto

Faculty Mentor: Hector Valenzuela

The Effects of Human Disturbance on *Lottia Gigantea* Abundance at Cabrillo Beach, CA

To evaluate population sizes, we want to know how disturbances such as foot traffic affect the owl limpet, *Lottia gigantea* by using length as an indicator of environmental health. Through identifying patterns in specific environments that correlate with disturbances, scientists can perform experimental procedures to conduct rehabilitation and nourish disturbed habitats. The intentions of this study were to analyze disturbances regarding foot traffic and estimated poaching of owl limpets by humans during low tide in the intertidal zone at Cabrillo Beach in San Pedro, California. We hypothesize that on average, individuals collected in areas of high human disturbances near the bridge will be smaller than individuals collectively located 90 meters away from the bridge in less foot traffic. We ensured that the results were unbiased by placing a 60x60 cm quadrat in each tide pool and recorded the sizes of different individuals within it. Many of the limpets observed were below 15 cm and not included in our documentation due to possible errors being made when distinguishing the different species. After collecting size measurements of limpets from the apex end of each individual, a t-test was done to analyze differences in the average abundance of limpets in different locations and exposures affected by human disturbances potentially limiting the growth of the species. The data consisted of the average abundance between different tide pools due to a majority of the individuals collected ranking

in sizes from 15 cm to 25 cm. Using these results, graphs were created displaying the average abundance between tide pools comparing near versus far, exposed versus unexposed, and far exposed and unexposed versus near exposed and unexposed together. There was an apparent significance between the exposed and unexposed plots overall with a p-value of .04, in which there is a greater abundance of species in the unexposed tide pools collectively. From these findings we conclude that if the *L. gigantea* species is constantly disturbed by humans they will gradually keep getting smaller in size. What these smaller size distributions could imply in the giant scheme of things may be that smaller sizes could lead to species extinction as the larger females are the reproducers or this could force limpets to develop different adaptations to cope with smaller sizes.

Allison Balocating

Faculty Mentor: Erica Fradinger

How Spatial Areas of Nasal and Optical Cavities Affect Sensory Acuity

Olfaction and vision acuity are determined by the frontal skull cavities of organisms is the nasal and eye cavities. The nasal cavity holds olfactory receptors which are located in the deep mid-sagittal of the face. The spatial area of the nasal cavities across the frontal skull differ between vertebrate, determining how large the nasal apertures and smelling abilities. The two eye cavities allow organisms to have vision, and determines how long the range of vision is. The optics and range can vary between different vertebrate. The purpose of this experiment is to determine if higher olfaction acuity and higher optic acuity of vertebrates correlates with longer and wider spans of their respective facial cavities. Olfactory acuity is the sharpness in the smelling functions. When taking the measurements of the skulls of various vertebra, such as carnivores and herbivores, and calculating the area of the normalized nasal aperture spans

to the entire skull, the averaged data sets of both types were similar. The differences between the areas of the nasal apertures for the carnivorous and herbivorous vertebrates, 23.74 cm and 24.76 respectively, indicate that the likeliness of higher olfaction acuity over the other is not significant. The nasal cavities measurements were larger for herbivores compared to the carnivorous vertebrate skulls, which supports that herbivores have better olfaction acuity. Optical acuity of prey is determined to be superior to predators. In further studies, increasing the number of herbivorous studied would increase the accuracy in the data, and taking into consideration omnivores would determine if there is a significant difference in l area measurements of the cavity.

Cindy Banh

Faculty Mentor: Sara Angevine

AborSHUNNED: Analyzing How Abortion Policy Positions Are Formed

The purpose of this paper is to study the factors that influence public support for abortion policy and the significance of those factors. This research is important because it dissects the reasons for why someone would oppose abortion, and I utilized SPSS to analyze up-to-date 2016 American National Election Studies (ANES) data. My first hypothesis is: In a comparison of individuals, people who live in the Midwest (independent) are more likely to oppose abortion (dependent), than people who do not live in the Midwest. I specifically chose to focus on the Midwest because it was a region that had a significant impact in the 2016 election. Three Midwest states: Wisconsin, Minnesota, and Michigan flipped for Donald Trump. I wanted to see if there were any conservative beliefs in the Midwest that developed over the past four years that can affect the future of public policy in traditionally partisan issues, such as abortion. For my independent variable, I looked at voter registration in all 50 states. I recorded the results and transformed it into a dichotomous

variable: “Midwest” and “Not Midwest.” I determined the grouping by looking at the 2010 U.S. Census Data. For my ordinal dependent variable, I used a variable that asked respondents about their views toward abortion policy. Through my analysis, the relationship between abortion opposition and the Midwest and Not Midwest regions, is not statistically significant. My second hypothesis is a comparison of individuals, people who oppose abortion are more likely to feel colder towards poor people than people who do not oppose abortion. For my interval dependent variable, I used “Feeling Thermometer Towards Poor People,” where “0” represented very cold and “100” represented very warm. I used my recoded abortion from my previous hypothesis, as my independent variable. The relationship is statistically significant and negative. Thus, my findings show that my hypothesis is incorrect; people who oppose abortion are warmer towards poor people than those who do not oppose. This could reflect a portion of people who are warm toward poor people, possibly meaning that they are willing to help poor people in any way, especially financially, to avoid having a woman seek an abortion. My findings will help unpack the variables and reasons behind how voters form opinions on abortion policy.

Keelin Bettridge

Faculty Mentor: Sara Angevine

Billary: Did it Matter? Yes.

A question that has been highly debated since the 2016 US Presidential Election is: how did Hillary Clinton lose, given that she had such a high probability of winning (Lohr and Singer, 2016)? This question remains important because, although several other aspects of the Presidential Election have been analyzed, one important factor that has not been considered is Hillary Clinton’s relationship to former US President, Bill Clinton. This paper applies multivariate regression analysis to the 2016

American National Election Studies data to analyze the impact of the Clinton's relationship on public perceptions of Hillary Clinton's likability and competency. The data indicates that people's feelings towards Bill Clinton were statistically significant when comparing them to feelings towards Hillary Clinton, when controlling for race, gender, and political party. These findings have broad implications for women and politics because it suggests that a woman's ability to run for public office may be hindered by her relationship to her spouse or partner. Deepening our understanding of the consequences of marriage on how voters perceive candidates, expands our knowledge of this long-established yet perhaps treacherous path for women to hold political office.

Alina Bonto and Loretta Swift

Faculty Mentor: Cheryl Swift

Ecophysiological Characteristics of Bottomland Hardwood Species Experiencing Rapid Relative Sea Level Rise

Coastal bottomland hardwood communities in the Louisiana Deltaic Plain are experiencing rapid relative sea level rise. The objective of this study was to use ecophysiological characteristics to determine how well understory trees are coping with environmental changes and to identify the most vulnerable. Out of the three chosen species for this study, we hypothesized that *Quercus nigra*, a weakly flood tolerant tree, would exhibit the greatest vulnerability across its distribution, followed by *Acer rubrum*, a moderately flood tolerant species, and lastly *Taxodium distichum*, the most flood tolerant of the three. The study site was a five-hectare plot in the Barataria Preserve Unit at Jean Lafitte National Park in Jefferson Parish, Louisiana. The plot spans a flooding gradient that includes rarely flooded levee forest, a periodically flooded intermediate zone, and a semi-permanently flooded back swamp. Pre-dawn (Ψ_{PD}) and midday (Ψ_1) water potentials were measured for each species, in zones where they were dominant along the flooding gradient, using a PMS

pressure chamber. *Q. nigra* had its lowest water potentials at the wetter end of its distribution, and its predawn and midday water potentials were significantly lower than *A. rubrum*. In the inundated back swamp, predawn water potentials of *A. rubrum* were more negative than that of *T. distichum*. These results suggest that the less flood-tolerant species are under greater physiological stress in this type of ecosystem, particularly where flooding is more prevalent. In contrast to our expectations, photosynthetic rates were highest in *Q. nigra* in the drier and intermediate sections of the gradient compared to *A. rubrum*; in general, both species had reduced, albeit not statistically significant, photosynthetic rates in the wetter, intermediate zone. Low stomatal conductance of *A. rubrum* suggests that it is able to adapt to various flooding conditions but at a cost. Results of this study imply that coastal bottomland species will increasingly experience physiological stress and likely be less abundant in future assemblages subjected to longer hydroperiods.

Nicole Briedis

Faculty Mentor: Anne Sebanc

Beyond the 8-3: A Review of After School Programs

After school programs (ASP) have been on the rise in the past few years due to various home life factors. Many parents rely on after school programs to tend to their children in the hours between school and parents getting off of work. There are a variety of different types of programs that range from simply providing supervision to providing recreational activities and academic enrichment. Research has shown that after school programs contribute to a child's development in several ways. After school programs have been found to have effects on the academic performance, including attendance, grades, and test scores, as well as social and emotional functioning, including behavior and self-efficacy, of

children. Research suggests that children who participate in afterschool programs, and are engaged, tend to do better academically, have more motivation in school, and display more positive social behaviors, than students who do not. The research also focuses on evaluation and effectiveness of after school programs and best practices. While this topic is gaining popularity, there are still many limitations in the research including variation of socioeconomic groups being studied and inconsistencies in regular attendance and retention in ASPs.

Matt Burkhart

Faculty Mentor: Danilo Lozano

Music Theory in the Digital Landscape

Musical composition has transitioned into the digital realm. Anything a composer could want is available as a digital tool, and all facets of music theory have been implemented digitally. My project demonstrates various examples of music theory within contemporary audio software, and how a composer can utilize this functionality to produce music more efficiently. I begin by outlining a few basic theory concepts that every audio software platform uses to communicate with the composer, including pitch organization, chordal harmony, and rhythm. Then, I detail how digital tools, called plug-in effects, allow a composer to precisely manipulate musical concepts digitally. Through my digital audio workstation, I will demonstrate compositional facilities such as pitch shifting, arpeggiation, and dynamic control. Each of these techniques will require basic knowledge pertaining to traditional music theory, as well as the ability to interface with audio software. While there will always be a place for live

music performance, my project will show software's paramount role in modern music production. Today, it is essential for every musician to be digitally literate.

Elizabeth Castillo

Faculty Mentor: Hector Valenzuela

Identification of Streptococcus

New strains of microorganisms are constantly evolving; therefore, it is essential to be able to identify a microorganism based on its characteristics. The objective proposal is to identify a strain of bacteria by using basic microbiology and molecular biology techniques. A blind study was created where it only used the top ten hospital acquired bacteria and a series of biochemical test to determine the morphological, physiological and cultural characteristics of the unspecified bacteria. A gram staining revealed that the bacteria was gram-positive which indicates that the peptidoglycan cell wall is thick. Additionally, the gram staining identified the shape of the bacteria to be cocci. The spore staining test was negative which indicates that the unknown bacteria cannot form spores. The results of these two tests narrowed the possible bacteria to four candidates: Staphylococcus, Micrococcus, Planococcus and Streptococcus. However, the catalase test was negative which indicates that the cells cannot process oxygen. Therefore, Streptococcus was the only strain of bacteria that is catalase negative. To confirm that the unknown bacteria was indeed Streptococcus, PCR specific primers were used to amplify a structural cell wall gene only found in Streptococcus and not in the other three bacteria. The use of dichotomous key and simple microbiology techniques allowed one to narrow down one of the most commonly acquired pathogenic bacteria, Streptococcus. Bacteria is known to causing disease in humans. Therefore, the aim is to redefine these basic techniques so that one day

they can be adapted as a quick clinical use to help expedite the correct patient treatment.

Alexander Chambers

Faculty Mentor: Erica Fradinger

Attack on Memory: A Look at Music's Effect on Memory Formation and Recall

The purpose of the experiment at hand was to ultimately find a connection between one's active listening (whether that be enjoyment or displeasure) to a song and how it relates to prior knowledge or any form of long recall. It has been shown time and time again that recollection of personal events and other memories can have a greater more potent recall if exposed to a song that they've encountered from their past. It was observed that subjects even had an overly emotional response along with a detailed description of either a memory that had occurred or if the certain snippet of the song evoked such a strong feeling and sense of place for the subject. Data was collected through a series of questionnaires interjected through sets of songs ranging from four to six in content ranging from the 70's to this current decade. Questions would range from the personal opinions to trying to recite any lyrics. Any key quantitative results have shown that overall active displayed a more concrete and engaged response to the music regardless of opinion on the pieces of music. There were trends of subjects confusing the sounds and artists or certain decades in the late 20th century. These answers overall reinforce the dichotomy of active listening and inactive listening and how it relates to prior knowledge and memory recall.

Ciara Clark and Xochitl Ruiz

Faculty Mentor: Xochitl Ruiz

The Socioeconomic and Political Impact of the Whittier Area Literacy Council

The City of Whittier, located in California, has multiple non-profit organizations serving the immediate community. The Whittier Area Literacy Council (WALC) is a non-profit organization dedicated to enhancing the literacy rates of students in third grade and beyond. Having this non-profit in the community assists many low-income families and individuals who are attempting to achieve either academic or occupational goals. Literacy, as a tool, has the potential to stimulate social, cultural, political and economic participation. My research, which began in September 2016, focuses on the educational and social impact WALC has on the Whittier community, particularly in the lives of students and their parents. Throughout my research, I have analyzed surveys distributed to parents and children by the non-profit in order to assess how students evaluated their own performance throughout the tutoring process. Interviews with parents of students focused on their child's progress and how parental involvement at the non-profit has shaped their experiences in the community. In interviews, tutors discussed their time volunteering at WALC and how their students have shifted their views on the community they reside in. The free literacy tutoring center has 74 students and 54 tutors. Enrollment at the non-profit is at an all-time high. This research sheds light on the reasons why there is such a high need for literacy tutoring in the community and how that need is addressed at the council. Using ethnographic methods to measure the impact the council has on the community shows how much one tutoring session can influence an individual's socioeconomic, and political involvement in their community.

Grace Creelman

Faculty Mentor: Sara Angevine

US-China Trade Policy and the Case of the US-China Relations Act

In 2000, Bill Clinton signed the US-China Relations Act into law, breaking with decades of precedent in trade embargos that existed in part due to a history of ethical conflicts between the US and China. The US-China Relations Act enabled the US-China trade relationship to grow into the powerhouse that it is today (in 2017 alone, the US imported \$506 billion of manufactured goods from China), a relationship that has been called into question by current political leaders for prioritizing trade over domestic manufacturing. This instance speaks to a larger question in US foreign policy-- what does Congress take into account when making trade decisions? How is the constituency represented in this process, if at all? Through an examination of the political moments leading up to the US-China Relations Act, I assess the role of foreign and domestic interest groups, businesses, and labor unions on the creation and passage of this landmark legislation.

Emily Crennen

Faculty Mentor: Natale Zappia

Colonization and Nativity: The Creation of New Identities

When we identify as natives to a place, we decide to identify with a certain culture and background associated with that environment. What happens when a new group of people (and their plant species) enter an environment they have never inhabited before, thus changing the culture and environment forever? By comparing the impact of the invasive plant species, *Acacia merensaii* in South Africa and *Tamarix aphylla* in Southern California on native species, I will look at how invasive and indigenous plants relate to the history of colonization by the Europeans in South

Africa and Southern California. This paper will look at anthropological and social uses of the words native, nonnative, indigenous and invasive, and will explore how these definitions define whether or not a nonnative/invasive can ever become native/indigenous. The main purpose of this study is to draw parallels between two very different environments that have undergone similar changes due to colonization, then analyze how that information shapes native/nonnative ideology and cultural identity formation. Through this project, the reader shall gain insight as to how definitions of nativity differ not only on an ecological and anthropological scale, but on a globalized scale.

Emily Crennen and Ray Tamas

Faculty Mentor: Cheryl Swift

How Physiological Attributes of the Invasive Species *Acacia Mearnsii* Have Allowed them to Out-compete Native Species in South Africa Post Dramatic Ecological Disturbances

This project focuses on the effects of invasive species on native ecosystems. The research we participated in was done in order to provide us a greater understanding of the rate of growth of invasive species in an area that recently faced a dramatic ecological shift i.e. flooding. By testing their growth, reproduction, and resource consumption we are able to better understand what the effects of *Acacia mearnsii* have on native species and ecology. Within our research we looked at the relationship between tree age and leaf area index, seedling dropping count, and tree diameter to better understand how this invasive species outcompeted surrounding species. We hypothesized that with the higher number of age there is greater leaf area index. We tested this hypothesis by first taking the cores of some of the trees in order to cross reference it with the diameters that we found in order to have an indication of age versus diameters. Then we found the remaining diameters of the selected group of trees, and then went back and found the Leaf Area Index of the same

trees. The importance of our question lies in its applicability to the current ecological crisis that South Africa is facing. Understanding how these invasive species are outcompeting native species and preventing their prosperity will allow us to better understand the measures that need to be taken in order to enact effective restoration techniques and prevent further invasion from the same and similar species.

Adrian Delgado

Faculty Mentor: Sara Angevine

Why All Americans Don't Vote: The Possible Impact of Proportional Representation on Future Elections

Every election cycle whether it be midterm or presidential, a recurring theme that emerges is the lack of voter participation and turnout in our country. Over the past four presidential elections, no more than sixty-one percent of eligible American voters participated in the U.S political process. While there are a variety of factors that have a possible effect on voter participation and turnout, the lack of alternate political parties and candidates could have a major impact on why this recurring theme exists every four years. Would doing away with the two party system and winner take all elections affect voter turnout? It is hypothesized the proportional representation in the United States could increase voter participation due to the variance of political parties and ideas and would further decrease voter disenfranchisement.

Alyssa Delgado

Faculty Mentor: Sylvia Vetrone

The Effects of Turmeric on MCF7 Breast Cancer Cells

Breast cancer is a life changing disease that is prominent in women. It is the leading malignancy in women to date. MCF7 is a breast cancer cell

line found in mammary glands. These epithelial cells are adherent and they are part of a cancer line that has been studied for 40 years by many different researchers. Through research, apoptotic events were examined at different concentrations by the addition of turmeric on the MCF7 breast cancer cells. An MTT assay was used to determine the effects of the turmeric on the MCF7 breast cancer cells. The MTT assay was done in as a three-day trial. The addition of the cells, drugs, and results were all completed on different days. There was a total of 3 MTT assays that ran in triplicate. After the data was collected, it was reviewed to see the exact effects of turmeric at different concentrations on the breast cancer cells. The results show that the higher concentration of turmeric used, the more that MCF7 cells exhibited apoptotic events.

Julian Droetti and Jacob Householder

Faculty Mentor: Fred Park

Convolution Neural Network

In this presentation I will cover what a Convolution Neural Network is and show some applications of my Convolution Neural Network. These applications will be in the form of the classifying the MNIST data set, which is a collection of handwritten digits, and to be able to classify human movement from video data.

Marika Fahndrich

Faculty Mentor: Kathy Barlow

The Influence of Variable Practice in Golf Putting

The purpose of this experiment was to observe the differences in golf putting skill acquisition as a result of constant and variable practice schedules. The motor learning theory known as the contextual interference effect explains that motor skills are better learned when

practiced in a variable schedule versus a constant one. To test this theory, 26 college students, 9 male and 17 female, with a mean age of 20.92, were recruited from Whittier College's Kinesiology and Biology classes. All participants signed informed consent forms and were screened for prior golf experience and/or injury before beginning data collection. All methods used in this experiment were approved by the Whittier College IRB/HSPC. The participants were randomly assigned to either a control group (n=8), constant group (n=9) or variable group (n=9). All participants were pre-tested on 15 putting trials to a target from 5.5 ft., this served as the target skill to be learned. The constant and variable groups then completed five days of putting practice consisting of 30 trials per day; the constant group putted only from a 5.5 ft. distance whereas the variable group putted five trials from 5.5 ft., five trials from 7.5 ft. and five trials from 9.5 ft. and then repeated this sequence. Two days following the last practice session, all three groups were post-tested on 15 trials from 5.5 ft. Two days following the post-test, all three groups completed a transfer test of 15 trials from 4 ft. The hypothesized results based on previous literature were that the control group would show little improvement, that the constant group would have superior performance during practice and retention but poorer performance on the transfer test, and that the variable group would have poorer performance during practice and retention but superior performance on the transfer test. The results of this experiment yielded no significant differences in group outcomes, although all three groups improved their accuracy from pre-test to post test.

Seth Feldman

Faculty Mentor: Rebecca Overmyer-Velazquez

The End of the Road of Europeanization: An Analysis of Hungarian Exceptionalism in the Wake of 'The European Migrant Crisis'

In 2015, a surge of migrants began entering Europe by the thousands in search of a life free of conflict and economic turmoil. Since labeled as the

European Migrant Crisis, the majority of migrants crossed into Europe at the Southeastern borders. This has further developed a global trend of right-wing populism and anti-immigration attitudes. In this paper, I will aim to facilitate discourse on what exactly are the chief contributors to attitudes towards immigration and migrants in Hungary, a country that exemplifies these developments. This discourse will include variables such as the manifestation of macroeconomic fear, personal safety, disease, and ethnic threat. My specific research questions are as follows: What specific societal characteristics determine attitudes towards immigration and migrants in Hungary? And how has the current migration crisis from Africa and the Middle East affected the formation of these attitudes? The majority of previous studies have focused on the entirety of Europe through large-scale surveys like the European Social Survey (ESS) and have been conducted prior to the recent influx of migrants moving through Europe. More research is necessary for particular regions to provide a more complex and nuanced picture of how attitudes are formed in Europe as a highly ethnically and culturally diverse continent. This research will revolve around qualitative data from semi-structured interviews conducted in Budapest and Szeged, Hungary. These interviews concluded the importance of the influence of government media campaigns on attitudes and pointed towards the tendency of an exceptionist Hungarian identity rooted in language and historical consciousness.

Maisi Felix

An Investigation of How Women Perceive Their Own Relationships and The Second Shift

The division of labor within households and amongst spouses has continued to become more of an issue as our society has strayed away from the notion of the stay-at-home mother and breadwinner father. With the phenomenon of women entering the workforce more and more

and families becoming dual-income, the division of housework and family work seems almost more difficult to distribute evenly. This is partly because of the gender ideologies that lie in our society; these ideas of what it means to be a woman in comparison to what it means to be a man and what tasks you should partake in solely based on your gender. In the literature, two major factors involving the division of household labor were presented and include how the housework is divided amongst partners as well as what is perceived as equal by the partners. My research will examine: 1) how different individuals view the division of household labor. 2) what the idea of “equal” is to women. And 3) why and how women feel that it is divided the way it is and how it reflects who they are and the way that they perceive their own relationships. I will do this through a qualitative study by conducting interviews amongst ten women; all of which live with their partner, but not all have children. In the interview, questions such as “What household chores do you complete in comparison to your partner?” were asked. How is the household labor divided in their homes; is it discussed between the partners? Is the way they chose to divide housework fair and equal? If partners feel that the housework is divided unequally, I am interested in why and how they think it reached that point. Additionally, I am interested in how the idea of what it means to be a woman and mother affects or influences how these women perceive their relationships. My research will add to this topic by doing a generational study and focusing on the responses from two different age groups to understand the differences or similarities within the women, how they perceive their relationships, and how they participate in housework within their relationships.

Colin-James Fellezs

Faculty Mentor: Rebecca Overmyer-Velazquez

A Coachella Community: How Music Festivals Nurture or Weaken Community Cohesiveness

There has been a recent rise in music festivals within popular media. Large-scale music events such as Coachella, Glastonbury, and E.D.C. have clear economic outcomes such as employment and tourism rates that benefit from their widespread popularity. Even though there is an abundance of research having to do with the monetary benefits, there is little to no research within recent years with reference to the social and cultural impacts of music festivals. To identify the variety of individualized communities embedded within music festival culture and to note the qualitative experience of festival goers in being a part of these communities is the goal of my study. What this research specifically questions are to what extent do social media and mobile phone technology play into the role of nurturing or hindering festival attendees' experience of community cohesiveness--and are there other factors that contribute to this? To get a clearer explanation, qualitative interviews were held to understand individual festival experiences comparing older attendees' festivals experiences (festivals prior to the year 2000) to younger ones (festivals within the last two years). The hypothesis was that contemporary festivals, because of the increased use of social media and technology, would then provide a basis for having an experience of community cohesiveness today more so than older festival experiences. In allowing these interviews to unfold, my findings suggest that it is a trend that older festival experiences prove to be more community based due to the lack of social media and technology, therefore being inconsistent with the hypothesis that was proposed. More research in music festival cohesiveness, however, must be analyzed to obtain a greater understanding of experiences and trends that take place in this particular environment.

Alicia Figueroa

Faculty Mentor: Roger White

The Great Recession: Income Inequality Before and After

We test the economic theory behind the measurement of income inequality, otherwise known as the Gini Index or Gini Coefficient (GC). The Ordinary Least Squares (OLS) technique is utilized to identify whether a change in income inequality occurs when a change in multiple economic entities, such as growth rates or Gross Domestic Product per capita, occurs. The academic literature on income inequality provide prominent independent variables for our model through previous studies conducted. Data on the independent variables are available on certain databases and will be used to conduct the estimated coefficients; The World Bank Open Data is a database that supplies many of the economic entities on countries across the globe. The four primary, independent variables that are discussed include economic growth rate, Gross Domestic Product per capita, the population of countries, and the political stance in which a country identifies itself with. Data was collected from countries within all continents given that the data was accessible. Although the sole focus of this research paper is on the income inequality change within the United States, data from additional countries allows for a more precise model. Regression analysis is utilized to understand whether income inequality increased or declined in the United States after the Great Recession. Additionally, we are able to make assumptions regarding other economies. It is necessary to keep in mind that an exact function for the Gini Index does not exist; therefore, this research analysis is a continuation of the current studies that express an underlying understanding of income inequality.

Fabiola Flores

Faculty Mentor: Rebecca Overmyer-Velazquez

Where Are We Now? Measuring Social Capital and Civic Engagement in South L.A.

This study aims to learn more about civic engagement and residents' feelings about their South LA neighborhood. Other quantitative studies

have argued that neighborhoods with lower socioeconomic status, low residential stability, high rates of crime and visible signs of social disorder result in lower levels of civic engagement. Unlike surveys, this study aims to understand and interpret residents' feelings about their neighborhood based on their lived experiences and their level of civic engagement. Do people feel safe in their neighborhood? Do they know their neighbors? What are the events happening in the local vicinity? Furthermore, up until three years ago, little to no research was available surrounding South LA in contrast to the vast discourse surrounding East LA, thus the need for this study. This study uses a triangulation of methods such as interviews, field observations and a content analysis of two local ethnic newspapers to interpret resident's feelings and snapshot community engagement in South LA. Thus far, residents feel that while the opening of new schools and lower crime rates have helped improve the safety and opportunities in South LA, however, they would still like to see more happening in their community.

Jasmine Garcia and Zitlali Lopez

Faculty Mentor: Cheryl Swift

Do Functional Traits Differ in Chaparral and Coastal Sage Scrub Populations of Black Sage?

Coastal sage scrub and chaparral are plant communities found in Southern California. Both of these plant communities are adapted to Southern California's Mediterranean Climate with its characteristic summer drought, although Chaparral occurs at higher elevation and receives more precipitation during rain events and experiences cooler temperatures. A number of species co-occur in chaparral and coastal sage scrub including *Salvia mellifera*, black sage. We examined several functional traits in a chaparral population and a coastal sage scrub population of black sage. Chaparral individuals were collected from the San Gabriel Mountains in San Gabriel Canyon, and coastal sage scrub individuals were collected at

the Arroyo Pescadero trailhead in the Whittier Hills. We measured leaf area to mass ratio (SLA), proportion of spongy mesophyll in leaf cross sections, and hydraulic conductivity which is the capacity to move water through stems. We predicted that higher water availability would result in chaparral individuals having a greater SLA, a greater proportion of spongy mesophyll leaf tissue, and higher hydraulic conductivity relative to coastal sage scrub individuals. Lower SLA enables plants to limit water loss, and spongy mesophyll tissue has large water filled spaces connected to the atmosphere through the stomata that increase water loss when stomata are open. As a result, an increased proportion of spongy mesophyll increases water loss. The ability to move increased amounts of water through stems from roots to leaves is related to vessel length and is a disadvantage when water is less available because of increased risk of xylem embolisms blocking water carrying conduits. The results of this project enable us to understand how individuals of a species adapt to changing water availability and temperature regimes, and may shed light on how species can adapt to climate change.

Adrian Garcia

Faculty Mentor: Michelle Switzer

Desecrating Public Space, An Affirmation of Capitalist Realism

The manner, in which public space has traditionally been defined relative to the self in Western states, has been centered on a public giving agency towards the state. On the contrary, the “Occupy” movement’s organizing strategy was one centered on forcing people to re-conceive these frameworks, instead thinking of public space as contested space. This presentation indicates that the agency that the state holds in defining public space justifies Occupy’s ultimate eviction from parks and public land. Mark Fisher’s “Capitalist Realism,” an apathetic sensibility that treats the existence and advancement of Capitalism as inevitable. The way in

which Capitalist Realism is internalized, in a late-capitalist society plays a large part in analyzing Occupy's eviction. Fisher contextualizes Capitalist Realism through cyberspaces of invisible discourse. This promotes a "crisis of space and time" in which the user can have anything at any time. Fisher's Capitalist Realism is a clear nod to the "end of history" sensibility that was developed after the collapse of the Soviet Union. Occupy Toronto held a clear political line about a more democratic way of structuring politics in order to resist Capitalism's contradictions. However, its ultimate eviction and rejection of something as conceptually "democratic" in public space serves as a further affirmation of Capitalist Realism

Colin Greenup

Faculty Mentor: Hector Valenzuela

Herbivores and Algae Interaction in Tidepools

Herbivores in intertidal zones are often credited with being the main force that regulated algal growth in a variety of environments. Models of the interactions between herbivores and surrounding algae have shown that there are many factors that could influence the grazing, including the nutrient levels in the algae, or the amount of wave exposure. To test these hypotheses, field experiments were conducted at Cabrillo Beach tide pools to identify if there was any correlation between the amount of herbivores in tide pools and the type of algae in the tide pool, as well as the amount of wave exposure in the area. The experiment was done by constructing a 1m² quadrat and placing it onto 40 tide pools with algae and counting the amount of herbivores in the area. To test whether nutritional levels affected herbivore grazing, we looked at different types of red and brown algae to see if there was any preference shown for grazing. Similarly, to test the effects of wave exposure on grazing, we examined groups of algae that were exposed to waves as well as areas that were at approximately 20 feet away from wave exposure. In both cases of differing algae nutrient

types and wave exposed versus non-wave exposed, there was no statistical significance in the difference of the amount of herbivores in any given area according to t-testing (p-values: 0.665, 0.117, 0.841, and 0.163). Rather, the distribution of herbivores seemed to have not been impacted by neither wave exposure nor nutritional value of algae. However, observations showed that there were areas that had more herbivores than others, but they were not grouped based on any criteria we set. These findings are inconsistent with previous research. This suggests that there are alternative reasons that drive herbivore-algae interactions at Cabrillo Beach other than wave exposure or nutritional value of algae.

Marilyn Guzman

Faculty Mentor: Sara Angevine

Fear of Los Inmigrantes: Trump's Exploitation of Xenophobia

In my research I investigate if anti-immigrant sentiments stem from the fear that Hispanic immigrants harm American culture, and if this was one of the reasons that Donald Trump won the 2016 Presidential elections. The surfacing of White Nationalist, or the "Alt Right", anti-immigrant sentiments has shed light on a group of individuals who reject the notion that America as a country is founded on its diversity; but rather this group seeks to preserve American White culture. By using 2016 ANES data, I test if race and candidate vote choice affect attitudes toward whether or not immigrants harm American culture. I further test if individuals who think it is important to follow America's customs and traditions to be truly American are more likely to have colder feelings toward immigrants. I found that there is a significant relationship between race and candidate vote choice and their belief that immigrants harm American culture. As well I found a negative relationship showing that as individuals' feelings toward immigrants cool, respondents find it more important to be truly American by following America's customs and traditions.

Lorena Heymans

Faculty Mentor: Erica Fradinger

Sensory Structure Placements on Skulls of Predators in Comparison to Prey Vertebrae

This study is examining the differences of eyes, ears, and whisker placement and their relation to each other through methods of skull measurement. A total of 10 vertebrae skulls, five prey and five predators will be measured. Four vertebrae skulls have been tested so far: the coyote and the bear represented predators, and the deer and the bull represented prey animals. Measurements were converted into normalized percentages. Similarities were searched for between coyote and bear skulls, animals of which represented predators, and the same of which applied to the skulls of the bull and deer. If similarities were seen in their respected categories, any differences between predators and prey was looked for. The only measurement that exhibited similarities thus far in their respected categories and a difference between predator and prey was eye distance. The coyote skull exhibited a 17.1% distance, the bear at 13.9%, the deer at 46.8%, and the bull at 41.8%. No other sensory structures exhibited any difference between the predator and prey skulls so far, indicating that the only placement that is determined by the animal assignment of predator or prey so far is eye distance. However, further measurements and increasing the sample size can change this analysis to showing differences in nasal and vibrissae placements between predators and prey. Nasal cavity differences may indicate vibrissae placements and perhaps a possibility of increased sensitivities in either prey or predator.

Aaron Hiedeman

Faculty Mentor: Patricia Van Oosbree

The Link Between Self-Perceived Quality of Life and Level of Physical Fitness

There has been research regarding a correlation between self-perceived Quality of Life (QoL) and Physical Fitness, but for the most part these studies have focused either on populations recovering from injury or illness and elderly populations. Not much has been done regarding young, relatively healthy populations. The purpose of this experiment is to see if a such a relationship exists in a population of college age students (ages 18-25). The results of this study could be used to illustrate to college students how important or unimportant physical fitness is to a person's overall quality of life. Methods: 23 participants first completed a QoL survey provided by RAND Health titled Measures of Quality of Life Core Survey which was uploaded to the website Survey Monkey. To assess the level of physical fitness, participants were scored in 5 areas; cardiovascular endurance, muscular endurance, flexibility, muscular strength, and body composition. First participants underwent a walking VO2 max test conducted to measure cardiovascular endurance. Then to test muscular endurance participants attempted push-ups, sit-ups, and to held a static squat until they could no longer use correct form. Next to test flexibility participants did a sit and reach test, the zipper test, a shoulder rotation test, and then had their practical range of motion at their ankles and knees measured using a goniometer. To measure body composition participants had their percent body fat measured in the BodPod. To measure muscular strength participants did a one repetition maximum test on bench press and squats. Results: Significant correlations have been made between categories of questioning and different components of physical fitness.

Esther Nailah Hills

Faculty Mentor: Rebecca Overmyer-Velaquez

Entering the Grey Area: The Effect Adoption Has on Identity and Belonging

What does identity and belonging mean to an adoptee? Is it easy for adopted children to feel like they belong? The research presented will be a collective of life history interviews of six adoptees from ages 18-30 who have had to answer these very questions for themselves. This study will use the perspectives of adoptees to try and shed light on the “grey zone” in which they find themselves because of their unique, independent adoption stories. The literature gathered emphasizes that children in both open and closed adoptions have the same difficulties; such as feelings of grief (adoption loss), adjustment periods, etc. My research adds to the literature as not much research has been conducted by an adoptee on other adoptees; it will also document the viewpoints of adoptees directly. My findings are in concurrence with what I found in the literature. The adoptees I interviewed experienced both adjustment periods and adoption loss when dealing with their adoptions. With my findings, I will give others a clearer idea of how adoptees view their identities and how being adopted affects adoptees throughout their lives.

Jacob Householder

Faculty Mentor: Fred Park

Geodesic Active Contour with Shape Prior Image Segmentation

We propose a shape prior image segmentation model that incorporates cliques shape signature and geodesic active contours. The model will enforce the cliques invariant shape signature on a parametric representation of a geodesic active contour. The main goal is to evolve a curve to stop on the boundaries of objects while enforcing prior shape. We will show successful results of our model segmenting occluded objects and illusory contours.

Jessica Iribe

Faculty Mentor: Sylvia Vetrone

The Effectiveness of Acetyl-11-keto-beta-boswellic Acid on Prostate Cancer Cell Viability and Cytotoxicity

Within cancer treatment, many chemotherapy drugs cause undesirable symptoms because of their toxicity and lethal effects to the cells of the body. This deterioration of the body's cells causes the patient to become susceptible to infection and health degradation. The component, acetyl-11-keto-beta-boswellic acid (AKBA), found in the essential oil frankincense, has been identified as a potential alternative in treatment for brain, breast, colon, pancreatic, prostate and stomach cancers. An androgen-sensitive human prostate adenocarcinoma cell line, LNCaP, was utilized in this experiment to test the effectiveness of the AKBA agent, in comparison to an established chemotherapy, Cisplatin. An MTT assay was utilized to observe cell viability and cytotoxicity at 0 and 100 uM as 0 uM, 4 uM, 10 uM, 25 uM, 50 uM, 100 uM, and 200 uM of AKBA and Cisplatin were treated in the LNCaP cells. As each agent was tested in the LNCaP cell line, similar results and trends were observed. For both agents, cytotoxicity increased as concentration increased. Furthermore, the decrease of cell viability from 85% to 10% was similar for both concentrations of AKBA and Cisplatin. The results from this experiment suggest that frankincense has the potential to serve as a natural and asymptomatic treatment of prostate cancer cells.

Gunner Joachim

Faculty Mentor: Jennifer Holmes

Abusive Power Within Gender and Class: How Patrick Hamilton's *Gaslight* Uses Victorian Ideology

To gaslight someone means to shatter their perception of reality, diminish their ability to interpret truth, and force upon them a narrative which does not reflect lived experience. Patrick Hamilton coined the name of this abuse in his 1938 play, *Gaslight*. The play depicts a typical British middle-class family but soon unravels into a story of power, abuse, and ultimately, escape. Hamilton examines the Victorian era, exposing the ways in which strict ideologies are navigated, manipulated, and abused. This essay examines the ways in which abuse, both psychological and physical, but with an emphasis on gaslighting, are perpetuated by all of Hamilton's characters. In doing so this essay examines these issues through the particular lenses of Victorian gender and class ideology. Within the rigid social structure of Victorian England, gender and class were intersectional, and one's identity in both categories shaped the way they were perceived by the rest of society. What were considered acceptable masculine and feminine behaviors was thus informed by one's position in the class structure. The construction of identities through normative behaviors and social convention help us to understand each character's relationship to the power structure of the Victorian home, and in turn, how this power structure is used to abuse those with limited control. Building on the research of scholars such as Kate Abramson, this essay asserts that the gender and class normative behaviors of Victorian society are used in order to strengthen the abuser's hold on others. The abuse within the play is thus made possible by a particular understanding of class and gender which aimed to limit the agency of women, both of the working and middle classes. Simultaneously, however, Hamilton's characters reveal how these ideologies may also be subverted, undermining one's expectations of their identity for the purpose of abuse. Finally, Hamilton's writing suggests the ability of escape for those found a victim of gaslighting, both through the assistance of others, but also from the assertion of one's own truth.

Gunner Joachim

Faculty Mentor: Natale Zappia

Performances of Identity in Antebellum New Orleans

This essay examines how free and enslaved people of color in Antebellum New Orleans understood their identity in a changing racial hierarchy. Having undergone creolization through French, Spanish, and finally, American jurisdiction, the city experienced a high degree of ethnic and cultural hybridization. During French and Spanish colonial rule, a burgeoning population of free, mixed-race people of color thrived despite prejudice within a three-caste racial hierarchy. Once the United States government acquired the city, however, this free population of color soon encountered a binary understanding of identity within a two-caste racial hierarchy, one which refused to mark distinction between free and enslaved peoples of African descent. My work explores this issue through the framework of performance, from which it has taken Erving Goffman's definition: performance being actions we take in order to create and display a certain identity for us to experience and others to see. A comparative lens is used to discuss the activities present at Congo Square, primarily undertaken by enslaved people of color, and the quadroon balls, whose participants were mainly free mixed-race women of color. Through travel narratives and historical newspapers, this essay examines how populations of color defined themselves; it argues that these performances were acts of cultural resistance. Specifically, the activities present at Congo Square and quadroon balls, born out of economic and social necessity, and embedded in a system of oppression, became venues of cultural resistance. At Congo Square, enslaved peoples maintained West African cultural practices while infusing them with local traditions. In doing so they created a racialized identity informed by class. At quadroon balls, free mixed-race women of color were able to insist on their position within a European, and now Anglo American, identity. They claimed and

defended a specific class identity intersected by race. However, this process resulted in the sexualization of these women by white men. Still, these venues reveal how attire, dance, music, and economic activity enabled populations of color to create, define, and perform identities of their choosing. Both groups were thus resisting the identities which the two-caste American understanding of race were attempting to enforce upon them.

Robert Kaaret

Faculty Mentor: Cheryl Swift

Physiological responses of *K. obovata* and *A. corniculatum* to an Invasive South American Vine

Mai Po Nature Reserve is a subtropical wetland in Hong Kong. The reserve consists of several distinct areas, the mangal forest along the seaward edge, dry/wet reed bed and Gei Wai. Gei Wai are man-made fish/shrimp ponds that have been modified to instead support migratory birds. Mangrove strands play a crucial role in preserving an area's coastline and biodiversity. With the increasing industrialization of Hong Kong and surrounding areas many of the remaining areas of intact mangrove ecosystems are under threat from a variety of different impacts, most notable invasive species, habitat fragmentation and pollution. Within our study we quantified the impact that an invasive South American vine- *M. micrantha* had on two separate species of mangrove- *Aegiceras corniculatum* and *Kandelia obovata*. This vine creates light competition with mangroves because the vine, climbs into the mangroves' upper canopy which results in reduced light availability for the mangrove. This reduction of light availability can eventually result in the death of a mangrove due to carbon starvation. We hypothesized that the two species would respond differently to the impacts of *M. micrantha*. Through the collection of data on stomatal conductance, water potentials, specific leaf

area, and light measurements for the two-separate species a comparison can be made as to how they cope with the vine.

Bailie Karcher

Faculty Mentor: Sean Morris

Victorian Artists and Ophelia

Ophelia's death in William Shakespeare's *The Tragedy of Hamlet, Prince of Denmark* has made her a popular allegorical figure in the fine arts and a universal symbol of tragic femininity. Many opportunities exist for artists to enrich our understanding of Ophelia's character precisely because there are many problems with her presentation in the play. Much of the story revolves around her, but Ophelia's voice and her persona are rarely given much depth. Readers of *Hamlet* are not permitted to delve into the innermost workings of Ophelia's mind as they are with Hamlet's; Ophelia delivers no soliloquies contemplating suicide or mourning the death of her father. Ophelia's and Hamlet's mental states are handled differently both by the play's other characters and by Shakespeare himself. Hamlet's famous "To be, or not to be" soliloquy, in which he contemplates suicide, is one of the most recognizable pieces of Shakespearean tragedy, and it provides deep insight into Hamlet's innermost thoughts. Yet, Hamlet is not the character who commits suicide. When it comes to Ophelia, the reader sees her from an outside perspective, as the other characters do. Through critical analysis of *Hamlet* and comparison between Shakespeare's treatment and development of both Hamlet and Ophelia, I argue that, Ophelia's underdevelopment as a character in writing has allowed for varied interpretations of her character in the visual arts. While interpretations of Ophelia exist on stage and screen, these portrayals are limited by the language that Shakespeare gives to the actors. But, visual portrayals of Ophelia have not been so constrained. Rather, the gap in Ophelia's character on paper allows artists to construct Ophelia's

identity, particularly through their ability to show scenes not written into the play. I use Victorian painters, Richard Redgrave and John Everett Millais, and the Victorian photographer, Julia Margaret Cameron, to exemplify the vastness of this enigmatic void surrounding Ophelia and how it has created a constantly evolving character identity.

Bailie Karcher

Faculty Mentor: Paula Radisich

Woman on the Move

Motion implies vitality and autonomy. The focused, still woman that has been the norm of Western art implies an obedient and passive woman. In this paper I compare Julia Margaret Cameron's photographs of women with those of Oscar Gustave Rejlander to show that Cameron challenged the masculinist implications of photographic conventions, especially those having to do with motion and occupation of space. I compare two works of Cameron's, *May Prinsep* and *The Echo*, to two photos by Rejlander, both known as *Unknown Young Woman*, as well as two collaborations between the artists. By creating compositions that blur the model and remove spatial context Cameron combats the traditions of focus and geometrical perspective in Western Art. Interdisciplinary scholar Lindsay Smith, in her book *The Politics of Focus: Women, Children, and Nineteenth-Century Photography*, dedicates a chapter of her book to these male-centric ways of looking. Smith's arguments seem to conform to Cameron's own statements made in her autobiography, *Annals of My Glass House*, as well as her own lifestyle. Cameron, herself, embodied a conglomeration of roles, occupying both the public role of artist and the private role of Victorian homemaker. Contrary to reductionist understandings of Victorian feminism, she created art as a result of, not in spite of, her domestic life. Her photographic practice merged these private and public spheres, drawing upon family, close friends, and a slew of

servants as models and inspiration. Rooted in her identity within the foundation of her home, Cameron was still able to branch into the public male-dominated world. Her development of her own photographic style and technique, in opposition to male practitioners, represented Victorian female identities, building upon and breaking down established traditions to normalize representation of female autonomy in photography.

Frances Kelleher

Faculty Mentor: Roger White

Theme Parks and Movie Tickets: Examining the Relationship Between Disney's Box Office Success and Theme Park Attendance

This paper shows the relationship between Disney theme park attendance in the United States and Disney's domestic box office earnings. Utilizing the Ordinary Least Squares technique of regression analysis to examine the annual number of people who visited either Disneyland, Disney's California Adventure, Disney's Magic Kingdom, EPCOT, Disney's Hollywood Studios, or Disney's Animal Kingdom as a function of Disney's box office revenue, the average airfare, average income, and the attendance of local competitors from 1993 to 2016. Given the understanding of complementary goods and the results of previous studies we anticipate a positive relationship between box office receipts and park attendance. If verified, the positive relationship will suggest that separate divisions within a large corporation may be connected in surprising ways. It would also provide insight into how Disney may market their theme parks and movies.

Leah Kolek

Faculty Mentor: Anne Sebanc

The Effects of Sports Participation on Children's Socioemotional and Cognitive Development

Sports participation has well-known physical health benefits, but research has shown that it can also be widely beneficial for children's socioemotional and cognitive development. While many forms of physical activity are available, sports participation will be reviewed in this paper because it has many benefits as well as potential risks. Sports participation has gained wide popularity in the field of child development because it allows children both socioemotional and cognitive benefits such as social competence, prosocial behaviors, problem solving skills, self-regulation, confidence, enhanced concentration and attention, and an increase in executive functioning. For example, one study found that sports participation for girls makes them less likely to be depressed, more likely to reach higher academic goals, and more likely to display improved body image and self-confidence. Another study, however, found potential risks from sports participation such as performance pressures which may lead to low self-esteem, confidence, negative self-image, time displacement, and change in sleeping schedule. This paper will review empirical studies that provide evidence on the effects of sports participation on children's socioemotional and cognitive development.

Karina Lule

Faculty Mentor: Sara Angevine

The Impact of Trump's Tweets on Company Shares: Do Trump's Tweets Have an Effect on the Stock Market?

Trump's announcement that he would be running for the 45th presidency of the United States in March 2015, not only created a shockwave for the political world, but also the U.S financial sector. This research investigates the effects of the Donald Trump's tweets on the U.S stock market. Several banks predicted that if Donald Trump won the election, the stock market could drop by as much as six percent the day after election (Gandel, 2016). On the other hand, others believe that Donald Trump could truly make America great again (Kaletsky, 2016). Furthermore, I observe that during the election season, Donald Trump capitalized on his Twitter account to lash out at numerous companies. To illustrate the impact of Trump's tweets on the stock market, I will use the methodology of the Wall Street Journal's "Trump Target Index" to measure the stock market response of 10 different companies tweeted about by Trump in 2016. One can argue that this analysis is important due to the consequences that could emerge in the stock market from the perceived symbolic representation that the President is emitting on behalf of the United States through his social media banter.

Joe Magana and Ashley Gonzalez

Faculty Mentor: Alvin Alejandrino

Effects of Oxygen and Temperature on the Abundance of *Anthopleura Elegantissima*

Does the temperature and/or oxygen levels of the water in both the high and low tide pools have any effect on sea anemones abundance in these regions? This is important because it contributes to our general understanding of these organisms and how they interact with the rest of the organisms within this environment. We hypothesize that the sea anemones that are found in the lower tides versus the ones found in the higher tides will have a difference in abundance, more of them, because of varying temperature and oxygen levels that the ones in the higher tides are exposed to. Quadrants, thermometers, and oxygen probes, will be used

to account for abundance of organism, levels of oxygen in the water, and levels of temperature in the water. We will use the quadrants to choose a set location and count the sea anemones within that area. We will also measure both the oxygen and temperature levels of the water within those given quadrants. This will be done three times in a lower tide and three times in a higher tide for each visit that we do. A t-test was used to identify statistical significance in the difference in abundance of the *A. elegantissima* within the low and high tides, over the course of the experiment. This was used in order to support our hypothesis, of lower abundance in the high tides. A correlation test was also performed using our other two measurements, to see if these differing levels of abundance could be correlated to the varying levels of either/both oxygen levels in the water and temperature changes. Our expected results, based on the literature, would be that there will not be a difference in the organism's size and abundance that are being sampled in the higher tide versus the lower tide because of different pH and oxygen levels. After compiling and analyzing the data, our two sample type 3 t-test results showed a value of 0.46. This means that there is some difference in the abundance of sea anemones within these two regions. Correlation test were performed to see if the two tested variables had any correlation to the abundance of the sea anemones. For all three, we obtained low R-values, meaning we cannot say that there is some type of correlation between temperature and oxygen level with the abundance levels of sea anemones within these regions.

Richard Manjarres

Faculty Mentor: Roger White

Income as a Determinant in College Students' Perceptions of their Familial Social Class

We examine the effects of the "Big 3" objective measures of socioeconomic status (SES) (i.e., family income, parental educational

attainment, and parental occupations) on perceived social class. Prior research has found that subjective social status is more strongly linked to physical health than to these traditional, more objective measures of SES. We use data obtained from a multiple identities questionnaire that was completed by students at an ethnically-diverse small liberal arts college to consider the relationships between subjective social status and the “Big 3” measures. Our sample consists of 1,021 women and 662 men. We find that all three factors are significant, with parental income as the strongest in determining subjective social class, and parental occupation and parental education following. This suggests that, among the “Big 3” measures, family income is the best single measure for determining subjective social class, contrasting somewhat with earlier research which suggests that occupational status is the best single measure for determining an adult’s objective SES.

Mila Markova

Faculty Mentor: Amanda Lash

Auditory Hallucinations in Schizophrenia: Examining Language and Auditory Processing

This literature review explores auditory verbal hallucinations presented as a symptom of schizophrenia. The current review explores a large body of studies presenting research on the processing differences presented in the brains of these individuals. Topics covered include: auditory processing areas, voice recognition, and language pathways and connectivity. Overall, there are various changes and abnormalities that occur within this population that are important to be studied. Specifically, there is increased activation of the auditory cortex without external stimuli being presented. Also, there are difficulties present in distinguishing between self and non-self-voices. Finally, in the language processing areas, there is a lack of connectivity found in this population. An understanding of these

differences will help inform researchers on ways to create better treatments for these symptoms.

Rodolfo Marquez

Faculty Mentor: Sara Angevine

The Intersectionality of Latinx and LGBTQ+ Representatives and Their Effect on HIV/AIDS across the Country

Representation in the political realm has been predominantly recognized on singular components of identification; however, the goal of equal representation is not being met in this system. The American community is comprised of one of the most socially, economically, culturally and sexually diverse peoples. To categorize individuals by only one of these facets of their character, is to dismiss that the others exist. Many research has shown works that focused on race and gender and their intersectional effect on certain policies, but not many research reviews the relationships of race and sexual orientation/gender identity. In this piece, I will carefully examine the ways in which certain state legislatures within the U.S. may be (whether purposefully or ignorantly) affecting specific policies on HIV/AIDS, based on the growing intersectionality of representatives' different identities, specifically the Latinx and LGBTQ+ communities. HIV/AIDS are diseases that many Americans regularly live with, so determining what drives the policy to ultimately help those affected could be beneficial. There is already a lack of current politicians that identify as Latinx LGBTQ+ and there should be more legislation focused to help mitigate, and possibly cure, the HIV/AIDS epidemic. Therefore, the goal of this piece is to showcase the importance of electing

public officials of many identities to rightfully represent their large pool of constituents and to possibly portray the amount of Latinx LGBTQ+ members in legislative bodies, the legislation centered on HIV/AIDS. I plan to define and explain both identities, supported by historical evidence, to lay a foundation for the significance of not only Latinx LGBTQ+ people, but also the importance of the intersectionality of any race and sexual orientation/gender identity. Additionally, I plan to compare six states: three with Latinx LGBTQ+ public officials and three without. By picking one or two bills on HIV/AIDS, I will analyze if the authors/cosponsors were members of both respective communities and if they had a major role in the creation and the passing of those bills.

Brian Marrocco

Faculty Mentor: Tony Barnstone

The Walk

The light reached out but he didn't know how to grasp it
The future was bright but he couldn't see it
The eyes looked forward but the body was frozen
The brain thought deeply but the man was yet to move
There were so many directions to choose he was confused
He stayed in the same spot for the rest of his life.

Hannah Martin

Faculty Mentor: Sara Angevine

Intersectionality and Descriptive Representation: White Women in Election 2016

Though US white women most often vote for the Republican presidential candidates (Junn 2017), the 2016 presidential election presented the first opportunity for white women to vote for a candidate who descriptively

represented them in terms of gender and race, Democrat Hillary Clinton. However, according to CNN exit polls (2016), 52 percent of white women chose not to vote for Hillary Clinton (while 69 percent of Latina women and 94 percent of black women did). In this paper, I investigate the political preferences of white women as a group, exploring their perceptions of leadership qualities, internalized sexism, and general political preferences by applying multiple regression analysis to 2016 ANES data. Based on the data, I argue that white women's political efficacy is significantly tied to their white racial privilege (Frankenberg 1993) and this may constrain notions of gender linked fate and feminist political consciousness. As scholars continue to investigate the influence of race and gender on political decisions, our findings suggest that a deeper investigation of the impact of white identity (and its intersection with identity vectors) is sorely needed.

Lyla Matar

Faculty Mentor: Teresa Delfin

Syrian Refugee Crisis: Where Are They Now?

With 5.4 million Syrian refugees, according to UNHCR and 6.1 million internally displaced, the war in Syria is one of the worst humanitarian crisis of our time. With news of an exodus from Syria surfacing in 2014, the world was equal parts inspired and distraught. Watching the Syrians undertake such a dangerous journey for the chance at a life free of war, inspired many in to action, including myself. With a six and a half minute short-documentary and accompanying research, I intend to discuss the beginning of the conflict in Syria and the exodus, the trajectories and host countries of the refugees, how and by who they are being aided by, and potential solutions for the future. Attitudes of the international community and host countries and policy that has been created, both negative and positive, in the face of the crisis will be discussed as well.

The overarching goal of the research is to educate, but also remind the public of the challenges that Syrian refugees still face, with the seven-year anniversary of the conflict being marked this past month. The documentary was made possible by the Groce-Ondrasik Fellowship and follows the journey of the Syrians through the beginning of the conflict to their arrival in Europe and elsewhere. It speaks to the stories of the 5.4 million refugees and the hardships that they faced through the duration of their arduous journey. With both the research and documentary, I hope to help share more information about the conflict and discuss its results and effects. I believe that it is important to both inform and remind people about the plight of the Syrian refugees in order to remain active and aware citizens of the globe.

Madeleine McMurray

Faculty Mentor: Sal Johnston

A Review of the United States' Food Product Dating Regime, its Impacts, and Policy Rewrite Recommendations

In 1975, the Federal Government began creating legislation aimed at regulating consumer safety, and began recommending that producers of food include dates on packaging to indicate the 'safest' shelf life the product could have. These policies were not stringent or clearly delineated; the result is regulatory dissonance between enforcing agencies, confusion for consumers, and waste. In the United States, 40 percent of produced food goes uneaten, "the financial equivalent of \$165 billion/year" (Gunders, 2012). What are the most effective ways to restructure policy to address the social and political implications of this current dissonance? Existing literature that dissects U.S. dating regulations largely agrees that the most effective policies work to address socially ingrained habits of consumers. These findings have helped to develop local, state and federal initiatives, each with varying degrees of effectiveness. By conducting a literature review of the current U.S.

regulatory policy regarding food product dating, I examined policy on a federal level. My review also explored how the policy on food product dating ultimately guides consumers to impact wasted food. Consumer confusion stems from the unclear product dating rules and loose manufacturer guidelines in the current policy. To address this confusion, policy rewrite should focus on changes that have impacts closer to the consumer end of the supply chain, such as the qualifying phrases used in product dating. Targeting the end of the supply chain through financial incentives like waste removal fees is also more likely to positively influence consumers and manufacturers in reducing levels of wasted food.

Sarah Medina

Faculty Mentor: Anne Sebanc

After Sexual Abuse – How is Resilience Obtainable?

The sexual abuse of children is escalating, and studies show that one in four girls and one in six boys will be sexually abused before they turn 18 in the United States. Resilience is an individual's abilities to adapt to life tasks in highly adverse conditions. The concept of resilience is needed to help determine how the child will maintain themselves later in life. Research has revealed that the properties of sexual abuse are connected to the risk factors that negatively affect a person both internally and externally which accompanies that child throughout their lives. Resilience in individuals dealing with abuse can be demonstrated by their emotional well-being, and their positive adaptation to everyday life. Along with resilience protective factors like appropriate environment and self-care behaviors can overcome for the negative risk factors associated with sexual abuse. This literature review assess 20 studies that investigate children who have experienced sexual abuse to determine how and when resilience was obtained. Overall, findings have indicated that resilience is obtainable for individuals that have experienced abuse, but only with the

right protective factors like positive environments, life style changes, and promotion of positive emotional health.

Celeste Medina

Faculty Mentor: Ayesha Shaikh

The Psychological Effects of Foster Care on Children

Being placed into the foster care system can affect a child both mentally and physically. The psychological effects on children in the foster care system are often ignored, and over the past five years not enough research has been done on the topic. This literature review discusses various empirical articles that focus on the psychological effects on children in foster care. Trauma exposure, psychological effects, and interventions are all explained in depth. The timing and types of trauma exposure are discussed, along with the behavioral and emotional effects. Lastly, interventions will be discussed such as trauma informed care and consideration of placement based on the child's psychological needs.

Christine Miller

Faculty Mentor: Hector Valenzuela

Identification and Authentication of an Unknown Bacteria Genus: Listeria

Identifying a bacterium is extremely important in diagnosing, treating, and preventing a disease. A blind study was designed to use standard microbiology and molecular biology techniques to identify microorganisms. In this study different strains of bacteria were provided with the objective of identifying the bacteria's strain. The results where: Gram staining shows gram-positive rods, Spore staining show a non-spore forming bacteria, Acid-fast staining expresses a bacterium that is not acid fast. Furthermore, slide observation under a microscope show regular shaped rods. Staining analyses and characteristic tests of unknown

bacterium detect specific features that are expressed by Listeria. Bacterium Listeria plays a fundamental role in spreading infectious diseases, many of which are foodborne. This study demonstrates an identification process leading to Listeria as my unknown bacteria, which was confirmed with the design of PCR primers specific to a Listeria gene.

Sarah Montoya

Faculty Mentor: Rebecca Overmyer-Velazquez

Evaluating Our Self-Empowerment Tool Kit: The Effects of Community-Based Programs on the Mexican American Experience

For the purposes of this study, I have conducted a series of semi-structured interviews with local Whittier parents to evaluate some of the community programs and their impact on their Mexican American experience. I will show this evaluation by looking at the program's purpose and how they interact with other programs in the community. I am interested in understanding how the intentions of both program directors, translate to day to day program functioning and how these programs address the concerns of the community. According to the pre-existing research, the assimilation, integration or acculturation experience of an immigrant group is dependent on the surrounding communities, cultures, and social norms of the "native population". Much of the pre-existing research on Mexican American assimilation is in the context of sociological theories that emerged after the first waves of European immigration. It is important to acknowledge the differences between European immigration

and Mexican immigration; the geographical location, the frequency of immigration, the reasons for migration, and the social challenges that each group faces over the course of many generations. When these social challenges are unaddressed it leads to academic achievement gaps, acculturation stress, biases, discrimination and unequal treatment of individuals based on a group's identity. Several community programs exist to help marginalized individuals, such as Fifth Dimension and the Community Engagement Parent Initiative (CEPI), yet there is little evaluation from the member's perspective. This study fills that gap in research. This research concludes that community programs like the CEPI and Fifth Dimension, offer a variety of empowerment skills and tools have affected the parent's experience as Mexican Americans.

Desiree Moreno and Sabine Huemer

Faculty Mentor: Sabine Huemer

College Students' Perceptions of Peers with Autism Spectrum Disorder

Negative social perceptions affect a person's development, social life and self-esteem (Ling, Mak, & Cheng, 2010; Pijl & Frostad, 2010). This becomes especially important in vulnerable groups, such as people with special needs, who struggle with peer acceptance (Matthews, Ly, & Goldberg, 2015). The current experiment examined factors that have shown to positively impact the perceptions that college students have of their peers who are diagnosed with an autism spectrum disorder (ASD) including knowledge of the diagnosis, knowledge of ASD, and exposure to people with ASD (Payne & Wood, 2015; Matthews et al, 2015). Forty Whittier College students were randomly assigned to two groups to read vignettes describing move-in day at a dorm; one vignette labeled the main character with an ASD diagnosis and gave a brief description of ASD, the

other did neither (Matthews et al, 2015). The perceptions of ASD were measured using 16 six-point Likert-scale questions (Findler, Vilchinsky, & Werner, 2007). Independent samples t-tests revealed no significant differences between groups but indicated a trend of more negative perceptions of ASD among students who knew about the ASD label compared to students who did not know about the ASD label. These results contradict previous findings (Matthews et. al, 2015). Correlational analyses between perceptions and knowledge, exposure, and demographic variables produced no significant results. Studies with bigger sample sizes, other population groups, and different scenarios need to be conducted to determine the effects of the knowledge of a prior ASD diagnosis and other factors on the perceptions of ASD.

Delia Muñoz

Faculty Mentor: Anne Sebanc

Risks and Rewards of Language Brokering in Childhood and Adolescence

The number of immigrant families in the United States has increased rapidly in the past 20 years. Children of immigrant parents often act as language brokers for their families from early childhood up until adolescence. Problems can arise when both Asian and Latino children are expected to broker for their parents. Children and adolescents face many barriers such as having trouble translating big vocabulary words, feeling obligated to interpret all the time and having the dynamic between parent and adolescent relationship change. Research within Asian immigrant families has shown significant results about the reasoning behind adolescents who continue to language broker as a way to show respect to their parents (Kim, Wang, Weaver et al., 2014; Shen, Kim, Wang et al.,

2014). On the other hand, research within Latino immigrant families has shown that Latino parents often feel grateful for their children brokering for them yet the Latino adolescents themselves have been found to have mixed feelings about brokering for their parents over time (Villanueva and Buriel, 2010; Kim and Hou, Zhang and Shen, 2017; Kam and Lazarevic, 2014). Both cultures have many differences within how they handle language brokering; yet, the two cultures share similar reasons why they need language brokering. This literature review will analyze 20 studies that explore the impacts that language brokering has had on Asian and Latino children and adolescents that have been brokering for their families for years with an emphasis on Latinos. Overall, current studies have shown that the experiences adolescents have had with language brokering impacts their language, social and cognitive development.

Erika Ngo

Faculty Mentor: Ayesha Shaikh

The Psychological Effects of Racial Microaggressions on Ethnic Minorities

In an ever-changing racial landscape where overt discrimination is becoming more socially unacceptable, racism continues to persist in the form of subtle events known as racial microaggressions (Sue, Bucceri, Lin, Nadal, & Torino, 2007). Because recent reviews have not fully addressed the ways microaggressions are harmful to racial minorities, this literature review highlights both the similarities and differences between various ethnic group experiences by analyzing literature spanning the past five years. Across groups, racial microaggressions have been linked to lower self-esteem (Nadal, Wong, Griffin, Davidoff, & Sriken, 2014), increased

levels of depression and anxiety (Hu & Taylor, 2016), a higher frequency of sleep disturbances (Huynh, & Gillen-O'Neel, 2016), higher levels of stress (Anderson & Finch, 2017), and poor general health (Nadal, Griffin, Wong, Davidoff, & Davis, 2017). Additionally, this review looks at the unique experiences of the four largest ethnic minority groups in America: African Americans, Native Americans, Latino/a Americans, and Asian Americans, as well as addresses the unique experiences of multiracial individuals. To varying degrees, African Americans, Native Americans, and Latino/a Americans are associated with high rates of dropout, low representation in STEM fields, and racial battle fatigue (Franklin, Smith, & Hung, 2014; Johnston-Goodstar & VeLure Roholt, 2017; Smith, Mustaffa, Jones, Curry, & Allen, 2016) Furthermore, Asian Americans report especially low levels of self-esteem and poor interpersonal relationships outside of their ethnicity (Nadal et al., 2014; Tran & Lee, 2014). The experiences of people coming from multiple ethnicities are relatively unique with questions of identity coming from both within and outside their races (Tran, Miyake, Martinez-Morales, & Csizmadia, 2016). Future research should further investigate underrepresented groups within the larger minority umbrella such as more research on Native Americans and multiracial individuals.

Kate Nunberg

Faculty Mentor: Alvin Alejandrino

The Effects of Oxybenzone on Bioluminescent Plankton

Sunscreen protects us from getting sunburn and prevents early signs of aging. However, it is possible that one of the most common sunscreen ingredients, oxybenzone or BP-3, may be hurting marine organisms. The most widely used active ingredients in sunscreen are zinc oxide and oxybenzone. Oxybenzone has proved to be a reproductive toxicant for fish and mammals. However, it is especially harmful to coral. Previous studies

have linked damage to endocrine and skeletal systems of coral reefs with oxybenzone based sunscreens. The objective of this project is meant to test whether oxybenzone is harmful to marine life. *Pyrocystis fusiformis*, a bioluminescent plankton, are food for larger aquatic organisms and form the base of the food chain. The methods employed for this experiment were done the following way. This project had two trials that exposed the organism to different experimental conditions. In Trial 1, the *P. fusiformis* were placed into eight separate tanks with amounts of 0.01%, 0.10%, and 1.00% of oxybenzone in saltwater and zinc oxide in saltwater.

Measurements were taken every day for a one-week period. In Trail 2, we used, *P. fusiformis* that were placed into six separate tanks with 0.01%, 0.10%, and 1.00% of oxybenzone in ethanol and the control being tanks of just ethanol in saltwater, in the same concentrations, also treated for several days. To determine if the compound was having an effect, we recorded how strongly the glow of *P. fusiformis* was (using luminescence recorder) to determine how much the ingredients could be harming them. Results: neither trials gave clear results. The average chemiluminescence results for oxybenzone of 0.01% was 0.300 lux, 0.10% was 0.275 lux and for 1.00% was 0.125 lux. We speculate that the zinc oxide nor oxybenzone dissolved completely in either medium, thus making results unclear. Alternatively, the plankton may have not glowed because the plankton were sick prior to the experiment, or from the ethanol. Although this result was unexpected, we will continue this research in the future by increasing the concentrations of oxybenzone and/or changing other conditions of the tanks such as the water temperature or exposure to sunlight, that might also contribute to the degradation of oxybenzone.

Sheldyn Odom

Faculty Mentor: Rebecca Overmyer-Velazquez

Conforming for Comfort? Religion's Effect on Sexuality Portrayal

Time and time again, people are judged on things that are out of their control. An ethnicity, a name, or a sexual preference are just a few of the targeted details that are unchangeable. Within my research, there are many people who face these prejudices everyday just for loving who they truly want. In today's world especially, more often than not, being anything other than heteronormative is often looked down upon by those who have a strong religious background, even if the person who is not heteronormative and the religious person are one in the same. People of color (POC) have it even worse off than those who are of European descent. My current research focuses on that exact idea: religion's effect on POC and their portrayal of sexuality to self, family and friends. My findings show that the majority of people who experience this are POC, while the primary population of currently existing research is on white men only. During data collection, I had to make sure that my participant consistently felt comfortable and safe enough to speak on such sensitive matters. Conclusively, I found that religion plays a larger part on sexuality portrayal than I previously thought possible, but still consistent with my hypothesis. Religion is not a bad thing, but it can lead to a struggle to understand one's self. Sexuality is something that cannot be truly changed by choice, but the way it is shown to the public eye may be altered. The connection between religion and sexuality is simply that the presence of the prior, can skew the portrayal of the latter.

Devin O'Donnell

Faculty Mentor: Kristen Smirnov

Battle for Los Angeles: Marketing Strategies for LA's Two NBA Teams

According to Forbes, the North American sports industry itself is estimated to be worth over \$70 billion by 2019. The National Basketball Association, or more commonly known as the NBA, is one of the most recognizable sports leagues in the world, with the league's teams having a

combined net worth of around \$40 billion, as per Forbes. This study investigates some of the ways that the local sports teams target their audiences, across all different races, ethnicities, genders, and backgrounds, and how they keep them coming back for generations to come. I attended the games of both the Los Angeles Clippers and the Los Angeles Lakers to see which specific social classes each team targets and how they want their fans to perceive them during and after games. Through observing the atmospherics and live note-taking while attending three games, fan engagement data was gathered, while also being supplemented by online research of ticket prices and team history. With the combination of fan engagement methods, ticket prices, and the use of team history, the Lakers and Clippers have both successfully targeted their specific segments; through the aforementioned combination, the Los Angeles Lakers have positioned themselves to be perceived as an upper-class, successful franchise, while the Los Angeles Clippers have used the tactics to make themselves more accessible to the greater Los Angeles population. In doing so, the Clippers have engaged in increasing brand awareness, while the Lakers seem to be resting on their laurels.

Liliana Perez

Faculty Mentor: Hector Valenzuela

An Analysis of an Unknown Bacteria

Bacteria come in all shapes and forms. Bacteria can range from being gram positive to being gram negative due to the characteristics they have acquired. Their unique features have been studied for years in order to classify the type of bacteria that it is. In this case, the morphological study of an unknown bacteria was examined. Several tests were conducted on the unspecified bacteria to derive its components and discover the exact

species. A series of different experiments were conducted on the bacteria including: gram staining, determination of the bacteria's shape, spore staining, acid-fast staining, catalase test, aerobic test and a PCR. The results of the study determined that the unknown is a gram-positive bacterium due to its purplish hue. The shape of the bacteria was determined to be cocci shaped due to its round shape. It was also determined that it was arranged in a staph – rather than strept – arrangement.

Christina Prestella

Faculty Mentor: Roger White

Is Using the HDI a Way to Determine Standard of Living

We employ regression analysis to examine the relative contributions of access to education, life expectancy, and average income on the Human Development Index. Further, each component of the HDI (i.e., school enrollment rates, life expectancy (at birth), Gross National Income per capita) are regressed, in turn, on sets of potential determinants.

Identification of the determinants of school enrollment, life expectancy, and average income are then substituted into our initial regression model to identify the factors that most influence HDI values. Thus, our results indicate the factors that underlie economic and social development, as measured by the HDI, and provide valuable insights on what factors should be most-intensively addressed to effect improved standards of living. The analysis is performed using data sourced from the United Nations and the World Bank. In total, our data represents 188 countries during the year 2015.

Grace Reeder

Faculty Mentor: Sara Angevine

Analyzing Security Sector Reform in Liberia: Does Women's Increased Representation in Security Roles Translate to More Effective Policies Regarding Gender-Based Violence?

Following Liberia's extensive civil war in the country, women were an integral part of ending the conflict. Despite this, women and girls still face high rates of violence in the country, with many of them suffering in silence. Liberia instituted a gender-sensitive police reform between 2003 and 2013 to increase women's presence in the police force, as part of their National Action Plan to implement UNSCR 1325, as well as with the hope it could reduce the high rates of gender-based violence. This paper aims to discover whether or not the increased presence of women in security sectors translates to more effective policing and responses to issues of gender-based violence. Through analyzing Liberia's National Action Plan, the gendered police reform in the country, and the effect it has had for women and girls' physical security, this research will determine whether or not applying a gendered lens to issues of security makes a concrete difference in improving the well-being of women and girls. Additionally, this will determine whether or not gender-sensitive police reforms result in improved response to the specific security needs of women and girls, especially regarding violence against women. The police reform in Liberia increased women's representation in the security sector, although there are still significant challenges that need to be addressed. Ultimately the country needs to go beyond the "add gender and stir" idea of representation that assumes more women in security sectors will result in a decrease of gender-based violence. This research demonstrates that while the country has made strides in addressing these issues, there is still work that needs to be done, and further research must be done in order to recommend sustainable solutions to solve the problem of gender-based violence in the country.

Emily Rich

Faculty Mentor: Rebecca Overmyer-Velazquez

Young-Adult Perspectives of Home: A Physical Place or a Mental Space

There have been many different perspectives of what a “home” means, especially at a pivotal time in a person’s life such as the college years. Some say that a home is where your family is, while others say you have to make a home wherever you are. For young-adults today, that perspective could be a multitude of factors distinct to their understanding of the world. I use interviews to gain information on what students transitioning into adulthood consider “home” to be, and where they believe it is. These interviews are to ground the way one talks about home in context to better understand that perspective. The students I work with are attending college as undergraduates during their final months, or have graduated just after doing an interview with me. They range from those who live within the city of the college while attending, to students from around the country who have moved onto campus for college, to students who have traveled abroad. Some of my findings show that the idea of having one’s own space, accessibility, and comfortability are major factors in what a home means to college students. The concept of home for young-adults during this time period is a very unique perspective that holds more than the idea of one physical space as “home.” My work in this study will help to gauge the understanding of diverse student lives pertaining to perspective of “home” while transitioning to or from a home, as opposed to other moments in one’s life.

Melanie Rizzotti

Faculty Mentor: Rebecca Overmyer-Velazquez

Learning the Difference: Young Adults with Learning Disabilities

This qualitative study is looking at the attitudes and perceptions that neurotypical people have on students with learning disabilities, and consequently how those attitudes and perceptions impact those students.

Many students, regardless of a public or private education backgrounds, experience living with a learning disability that is undiagnosed. This leads them to act out, have low self-esteem in school, and experience other social-emotional factors. This study is critical because it is an area in which available literature is lacking. The present literature is primarily quantitative, and compares those with LD to those without. In a comparison like that, you miss crucial information on learning disabilities. This study will focus on the individual, and their individual experience with different learning disabilities. By using life history interviews, I am able to ask meaningful questions to better grasp multiple facets of LD. On a broader scale, this is an institutional issue in a majority of schools where educators are not trained nor qualified to identify or diagnose learning disabilities in their classrooms. Every person who has a learning disability has a different experience with it, and my research is looking at, and I am looking to identify similarities and differences among individuals' experiences. Additionally, in looking at the variety of schools my participants attended, we can see how large an issue this is across the United States. Thus, we can understand how students with learning disabilities, regardless of socioeconomic status, experience similar socioemotional feelings because of the negative attitudes and perceptions of those without LD.

David Rodriguez

Gender Disparity in U.S. Politics

Why do women continue to be an underrepresented group in Congress, even though they comprise over 50% of the U.S. population? According to

the results of the 2016 election, the number of women in Congress remained static at 104 or 19.4% of the 535 members. After comparing the number of women in Congress in 2015 to the number of women who were elected in 2016, I found that the number did not increase. Based on the total population of 325 million, women comprise 51% of the population, but only 19.4% of the seats. The issues of gender disparity in U.S. politics is a very important issue if representation is to be equal for all citizens in our Democracy. After researching this problem, I found that there are several barriers that women face when they decide to run for political office. These include: a gender gap in political ambition, women are not recruited or supported when they run, stereotypes that exist about women, the double bind faced by women, the self-perception of being unqualified for leadership roles, and the perception that women have about how politics cannot be used to solve problems. To make our Democracy legitimate, women need equal representation in Congress, and therefore need to hold 51% of the seats. I have concluded that in addition to identifying the barriers women face when running for political office, we must also as a society, figure out how to overcome or eliminate them by making major cultural and political changes in our society.

Tayler Scriber

Faculty Mentor: Ann Kakaliouras

An Exploration of Images of the Black Diaspora in Science Fiction and Horror Films

To understand the implications of the images that are disseminated to the public via the medium of film we must take historical and sociological stances. My research is an exploration of these stances as they relate to images of the African Diaspora (1850-Present) that can be found in science fiction and horror films. It is my belief and the object of my research that these historical instances have a direct effect on the formation of these film genres as a whole and the imagery within them. In

fact, I have come to the conclusion that the images of the black diaspora do not only parallel elements that are considered to be the main tenets of these genres, but that they do so in order to push specific images onto the populations that watch them, influencing the structures of societal paradigms. In keeping with this conclusion, I have also found that both science fiction and horror provide a more than adequate basis for showcasing the social realities and anxieties of black people who have experienced the effects of the diaspora. By dissecting the plots, characters and cinematography in a single film, *Night of the Living Dead* (1968), I will further illuminate this point.

Bryceton Scurr

Faculty Mentor: Glenn Piner

Quasars the Python Way

Quasars are energetic systems surrounding super-massive black holes in distant galaxies. Some quasars emit jets of plasma at high speeds almost directly towards the observer; these jets can appear to move at many times the speed of light. To understand the kinetic energies being released and the dynamics of the jet, astronomers must accurately track the motions in these jets over many years. This can be difficult because astronomical observations, due to observatory time constraints, are unevenly sampled in time. In this talk, I describe a method implemented in the python programming language that computes an evenly sampled time series from unevenly time distributed radio telescope images obtained by the Very Long Baseline Array (VLBA). These evenly sampled time series can then be viewed as animations to gain a visual understanding of motions in quasar jets. I show the results of this code applied to a small series of test data on the quasar 0827+243. Future applications on much larger datasets can help in revealing the true nature of the plasma motions; for example,

as ballistically moving plasma blobs or as waves propagating through the jet.

Jessica Stackhouse

WHO SUPPORTS US? Motivating African-American Students for Success

The misconception that the African-American family does not view education as important is one that has been falsely claimed for years. Society gives African-American families a reputation for being unsupportive and their children as unintelligent when realistically the family unit within African-American communities proves as the most stable base to build a successful academic career. Topics such as this one are important to examine because it can encourage or inhibit of African American students to work towards education contributing to our society which lacks educated people of color. This diversity leads to a more culturally relative and educated people, which in turn affects policy and creating positive policy change. Current researchers have identified that African-American students are turning to their families instead of educational leaders because of the lack of support received from teachers and faculty in the classroom. The research I am conducting focuses on the actions of the African-American family rather than the educators, bring the spotlight on what parents are doing in the home that are actually beneficial towards this community of students. This project will examine how institutionalized racism has evolved in its effects on African-American people, how African American families support their students today, and why their parenting techniques and attitudes go unrecognized by leaders in education. Through six interviews and the surveying of 55 individuals who identify as African American, my data uncovers answers that point to African-American students feeling unsupported by the education systems with 60 percent of students rating support from school as a three or under on a five-point scale. However, family support is scoring a four and above among 83 percent of those same students. This

suggests that immediate family members are the main catalyst towards these students getting educated in this pool of participants.

Amia Thrash

Faculty Mentor: Hector Valenzuela

Staphylococcus Aureus

A blind study was developed to identify the microorganisms using basic microbiology in combination with molecular biology techniques. This blind study's overall objective is to determine if basic microbiology techniques could be sufficient with minimum molecular techniques to identify different strains of bacteria. In this study an unknown bacterium was given a series of tests in order to determine its physiological and cultural characteristics. The cellular and oxygen requirements for this bacteria were key for determining the species of the bacteria.

Observations made under the microscope revealed that the bacteria were non-motile, spherical and grouped together in irregular clusters. In addition, the unknown bacteria were nitrate positive, catalase positive, and oxidase which determined that it was anaerobic and grew in the absence of oxygen. The results of the study determined that the unknown was a gram positive bacteria known as Staphylococcus aureus. Although this technique successfully identified the genus and species it was not enough to identify the specific strain of this species.

Ethan Trejo

Faculty Mentor: Sara Angevine

Public Opinion on the Governmental Representation of Women's Rights

With the campaign of Hillary Clinton during the 2016 American Presidential election, a bright light was shined on how women's rights are represented in government, especially by female legislators. Many voters,

females especially wondered how Hillary's victory would translate to gender-sensitive issues, especially given Hillary's extensive history for fighting for women's issues. It's also an opportune time to investigate women's rights and their portrayal in government. Upon the election of Donald Trump, a man widely held to a sexual abuser and a history of making misogynist, racist remarks, many women have mobilized and waves of women's movements have swept the nation. From the Women's March on Washington, D.C. in January of 2017, to waves of sexual assault victims coming forward (especially with the #MeToo movement), women's rights movements have spawned from Hillary's defeat and the election of such a controversial candidate. Additionally, given the recent large influx of women seeking office, how the American electorate view the representation of women's rights in government is on the mind of constituents as midterm elections approach. How will this influx of women affect representation of women and women's rights? Will constituents find solace and representation in these candidates? How will gender, race, and political party affect these sentiments of representation? And if the electorate doesn't feel women's rights to be represented, how and can this be rectified? I use data from the 2016 American presidential election collected by the American National Electorate Survey to investigate how the American electorate perceive the representation of women's rights in government. Focusing on various combinations of races, gender, and political party, I look at women's rights-relative data found in this dataset to see how the American electorate perceives the representation of women's rights in government and aim to make inferences in how these opinions may affect the upcoming midterm elections and the women running for office.

Amy Trinh

Faculty Mentor: Kristen Smirnov

Perception Product Purchasing

Every day, consumers identify needs or desires and make purchasing decisions in hopes of satisfying them. When choosing a product, the consumer is dependent on their perception that the product has features that are capable of satisfying their needs. When creating a product, marketers can analyze the perceived values that aim to provide post-purchase satisfaction. This research explores how the visual perception of a product can affect how a consumer behaves and processes their post purchasing satisfaction. This study focuses on the consumer purchasing process using the hierarchy of needs, perception of the product, and perceptual filters. The research methodology used was the natural observation method to gather data for both in-person and online consumer behavior. After reviewing the qualitative data, behavioral trends emerged on how consumers choose to interact with the product. It was found that consumers often felt the need to photograph and share a product that was designed to be visually aesthetic before they could be satisfied with their purchase as a whole. Through this research, we have identified a more comprehensive explanation for perceptual filters, such as smartphone cameras, that consumers view the product through. Findings suggest that the Instagram food culture, including Little Damage's goth ice cream, was designed to satisfy secondary needs through their products strong visual features and colors. This consumer behavior has become more relevant because of how visual social media platforms such as Instagram, Snapchat and Facebook have become.

Alma Vallin

Faculty Mentor: Becky Overmyer-Velazquez

Women Not Confident enough to “Role” with the Boys?

Previous studies have acknowledged the persistent problem of women facing the glass ceiling in their career advancement. Many studies analyze how top executives are biased towards women when considering them for a promotion due to their gender. The problem is that that many women begin facing these issues very early on in their careers without noticing it. Important studies have revealed that women continuously doubt their own potential, starting in the classroom setting and later in their careers in the boardroom. This research paper will propose that this issue of biased promotions, and low self-expectations for women continue to exist within classrooms as well as with women who have already pursued their careers, not only in the United States but internationally. A series of surveys were conducted in undergraduate classrooms in upper-level courses to gather an understanding of undergraduates' feelings toward career development and expectations, and a series of interviews were also conducted with professional business women in order to compare how much of what they experience has changed compared to the undergraduate students. My perspective will offer insight from a cross-national and multi-generational standpoint. This research determines that male and female business students consider math to be challenging, but the gender parity still challenges this with occupational segregation and gender bias.

Daniela Vega

Faculty Mentor: Laura McEnaney

Mexican Immigrant Women in the Workforce: The Lettuce Strike of 1979

Despite the amount of information about Mexicans in the agricultural workforce, the involvement of women is typically overshadowed. This project involves describing the involvement of Mexican women in the workforce and labor organizing in the agriculture industry and reflecting on how that impacted the industry and power dynamics at home and in the workforce. The goal is to show that Mexican immigrant women in the agricultural industry were active participants in labor organizing, and it affected the power dynamics in their households because of cultural standards. This has been done by examining the history and involvement of women in the industry and using The Lettuce Strike of 1979 as a case study. Oral history will also serve as a valuable way of recording the involvement of Mexican women; this is preliminary research, as the process of conducting oral history for this project is still in progress. By using a largely untapped source of information, Mexican oral histories will add to the future of this topic. Through scholars, such as Vicki Ruiz, I have been able to model my research. By demonstrating that Mexican agricultural workers actively participated in the industry, this research will highlight the impact Mexican women have had in the agricultural industry and the road they have paved regarding stereotypical women roles in conservative Mexican culture.

Rebecca Urbano and Sylvia Vetrone

Faculty Mentor: Sylvia Vetrone

Detection of Salmonella Enterica Contamination in Spinach Using a DNA-based Biosensor Detection System

Our DNA-based biosensor, which utilizes gold nanoparticles (AuNPs) for signal amplification and magnetic nanoparticles (MNPs) for easy and clean separation from samples, has been shown to detect non-PCR amplified genomic DNA targets (DNA_t) from bacterial pathogens. While this detection system can provide detection within a five-hour window within liquid food matrices, it needs to be determined how well it will detect pathogenic DNA within solid food matrices. Therefore, in this study, genomic DNA was extracted from spinach spiked with Salmonella enterica, E. coli (non-specific negative control), a mixture of Salmonella and E. coli, or just water (negative control) using either the Trizol®. Genomic DNA targets (DNA_t) from samples at 3ng/mL, 1ng/mL, and 0.125ng/mL were detected using the biosensor: hybridizing the DNA_t into a sandwich-like structure consisting of MNPs/DNA_t/AuNPs, which were then placed onto screen-printed carbon electrodes to detect the voltammetric peaks of gold using differential pulse voltammetry. Our results indicate that the biosensor is able to detect only the specified pathogenic DNA target, Salmonella enterica, down to the lower limits of the DNA_t concentration of 0.125/mL (p=0.05). These findings suggest that this detection system works well in thicker food matrices, provided that when sampled for DNA extraction, the sample is not viscous.

Yaneli Stinson and Sylvia Vetrone

Faculty Mentor: Sylvia Vetrone

Detection of Salmonella Enterica Contamination in Dog Biscuits Using a DNA-based Biosensor Detection System

Our DNA-based biosensor, which utilizes gold nanoparticles (AuNPs) for signal amplification and magnetic nanoparticles (MNPs) for easy and clean separation from samples, has been shown to detect non-PCR amplified genomic DNA targets (DNAt) from bacterial pathogens. While this detection system can provide detection within a five-hour window within liquid food matrices, it needs to be determined how well it will detect pathogenic DNA within solid food matrices. Therefore, in this study, genomic DNA was extracted from dog biscuits spiked with Salmonella enterica, E. coli (non-specific negative control), a mixture of Salmonella and E. coli, or just water (negative control) using either the Trizol®. Genomic DNA targets (DNAt) from samples at 3ng/mL, 1ng/mL, and 0.125ng/mL were detected using the biosensor: hybridizing the DNAt into a sandwich-like structure consisting of MNPs/DNAt/AuNPs, which were then placed onto screen-printed carbon electrodes to detect the voltammetric peaks of gold using differential pulse voltammetry. Our results indicate that the biosensor is able to detect only the specified pathogenic DNA target, Salmonella enterica, at the higher concentration of 3 ng/mL ($p=0.05$). These findings suggest that while lower detection limits cannot be achieved within thicker food matrices, this system is still able to detect pathogenic targets within solid food matrices.

Klariza Viramontes

Faculty Mentor: Hector Valenzuela

Uncovering Pathogenicity or Non-pathogenicity of Unknown Bacteria

New strains of pathogenic bacterium are constantly emerging. In addition, many bacteria are also antibiotic resistant, which has put pressure on hospitals and laboratories to quickly develop efficient methods to identify bacteria. The objective of this study was to develop methods to uncover an unknown bacterium using standard microbiology techniques with species-specific molecular biology techniques. In this blind study, multiple bacteria strains (from ATCC) were provided to a research group and everyone in the research group worked independently to identify the bacteria species. Our results were the following: the gram stain revealed that the unknown was a gram negative bacteria, motility, could ferment lactose, and tested positive for methyl-red with citrate and urease test coming back negative, the most likely bacteria that fits these characteristics is *Escherichia coli*. To confirm these results, the gene *dapE*, specific to *Escherichia coli*, was amplified through Polymerase Chain Reaction (PCR), confirming our results. Conclusion: Although standard techniques allow us to identify key morphological features that help us identify the microorganism, which we can confirm with PCR, we still nevertheless would be unable to distinguish pathogenic vs. nonpathogenic bacteria.

Jacklyn Waight and David Muller

Faculty Mentor: David Muller

The Evolution of the Viola

The viola is assumed to have been first crafted in the 16th century to be distinct from the violin in tone, form, and technique. Despite the viola

having been overlooked throughout its existence, it has shown its importance as both a harmonic and solo instrument. The viola was initially only utilized as an alto/tenor harmony in the string orchestra, with it gradually being featured as a solo instrument in more repertoire. From the 16th to the 21st century, the role of the viola has become much more significant in the string orchestra as it started to have more technically difficult parts. The purpose of this presentation is to highlight the instrument's often neglected and underappreciated history and its expanding role as a capable solo instrument. My personal perspective is that the viola is too often disrespected when it deserves to be seen in a more positive light.

BryAnna Wertz and Robert Montgomery

Faculty Mentor: Cheryl Swift

Terrestrial and Aquatic Food Web Inputs of Riparian Plants in Dwarsberg, South Africa

Riparian plant species located along the riverbank in Dwarsberg, South Africa contribute differently into the aquatic and terrestrial food webs. We compared four species of riparian plants, *Acacia mearnsii*, *Metrosideros excelsa*, *Brabejum stellatifolium*, and *Brachylaena elliptica*, in both the terrestrial and aquatic ecosystems. We did this by separating leaves from the different individuals into various boxes with different size mesh netting to allow water flow and insects to get in. We sunk these boxes throughout the river and left them there for a week's time. After a week, the boxes were collected and weights were taken. For the terrestrial ecosystem, we marked leaves on various individuals of each species and came back a week later to take a percentage of how much of the leaf was eaten. We also looked at the litter fall in the river to get an idea of the food web inputs as well as taking water potentials of the species. We saw that for the terrestrial ecosystem that *B. stellatifolium* had a higher percentage of leaf eaten than the other three species. In the aquatic

ecosystem, *B. stellatifolium* and *A. mearnsii* had the highest percent loss. We also saw that leaf parts made up the highest portion of litter fall.

Isabella Zonni and Ariana Firebaugh Ornelas

Faculty Mentor: Cheryl Swift

South Africa 2018 Research – What are Differences between Submerged and Emergent Willows?

This poster presentation will review the research that was conducted in South Africa in January of 2018 during their prolonged and severe drought. With scant rainfall, the conditions in the Western Cape are so dire that even with tight water restrictions and rationing, the taps are projected to run dry in April. Our research focused on the differences between submerged and emergent willows, *Salix viminalis*. The benefit to the species being submerged is the increase in water availability, though this increase in water availability leads also to an increase in water stress. However, the disadvantage to them being on land is there is less water but no intertwined roots; this lack of water can also lead to a different variation of water stress. *Salix viminalis* was the species studied; the stomatal conductance, water potential, and canopy density were the primary measurements being taken and recorded. Stomatal conductance is the exchange of CO₂ and water made throughout the day via the leaf's tiny stomata pores. During the pre-dawn measurements, data to measure how the plant was able to "recharge" during the night was gathered. It was found that there is greater water availability as the plant had not had the sun shining on its leaf, causing photosynthesis and evaporation. During the midday measurements, plants were found to be under greater stress. Under the strong South African sun, stomatal openings and conductance were at their greatest, and the plant was working its hardest carrying out

photosynthesis and keeping up with the water evaporation that was occurring from its leaves. One species, *Salix viminalis*, was studied at two locations, with five sights per location at a riparian area, which is the area where the integration of a river and dry land occurs. The first location with five sights was located in the river, where the species could be found with their roots completely submerged. The second location, with an additional five sights, was located inland from the river, where the species could be found on completely dry land. Preliminary results suggest willows that occur on land managed water stress more effectively than those that occur in the river based on maximal stomatal conductance findings. Furthermore, water potentials were more negative in willows that occurred on land indicating greater water stress than those that occur in the river. The information gathered will help to further understand the relationship between water, dry land, and its inhabitants.

Samantha Zarate and Serkan Zorba

Faculty Mentor: Serkan Zorba

Investigating the Modal Vibrational Phenomena with a Homebuilt Chladni Plate

The objective of this project is twofold: first, design and build a Chladni plate using a speaker, an audio amplifier, and a metal sheet in a machine shop, and second, by driving the built Chladni plate with a tone generator, experimentally correlate the vibrational modes of standing waves produced on the plate—and made visible by fine sand—with the driving frequency. We expect to see a dependence of the observable nodes on the boundary conditions, or shapes, of the plates we produce, which can be recorded as a function of frequency. We will compare the configurations of the waves generated in four different plates, with boundary conditions corresponding to various geometrical shapes. We will ascertain the factors that can account for the observed differences and similarities across the boundary conditions. We will also try to glean the speed of sound in

aluminum information from the observed/measured patterns. Finally, we will compare our findings with extensive experiments performed by the physicist Mary D. Waller in the 1940's on vibrations of free plates.

Serkan Zorba

Faculty Mentor: Serkan Zorba

Transmitting Music using Laser Intensity Modulation

The goal of this project is to transmit music across a room using laser intensity modulation. The experimental setup will consist of two modules: a “transmitter” and a “receiver.” The music signal will be coupled, via an amplifier, to a laser pointer in the transmitter, and after transmission, it will be detected and demodulated in the receiver. In the process, we will measure the relative strength of modulated music signal with respect to the overall intensity of the laser using a photodetector and oscilloscope. We will also investigate the effects of varying laser light intensity and polarization on the quality of the signal transmission. Finally, in order to have a completed optoelectronic product, we will design and build two plastic cases for the transmitter and receiver utilizing CAD programming and 3D printer technology such that the two modules, when not in use, can be attached to each other for convenience.