



CREATIVE COLLABORATIONS UNDERGRADUATE RESEARCH

CONFERENCE



Thursday, April 11, 2019 | 12–2 p.m.

University of San Diego | Hahn University Center

www.sandiego.edu/cc-urc

Student-faculty

Research

Scholarship

Creative Works

WELCOME to the 29th Annual Creative Collaborations Undergraduate Research Conference!

This annual forum celebrates the research, scholarship and creative accomplishments of students in all disciplines. The high-quality work you see reflects the intellectual curiosity of our undergraduate students and their ability to make substantial contributions to society. Creative Collaborations also showcases the commitment of our distinguished faculty in mentoring the next generation of research leaders, as well as USD’s long-standing dedication to academic excellence by providing students with experiential and engaged learning opportunities.

This year, more than 200 abstracts were submitted by students across a broad range of disciplines. We encourage you to visit students as they present their research in poster, interactive and visual arts exhibits. The engaged scholarship conducted on campus and presented today addresses a variety of contemporary issues and has the potential to make real contributions to knowledge and practice.

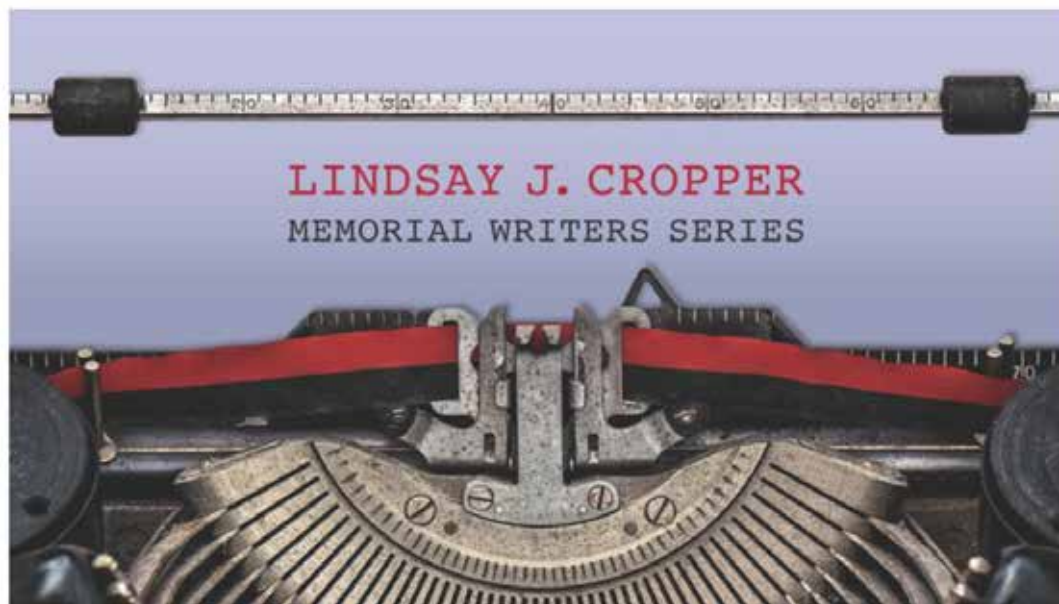
Among the presentations are studies about the Salem Witch trials and #MeToo movement; methods to estimate urban parrot populations in San Diego; and the birth of Korean Beauty or K-Beauty. We also have a group of students from the Azrieli College of Engineering in Jerusalem, Israel presenting their research on wastewater treatment and treatment during water desalination. Other research being presented at the undergraduate research conference results in a “product.” Examples include a floating robot for eliminating floating plastic debris in the ocean, an autonomous lawnmower, and a machine for recycling banana stems into construction materials.

Creative Collaborations is an important part of Research Week at USD (April 8-12, 2019), which showcases activities across the university and honors students and faculty members who challenge themselves to extend learning beyond the classroom. This year USD Research Week also coincides with the Council on Undergraduate Research (CUR) Undergraduate Research Week. We invite you to view and experience a variety of presentations during this celebration of faculty-student scholarly collaboration.

Congratulations to all the student presenters and faculty members participating in this year’s Creative Collaborations Undergraduate Research Conference!

Sincerely,

Elisa Maldonado Greene, PhD
Director



Cropper Creative Writing Student Reading

Thursday, April 25, 2019, 6:00 p.m.

Humanities Center, Serra 200

Dessert Reception to follow. Free and open to the public. Friends & Family welcome!

Students completing the Creative Writing Emphasis will read from their own works. The English Department's Creative Writing Emphasis (fiction, nonfiction, and poetry) is comprised of four rigorous, upper-division creative writing courses in which students practice the dedication and commitment required of the serious writer. These courses hone critical reading, creative thinking, and writing and communication skills. Such skills are not only essential to the budding writer, but are also highly valued in all professional fields and are integral to the creation of a well-rounded graduate of a liberal arts college. Students participating in the reading are:

Ashley Barraugh	Leilee Ghassemi	Gurleen Kang	Nicole O'Farrill
Zach Bernstein	Omar Jawdat	Stephanie Meraz	Hayden Witt
Joe Duffy	Marisa Hanson		



FOR MORE INFORMATION

Please visit us at www.sandiego.edu/cropper or join us on Facebook at

www.facebook.com/USDEnglish

If questions please contact Dr. Halina Duraj at hduraj@san-diego.edu

More info on the Creative Writing Emphasis:

www.sandiego.edu/cas/english/program/creative-writing-emphasis.php

Schedule

Welcome

12:00 p.m. Hahn University Center Forums

Gail F. Baker, PhD
Provost and Vice President of Academic Affairs

Elisa Maldonado Greene, PhD
Director for the Office of Undergraduate Research

Student Presentations

12:00 to 2:00 p.m. **Visual Arts Exhibits:** Student Life Pavilion Exhibit Hall

12:00 to 12:50 p.m. **Session One (Presentations 1-1#8) Poster Presentations:** Hahn University Center Forums. **Oral Presentations:** UC 1003 & 104

12:50 to 1:00 p.m. **Intersession**

1:10 to 2:00 p.m. **Session Two (Presentations 1-1#7) Poster Presentations:** Hahn University Center Forums. **Oral Presentations:** UC 1003 & 104

ABSTRACT BOOK

In keeping with USD's commitment to sustainability, the 2019 abstract book is available on the mySDmobile app during Research Week, and can be found online at www.sandiego.edu/cc-urc.

RESEARCH WEEK April 5-12, 2019

Creative Collaborations Undergraduate Research Conference is part of USD's 5th Annual Research Week. For more information about offerings, please visit <http://www.sandiego.edu/osp/research-week/>

OFFICE OF UNDERGRADUATE RESEARCH

Established in September 2011 with a grant from the W.M. Keck Foundation and funding from individual donors, the mission of the Office of Undergraduate Research is to support undergraduate students in research, scholarship and creative activities. Underlying our mission is a commitment to equity and access, to ensure that all students are able to participate in and benefit from research activities both in and out of the classroom. The office provides services to both students and faculty members who mentor them in research activities, and encourages collaborations across departments, disciplines, and with the local and global community.

The University of San Diego is an enhanced institutional member of the Council on Undergraduate Research.



12:00 - 2:00 p.m., Oral Presentations

Thursday, April 11
Session I; 12:00 - 12:20 p.m.
UC Room 103

Synthesis of Biorenewable Starch-Farnesene Amphiphilic Conjugates via Transesterification of Terpene-Derived Diels-Alder Adducts

BRANDON J. ORZOLEK, Md Anisur Rahman and Peter M. Iovine

We describe a new class of terpene-starch esters synthesized from biorenewable building blocks. Although our work is specific to starch, we believe the synthetic methodology can be extended to a wide range of polysaccharide substrates. In our approach, an ester functionality is first introduced to the farnesene backbone via high yielding, solvent-free Diels-Alder chemistry. The farnesene esters are subsequently transesterified with starch to produce a range of starch-farnesene amphiphilic biopolymers. The key transesterification reaction between farnesene and starch employs 1,5,6-triazabicyclo[4.4.0]-dec-5-ene (TBD) as a guanidine base organocatalyst and is capable of producing materials with a high degree of substitution (DS). The DS can be modulated by altering the starch/farnesene feed ratio. Low DS starch-farnesene esters show surfactant-like properties while the higher DS materials were successfully solvent-cast into standalone films. Thermal and mechanical tests reveal starch-farnesene esters to be robust under both solution and thermal processing conditions. Given the versatility of the synthetic method, the biorenewability of the components, and the biodegradability of the ester linkage joining the subunits, the newly produced polymer amphiphiles appear to be a promising class of new green materials.

Thursday, April 11
Session I; 12:30 - 12:50 p.m.
UC Room 103

Accessing Functionalized Beta-hydroxyboronate Esters via a Diboration/Homologation Sequence with Aldehyde

MAGGIE NISTLER, Gillian Meyer, Anthony DePaul, Andrey Samoshin and Tim Clark

Even though boron and boron moieties are not overly abundant in the final structures of pharmaceutical drugs, there have been several advances in the past decade. Now several FDA-approved medications incorporate boron into the final form of the drug. This research focuses on expanding the synthesis of biologically relevant compounds that incorporate and utilize boron. To synthesize these compounds, an aldehyde undergoes a copper-catalyzed diboration reaction and is hydrolyzed under previously established conditions to yield an alpha-oxyboronate ester, incorporating boron onto the same carbon as oxygen. The synthesis of beta-hydroxyboronate esters is under developed. This is a difficult motif to access and has not been utilized extensively. The goal of this project is to develop new reactions that utilize this newly formed carbon-boron bond. We have developed one such reaction that inserts an allyl group into the carbon-boron bond. The development and scope of the reaction will be described.

12:00 - 2:00 p.m., Oral Presentations

Thursday, April 11
Session I; 12:00 - 12:20 p.m.
UC Room 104

The Light in the Abyss of Technology

BRANDON KENNEDY and Rico Monge

Science, Technology, Engineering, and Mathematics (STEM) are subjects that hold great promise but fail to actualize solutions to humanity's most pressing problems. While the world's population could have been fully fed, clothed, and housed since the 19th century thanks to the technological advancements of that era, the gap between the rich and poor has increased, aided in large part by STEM fields. These fields have been rigorously and blindly pushed for in the American education system; rigorous for profit and blind because critical thinking is not part of the process anymore. Students from lower socioeconomic backgrounds are the ones most affected by this due to the need of breaking the cycle of poverty in their families: there is more money to be made in STEM related fields of work. Technology is made on command by students entering the workforce without understanding the implications of their work as they are stuck in a calculative way of thinking; the answer to their lack of wealth is doing blind science. In a world full of deadly weapons, the technology behind them will not be the cause of human destruction but the increasing inability for people to think in a meditative way. Technology can be a catalyst for positive change, but the one unique characteristic of people to think must first be brought back to the front lines of anything STEM related.

Thursday, April 11
Session I; 12:30 - 12:50 p.m.
UC Room 104

Women, Agency, and Resistance: From the Salem Witch Trials to the #MeToo Movement

SOPHIE ABBER and Kate DeConinck

This project centers on the question: how are dynamics present in the Salem Witch Trials related to contemporary religious issues surrounding gender and agency? An existential approach to studying the Salem Witch Trials is used, highlighting themes like agency and intersubjectivity to create a new understanding of these events. Not only has this not been done in previous scholarship, but existential analysis opens the door to making connections between the Salem Witch Trials and modern times. Women today are still constrained by social and religious norms and motivated by existential needs and questions. This will be seen in a variety of different case studies the author will analyze, including scholarly critiques of feminists who force neo-liberal notions of liberation and empowerment onto other women (such as the desire to 'free' Afghani women from wearing the hijab) and fictionalized accounts like *The Handmaid's Tale* that depict women who are socially and religiously regulated. Overall, this project will draw from existential, anthropological, theological, and psychological themes to argue that religious women today still struggle with agency and resistance and create a case study for use in high school and undergraduate classes.

Thursday, April 11
Session II; 1:00 - 1:20 p.m.
UC Room 104

Organic Matter Variation off the San Diego Coast

RACHEL SARNER, Jorge Saavedra-Alvarado, and Sarah Gray

The purpose of this study is to evaluate percent organic matter off the coast of Southern California. The study area is called the California Continental Borderland (CCB) and consists of Northwest directed ridges and basins following the San Andreas Fault system extending off of San Diego. This unique bathymetry allows for organic matter from high productivity to collect in the deep basins to then be preserved due to low oxygen conditions. It has been hypothesized that because organisms cannot survive these anoxic conditions, none of the organic matter will be broken down, therefore leaving the basins full with organic-rich sediments. This sediment is important to research as it has been linked to climatic conditions like nutrient upwelling occurring off the California coast. The water oxygen conditions also relate to climate change because when waters in the ocean warm up, it cannot hold as much oxygen and that will further expand the oxygen minimum zone. A group of researchers and I set out from San Diego on the RV Sally Ride research vessel to collect sediment samples from various locations and depths between 200m-1000m along the edges of the basins and ridges of the CCB. A Van Veen multi grab sampler and a Multicorer were used to collect the samples of sediment. Loss of Ignition methods were then followed to burn the organic matter in order to find its percentage. Results did show higher percentages of organic matter at deeper depths, yet more test must be conducted to further strengthen the hypothesis above.

Thursday, April 11
Session II; 1:30 - 1:50 p.m.
UC Room 104

Race and Representation in Four Plays by Shakespeare

EMMA HEFLIN and Maura Giles-Watson

The racial beliefs that emerged in sixteenth-century Europe still influence notions of race and myths of racial superiority today. In this project, I will contextualize the racialized representations of marginalized characters found in Shakespeare's *Othello*, *Titus Andronicus*, *The Merchant of Venice*, and *The Tempest*. I will analyze Shakespeare's representations and how they reflect the racial thought of the early modern period, as well as how he uses these figures to complicate notions of race that were developing at that time. In the process, I will apply W. E. B. Du Bois' theory of 'double consciousness' to these marginalized characters and reflect on how the opinions of society and dialectical tensions relating to identity affect their self-concept, actions, and motivations. This project will assert that early modern historical developments such as the slave trade and colonial expansionism shaped cultural understandings, Shakespeare's perspectives, and his production of these characters.

Session I: 12:00 - 12:50 p.m., Poster Presentations

1

Thursday, April 11
Session I; 12:00 - 12:50 pm.
UC Forums

Examining the Transformation of Brixton with an Emphasis on Gentrification and the Caribbean Community

JANA HUNTER and John Halaka

Gentrification is a massive problem happening across the world. This study focuses on the transformation of Brixton, a neighborhood in the Lambeth Borough of London, England and the adverse effects of urban renewal programs, with a focus on gentrification which is the process of renovating and improving a house or district so that it conforms to middle-class taste or the process of pushing out lower classes due to increased costs of living and housing in an area that was previously established. Urban renewal policies are meant to improve neighborhoods that are deprived or declining, but with the adverse outcome of gentrification, they mostly serve to increase the wealth gaps. The specific aim of this study is to map the evolution of Brixton and analyse the results of urban renewal policies implemented after World War II with a focus on how the Jamaican community has been affected. This is done through an intensive literature and archival review and field research. This study takes on an interdisciplinary approach concerning socio-political, historical, and architectural concerns. Through interviews of the inhabitants of Brixton the study will be well informed with multiple perspectives of the current situation. Given that there are neighborhoods and communities with dense immigrant populations around the world, this study will contribute to the discourse on this specific type of gentrification.

2

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

Mexico City: Emending the City Block

KATHERINE GRANNEY and Can Bilsel

My thesis project delves into the dense population of Mexico City through focusing on a single colonia near the city center; Colonia Doctores, which is listed as one to avoid by many travel sites due to being more "dangerous" than neighboring areas. However the city simply seems to harbor a harsh disjunction between the public and private spaces that cause the street to become a hectic environment, lined with mercantile facades that don't allow for proper spaces to maintain community nor a break from the stress of the city. Therefore, my project focuses on the significance of private and public space within a community and how separation and integration of both types of space affects it and I will reimagine the city block by designing an intervention that creates a secluded public space, enveloped by a structure that separates the area from the harsher conditions of the exterior that still maintains a connection to the public and incorporates principles of existing architecture, such as the courtyard. The site is located in the core of the colonia within a block hosting a large transportation warehouse-esque structure, various auto-related buildings and apartments that lack the style and flare of the Mexican city. Research for this project will include photo documentation, readings on the history of construction and architecture and its movement into urbanization, and analysis of case studies that involve reimaging city blocks and the infusing of public and private space.

3

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

California's Affordable Housing Crisis: The Housing-Element, Noncompliance, and its Effects on the Local Community

KERRI WONG and Can Bilsel

The State of California adopted the first of its Housing Element laws in 1969. A fair-share housing measure, the law intended for city and local governments to increase the number of new housing to ensure affordability within the state. In the course of the following decades the Housing Element was revised multiple times, however each cycle has failed in its mission to create new housing. This research examines the Housing Element of 1969 and changes in the law to identify patterns since its implementation, as well as the process of state institutions in allocating the number of affordable units through the Regional Housing Needs Assessment. To determine how the current system has failed to provide adequate housing for several communities, this project looks closely at the city of Encinitas, its proposed fifth cycle housing element, and the effects of it on the local community. From this research, it has been revealed that state intervention through the market has not only failed to increase the number of new homes, it has also unintentionally homogenized communities like Encinitas through normalizing architectural typologies of homes and socioeconomic classes.

4

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

Berlin-Kreuzberg Appropriated: Fluidity and Disconnect in SO36

JULIA NORMAN and Can Bilsel

This research analyzes the urban environment of Berlin's inner-city neighborhood of Kreuzberg SO36. It considers how the construction of the Berlin Wall in 1961 transformed the neighborhood into a border region, and the ways that non-native populations have come to share the city while resisting total assimilation. The project identifies three primary groups coexisting in Kreuzberg: communities that hold on to an ethnic background, such as Turkish immigrants; non-conformists; and refugees. The coexistence of disconnected communities within the neighborhood creates a state of fluidity, where there is no "norm", and therefore no possibility of exclusion. The project considers how Kreuzberg's fluidity is made possible by the appropriation of open space, allowing otherwise disconnected populations to coexist parallelly and connect in unscripted forms. In conducting this research, the project analyzed the Gerhart-Hauptmann Schule, the site of a highly debated refugee squat that culminated in 2018. Moving forward, the project will design an intervention for the block containing the Gerhart-Hauptmann Schule that considers how the physical structure of the block can be complicated to match the social complexity of the neighborhood. By incorporating social and emergency housing within the block, the intervention assumes that SO36 will always be anticipating the arrival of new populations. Furthermore, networks of public and private courtyards will draw the pedestrian into the block's core, combating the hierarchical structure of the inner-city block and forging new opportunities for community.

5

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

Nothing Heard But Far from Silent: the Art of Presidential Gestures

TESSA WOOD and Monica Stufft

Broadcasted speeches given by American presidents are a way for the Commander in Chief to reach the public. Through television, not only the words of the president but his physicality is communicated to the people. There is an underlying language that presidents embody with their head, hand, and shoulder positioning. Their gestures tell a story and are a part of their performance as they take on the role of the presidency. This project will explore the gestures of the 43rd, 44th, and 45th presidents of the United States through the lens of theatrical performance. A predicted finding in the examination of presidential speeches is a distinct contrast in types of gestures between the presidents studied. Also, a particular group of gestures per president is anticipated to emerge as a cohesion with the ascension of personality politics. The interpretation of gestures will be guided by the theories of Restored Behavior and Delsarte's System of Oratory.

6

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

The Effects of Demonetization

MAANIK KHANNA and Alyson Maa

This research paper examines the effects of demonetization and whether there is a positive impact on the countries that have participated in the act of making changes to their legal tender. The empirical analysis is based on a natural experiment using the change in the GDP over the time period of 50 years from 1960 to 2010 and various other factors affecting the GDP in relation to seven countries: Australia, UK, USA, Nigeria, Ghana, Democratic Republic of Congo and Myanmar. This research would have expected results that the demonetization will have a positive impact on the GDP that promotes that growth of the economies.

7

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

The Effect of Tourism on Housing Affordability in Hawaii

ADAM SWETE and Alyson Ma

This paper examines the relationship between tourism activity and housing affordability in the Hawaiian islands. Tourism is a massive industry worldwide, it has an especially large impact in small island economies. The first challenge faced by the paper is the creation of a tourism index that reliably encompasses the amount activity at a given time. This index will then be regressed against quarterly housing affordability data for Hawaii. The paper expects that High Tourism activity will be correlated with higher levels of housing affordability which would imply that Tourism as an industry has a positive impact on the small island nations that rely upon it.

8

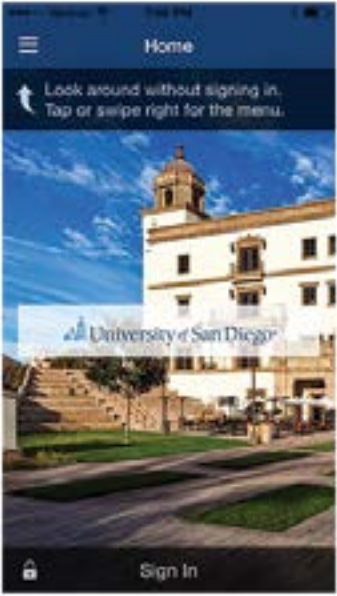

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

The Impact of Educational Attainment and Earnings



GINO GHILOTTI and Alyson Ma

This paper will hypothesize a positive statistically significant relationship of increases in educational attainment on increasing levels of income. My data will come from the My Congressional District by the Census Bureau including information on all 53 California districts. The paper will summarize relating economic literature and a description of the results from running my regression equation of explanatory variables on income. The intended implications of the findings of the educational attainment impact on revenue will provide policy direction and extend economic study on the relationship between educational attainment and levels of income.

GO MOBILE!
Download the mySDMobile app for information on student presenters, presentation times & presentation locations, all from the palm of your hand!

Download at

9

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

Rainfall Trends effect on GDP growth in sub-Saharan Africa

Jason Gnibus and Alyson Ma

this presentation will be investigating and discussing the economic implications of rainfall trends in sub-Saharan Africa. Sub-Saharan Africa historically was on a similar development track as other developing regions, however in the late 1960s the region became subject to a decline in yearly GDP per capita growth that has resulted in a present day market cap difference of more than ten billion USD in the present. Rainfall could have a significant influence on the regions due to the are's reliance on both simple agricultural practices and hydroelectric power. Changes in rainfall trends are likely to effect the production abilities of this region by limiting water availability. Without the necessary levels of precipitation to support agriculture as well as the power needs of the region production capabilities are assuredly damaged. This presentation will be exploring the relative effect of Rainfall on GDP per capita growth in sub-Saharan Africa in comparison to the effects of rainfall on developing countries in Southeast Asia, a region which was formerly at a similar size and growth rate to sub-Saharan Africa. The economic implications of the results will reveal the influence, if any, that rainfall trends have had on sub-Saharan Africa's declining GDP growth which will add to our insight about the causes of of this growth decline

10

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

Military Spending and Poverty: A Global Perspective

RYAN KEEN and Alyson Ma

This project is intended to analyze the relationship between military spending and poverty in countries around the world. It will cover around 60 countries over a 15 year period and test the hypothesis that an increase in military spending as a percentage of GDP is associated with an increase in poverty rates. I will be using economic theory and statistical methods to put together the components of the study and analyze the results.

11

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

Pet Restrictions and Condominium Prices

BRIAN SMITH and Alyson Ma

This research examines the relationship between pet restrictions and condominium sales prices. It will focus on sales of condominiums in the Downtown San Diego area. There is expected to be a premium in sales prices of condominiums without pet restrictions due to the theory that potential buyers with pets will be less sensitive to price increases.

12

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

Engaging the Right Brain: Investigating the Effect of Humanities Courses on Future Salary

KIERA MCNEILL and Alyson Ma

What is the value of taking a humanities course in the university setting? This research will examine whether the ranking of a university's humanities program affects the average salary of the university's graduates. Using data from College Factual on the ranking and salary for colleges with humanities programs from 2015 to 2019, the expected findings of the empirical analysis are that studying humanities, even in the small scope of one class, will lead to higher earnings for university graduates. Prior research on topics similar to this employ human capital theory, the idea that human capital, which can be developed through education, produces an economic agent who can perform more valuable labor and thus holds more economic value. This research has the potential to provide students and parents with information to make more informed college decisions and to demonstrate the worth of investment in humanities at the university level

13

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

How Has E-commerce Affected Business?

ALEXANDRA SMITH-FARINA and Alyson Ma

This paper will analyze the impact of online shopping on shopping malls. The variables will be sales revenue from different businesses to analyze the changes in the market. E-commerce is a large factor of this paper, and therefore Amazon and other e-commerce website sales will be captured in the regression. The data will be taken from over time to understand the trends and changes.

14

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

Homelessness & the Family Unit

KAENE SOTO and Alyson Ma

According to the United States Department of Housing and Urban Development, 552,000 Americans experienced homelessness in 2018. Homelessness has been a long standing issue in the United States, seeing little to no improvement over the past five years. Furthermore, 88,000 individuals experienced long-term homelessness during the calendar year. The homelessness problem is magnified here in San Diego, where the county marks the fourth highest homeless population in the country at around 8,500 according to the same study. Societal factors along with the state of the economy are generally the first causes of the issue presented by those looking deeper. An epidemic that is often overlooked by much of the population today is the breakdown of the family unit within the US. According to the 2017 US Census Bureau, 25% of children under the age of eighteen are living with either a single parent mother or father. This is not a new trend, but instead the culmination of a steady decrease in the importance of a dual-parent household over the years. Children being raised in these single parent environments are exposed to various dangers and risks like exponential rises in dropout and crime rates when compared to their dual-parent counterparts. This raises an interesting question of how such a theme affects the homeless rate down the line. In this presentation, we seek to analyze how rates of single parent households compare to the rate of homelessness in counties across the United States.

15

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Gender Composition of Executive Boards Effect on Corporate Profits

SHELBY CRONIN and Alyson Ma

Gender diversity has become a growing debate, as California recently became the first and only state to require women in the boardroom (Wamsley, 2018). My research aims to answer the question whether or not the gender composition of executive boards affects corporate profits in the United States. I hypothesize that the greater the composition of females on an executive board, the greater the profit, measured by return on equity. Research has shown that having a more diverse board is correlated with better public image, better board member attendance, and, if a certain female threshold is achieved, to an increase in firm innovation (Bear, Rahman, & Post, 2010; Adams & Ferreira, 2009; Torchia, Calabrò, & Huse, 2011). I am running a linear regression using the top one-hundred firms listed on Forbe's "America's Largest Public Companies List". As measures of gender diversity, I will be utilizing a female dummy variable, a percentage female variable, and a critical mass dummy variable, coded as a one if three or more women are present on the board. If I find that these gender diversity variables are statistically significant, which would support my hypothesis, my research could act as further support for government efforts to impose gender quotas and increase diversity in top leadership positions.

16

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Effect of Digitally Enhanced Instagram Images on Attitudes and Purchasing Habits

ALEXIS VENEMA and Alyson Ma

It is believed that the better one's education is, the more job opportunities will be available to them, which are associated with higher earnings. To test this theory, I am researching the returns associated with earning a bachelor's degree. I will be gathering information from 50 counties from the San Francisco Bay Area down, as wealthier families tend to live in suburban areas, not a direct metropolitan city. Other factors I will examine include high school graduate incomes, unemployment rate, the population in the county age 25-64, race, and some other usual suspects that affect income.

17

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Light and Commuter Rail Effects on Land Values in San Diego County

Matthew Gillingham and Alyson Ma

Light and commuter rail transit stations have shown patterns of benefitting land values throughout San Diego County. Transit-Oriented Development has been a big push by the San Diego Association of Government in the last decade and they have used numerous incentives for private investment aimed at the growing areas centered around transit. San Diego's urbanization has been focused on transit-oriented development, as the first city to approve legislation that advocates for development near light-rail stops. Focusing and extending the work of Robert Cervero (2004), his theory holds that if there are finite supplies of land, people who want to locate near transit stations for living, working and -

leisure will drive up land prices. The focus of the study emphasizes two forms of transit rail transportation; light and commuter rail, and how they affect commercial and residential real estate in San Diego County. Transforming Cervero's data to East County in San Diego, Santee reveals land market impacts of transit in a relatively new transit area. Analyzing land value benefits from transit lines in the Santee area will highlight the health of the local economy as well as reveal the relationship between transit-oriented development and the real estate market as a whole. Future public policy can be shaped by this study as well as shape and designate future development in the Santee area.

18

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Effect of Government Shutdowns on Consumer Sentiment

EMMALYN SPRUCE and Alyson Ma

Since 1976, the U.S. Government has experienced nineteen government shutdowns ranging in length from one to thirty-five days. Prior research has demonstrated the negative effects of government shutdowns on the macro economy but makes no mention of how consumers perceive these effects. Using a multiple regression analysis of data from the Index of Consumer Sentiment and the Federal Reserve, this paper will examine the empirical relationship between measures of consumer sentiment and government shutdowns in the United States. I anticipate that the occurrence of a government shutdown in a particular month will be associated with a decrease in consumer sentiment for the same period, and that the length of the government shutdown will amplify that decrease.

19

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

A Modern Look at Value Investing

CHRISTOPHER CONTE and Steve Conroy

This paper aims to modernize certain aspects of Dr. Benjamin Graham's theory of intrinsic value and its pivotal role in stock appraisals. Originally published in the year 1934, Dr. Graham's time-tested concepts continue to serve as the foundation of value investing philosophy. Yet, due to the dynamic nature of modern financial markets it seems now is the time for economists and financial scholars alike to begin the process of updating Graham's work to better suit the needs of contemporary investors. In this report, I attempt to take a step in this direction by introducing cash as annually reported on the balance sheet into Graham's equation for intrinsic value pricing. The data used in my analysis is comprised of annual earnings reports for roughly five-hundred S&P 500 companies over a twenty-year time period. By way of this data, market capitalization (an equivalent for intrinsic value) is estimated as a function of cash, along-side net income and dividend payments, using standard regression techniques with time fixed-effects. The results of this report demonstrate that cash is a significant contributor to a business' intrinsic value, especially in circumstances where the firm's cash holdings exceed their short-term debt. These results stand to reason, as more cash translates to more liquidity, giving an enterprise a certain financial agility that they would otherwise lack. Therefore, in the pursuit of educated and intelligent investment, it would be wise for all investors to include cash in their appraisal techniques.

20

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

What can be done to decrease the gap in income inequality in ten OECD Countries?

ROMARIO SUNI and Alyson Ma

This research focuses on the long-run trends in income inequality in ten OECD countries. The hypothesis that serves as a preliminary answer to this question is that there are strategies that can be implemented to close the gap with the inequality in income that is experienced by OECD nations. The main findings of this research indicate what policies can be applied to reduce income inequality, and the literature review analyzes how variables such as net inequality, employment rate, population, foreign population, and life expectancy may decrease or increase growth, which it leads to higher or lower income distribution. Indeed, the purpose of this research is to provide a better understanding of income inequality, and the relationship to growth.

21

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Grand Plan for the UFC. How to turn a short-term focused company into a sustainable enterprise

ERIC MOSHKATEL and Tara Salinas

With every small business that experiences explosive growth, there comes a time when the executives need to adjust their operations to compensate for their increasing size. Changes that need to take place can be with regards to operational efficiency, financials, public relations (if a company is growing, they're going to have a larger spotlight), and marketing. The UFC (Ultimate Fighting Championship) is one such company that has experienced growth at a high rate (valuation jumped from \$2 million in 2001 to \$4.025 billion in 2016). However, many aspects of how the UFC handles their day-to-day operations, opportunities, and crises are subject to improvement as the company continues to grow. The purpose of this paper is to illustrate a roadmap that the UFC, other MMA (mixed martial arts) promotions, and growing companies can use to make sure that they're correctly adjusting their companies to accompany the growth they've experienced, and to maximize their potential. In order to write this paper, I will be utilizing research and history on the UFC, and MMA as a whole, and combining that with business practices used in areas like marketing, corporate finance, and public relations.

22

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Evolution and Analysis of the 20 Year Anniversary of the UN Global Compact

TAYLOR HAMER and Eileen Daspro

Since 1950, the expansion of multinational corporations (MNC's) has caused a discussion about the role these corporations should have in society. The previous mentality was that only the government and nongovernmental organizations could serve the people. This has changed as MNC's grew across borders and were confronted with humanitarian, environmental, and political issues. These issues arose from the lack of one single body of international law that regulates the practices of MNC's overseas. Different legal principles were put in place, but none of them were binding. As companies faced extreme scrutiny for their practices in a host country, arguably one of the most important documents was created, the UN Global Compact of 1999. With principles set forth that aligned with the Sustainable Development Goals, it required annual reporting and would be monitored to ensure the signatory companies met the requirements. I will assess the UN Global Compact over the past 20 years and focus on if the compact has achieved the goals set forth at promoting greater business responsibility and achieving social impact aligned with the Sustainable Development Goals. I will then draw my own conclusions and analysis in regards to how successful it has been, where it falls drastically short, and where the compact could improve.

23

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Easternization of the West in Product Labelling of Food and Drink

JINJING (COCO) WEI and Maria Kniazeva

The objective is to explore how packaging stories educate western consumers and convey wellness values, norms and ideas born in the East such as Yin and Yang, Zen and the eastern purity. The project shows the increasing interests of eastern ideas among the western world using the U.S. as the primary example. The Westerners were more curious about eastern spirituality than material goods. The accessibility to the general public expanded dramatically since the 1950s, predominantly because of World War II. It enabled a considerable group of Westerners to have direct contact with the East and learn from their observation. In a capitalistic marketplace, products reflect the demand from customers and customers' need can be found in the variety of products already existing in the market. Some products were sold with remedies found in the eastern spirituals for western evils such as chemicals or anxiety. Understanding how the trend of Easternization appears, evolves and applies in the market enables businesspeople to make the next decision more successfully. It is also beneficial for scholars in the liberal arts studies such as philosophy, religious studies and sociology to read and further their research in their respective fields.

24

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Ethical Representations of Intergenerational Migration Traumas

ELENA GONZALEZ and Dr. Amanda Petersen

Through this project I study literary representations of the experiences of migration that reveal intergenerational traumas that are a result of migration. By analyzing the haunting persistence of trauma and the ethical implications of representing it in several literary works, my analyses present the intergenerational impact of dealing with migration. I analyze works such as Antígona González by Sara Uribe, Are you bringing something from Mexico? by Daimary Sanches Moreno, and Migrante 72 by Alma Guillermoprieto, among others. In examining these texts, I investigate how authors represent traumas such as violence experienced at the border and through the process of migration, the loss and sacrifices that come with migrating, the grappling with absence and closure, and the struggle to maintain cultural connections are all examples of what I research in my analysis of these literary texts.

25

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

A Literature Review on Youth Development Programs Based on Empowerment Theory in Underserved Communities

JUSTIN OLIVARES and Matt Zwolinski

Contemporary research based in sociology, psychology, and youth development illustrate a strong inverse relationship between education, and the many antisocial cycles prevalent within underserved communities (incarceration, drug abuse, low school completion rates). The following literature review is concerned in Empowerment Theory, largely progressed by Dr. Marc Zimmerman of Michigan University. Specific attention is paid to Youth Empowerment Programs whose purpose is evoking social change through empowering youth. Furthermore, this work will not only identify and discuss elements that prove to be accurate and effective in delivering program philosophies to youth, but this review more importantly serves as a guide for implementers to better understand the underlying principles in hopes of bridging information gaps between researchers and implementers. The chief goal of this research is to progress the effort in bridging social, economic, and political achievement gaps of underserved community with their affluent counterparts.

26

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Appropriation of the Women: From Greek Mythology to Philosophy

KAYLA BEAUREGARD and Michelle Grier

This paper seeks to better understand the concept of women. This concept, which once was thought to be obvious and self-evident, has become contentious in recent decades, a topic of great debate. While this debate is by no means trivial, this piece does not engage in the current discussion of gender identity. Rather, this piece should be seen as an archeology of thought in hopes to provide a more fruitful understanding of how the concept of women arose in Western history. In diving into Greek mythology and tracing the evolution of these myths, we are better able to understand the progression and evolution of human thought. A mythology, which began with Gaia- a mother goddess birthing all things from herself alone- soon was dominated by Zeus, who birthed his own mother from his thigh. As man came to know himself, his intellect, and his role in procreation, he also came to know women. And in knowing women, he was able to appropriate her mysticism and female characteristics of reproduction onto himself. With mythology setting the stage, Plato then intellectualized these myths, establishing them as truth. Followed by Aristotle who then "proved" them biologically. This appropriation of the female by the early philosophers set both the tone and the limits to discourse on women in philosophy and society at large.

27

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Native Hawaiian Activism: The Self-Determination Rights Movement Rejects Federal Recognition Based on Political Status

KASHANNAH-BEE BAUTISTA MANAWIS and Del Dickson

The Supreme Court ruling for Rice v. Cayetano prevents Federal recognition based on the political status of indigenous people. In addition, a failure to differentiate Native Hawaiians from Native Indians in the U.S. Constitution allow lawmakers who classify Native Hawaiians as Indians to curtail sovereign, indigenous rights. Subsequently, Native Hawaiian self-determination rights are a non-national agenda, for which legal treatment can be administered in two ways, through U.S. Federal Courts, and recently, through resolutions made by the United Nations General Assembly that allow effective self-determination movements under an international model. My research paper analyzes the importance of both of these strategies and the positive effect of their synergy on Hawaiian self-determination rights to find a tangible solution to self-determination without requiring of a government-to-government relationship with the United States.

28

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

"Long Live Chairman Mao: The Cultural Revolution and Mao's Dream to Modernize China, 1966-1976"

ELIZABETH BADER, KEELEY COPELAND, JUJU LUCENA, ELLE JONHSONG, and Veronica Galvan

There is a man every person in China knows; there was a man who shaped Chinese politics and culture; there was a man who unified China. This man was Mao Zedong, China's leader from 1949 to 1976. Mao did transform China. He ended the Chinese Civil War, united China, granted women equality, and passed reforms to help the poor obtain land. While these reforms changed China, there is a question if Mao needed to rely on force and violence to accomplish his goals. In 1966, -

Chairman Mao led the Cultural Revolution that to preserve 'true' Communist ideology in the country by purging remnants of capitalist and traditional elements from Chinese society, and to re-impose Mao Zedong Thought as the dominant ideology within the Party. From 1966 to 1976, violent activities led by Red Guard happened everywhere in China. Many venerable scholars and communist member dead, and many cultural relic were burned. The whole society became chaos. According to China's Bloody Century: Genocide and Mass Murder Since 1900, Rudolph Rummel examine that during the Cultural Revolution, over seven million people dead. The Cultural Revolution represents the difficulty of finding an answer: Was it necessary for Mao to employ extreme measures to modernize China's society and the economy?

29

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Spiritual Path of Migration

MONICA MILLAN and Amanda Peterson

This project researches cultural productions that reveal connections between visual spiritual practices and migration from Latin America--primarily from Mexico and Central America--to the US. Along with looking at the visual practices of popular spirituality, I research narratives that represent migrant experiences and that treat questions of faith and popular beliefs. I look into votives paintings created in relation to popular expressions of the Catholic faith, in particular, la Virgen de San Juan de Los Lagos, as well as other popular saints in communities impacted by migration. My findings in this research inform my artistic interpretation of visual culture that reveals forms of popular spirituality and how they help process and document the experiences and traumas of migration. This research project seeks to understand the ways that groups use visuals representations to maintain a sense of community in the face of migration. My findings reveal that this sense of community is an important expression of collective loss and absences that are often part of communities living in the diaspora.

30

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Shift in Marketing from Traditional to Digital, and the Importance of Successful Social Media Marketing

MONICA COOPER and Jonathan Bowman

With the creation of the world wide web less than 30 years ago, the internet and its use has grown immensely. With this growth, we have seen a shift towards the digital world, as well as the rise of social media and online communities. One industry that has been largely affected by this is the marketing industry. It has resulted in a shift from more traditional means of marketing, such as billboards and magazine ads, to digital marketing, such as internet ads and social media marketing. Social media marketing in particular is still a recent trend that businesses and companies are adapting to, as many of today's successful social media platforms have only been around for 15 years or less. While many people simply view social media as a leisure activity to pass time, it is a large investment for companies and businesses to market their brand and products or services. Although social media marketing can be an extremely beneficial tool when done right, it can also negatively impact a company, business, or brand if done wrong. It is important to develop certain strategies and successful practices when going about social media marketing, as well as looking at the consumers and curating content that will attract and please them. If we can better understand consumers' actions and behaviors on social media, we can better adapt real world practices, such as marketing, and maximize the benefits we gain from this popularity of social media and online communities.

31

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Restrictiveness of Space in Wong Kar-wai's In the Mood for Love

YIN CHIN CASEY HUANG and Koonyong Kim

This project argues that the restrictiveness of space in the cinematography of Wong Kar-wai's In the Mood for Love reflects the limited existences of its main characters, Mr. Chan and Mrs. Chow. By examining cinematic elements such as the limitations of space, camera angle, sound, dialogue, music, repetition, and framing amongst others, this projects seeks to understand how these components parallel the suffocation that the protagonists feel in their individual lives. Trapped between closed walls and cramped spaces, Wong's cinematography reflects how their already limited worlds narrow further as they begin to fall in love after they discover that their spouses have been having an affair together. Through this limited style of filmic framing, Wong uses the physical filmic space to reflect the emotional state of the protagonists. Wong evokes the sensation of nostalgia and memory to emphasize the characters' constant desire to return to the past, as they are stuck between their desires and what they are able to do in reality. This project also seeks to connect this desire and their personal relationship to parallel that of the historical relationship between Hong Kong, Britain, and China. It argues that the relationship between Chan and Chow can be read as a metaphor for the complicated colonial relationship for the three countries, in which China and Britain both seek to possess Hong Kong. The restrictiveness of space in the film then function both as a physical reflection of the emotional state of the characters and a possible metaphor for a larger historical relationship.

32

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Chicano San Diego Applied Project: Art Exhibit

CARISSA CARRASQUILLO and Alberto Pulido

Students in Ethnic Studies 343: Chicano San Diego spent the semester organizing and researching Chicano muralists to write narratives that will be displayed in an a multi-site exhibit featuring the art of the muralists of Chicano Park. Students individually selected specific artists to research. After collecting some information, students reconvened and discussed how they would like to organize the information in a way that would be most beneficial to a museum setting based on the goals of the exhibit. The goal of the exhibit is serve as a site to reflect on the relevance of public mural art for all of the community. It hopes to function as a tool for community centered education and display the history and hard work of the Chicano muralists in San Diego. The information and narratives, in which the students collected this semester, will be a part of the historic exhibit that will feature the art of the muralists of Chicano Park. The documentation of these artist, activist, community leaders, mentors and teachers will be on display in the multi-site exhibit partnering with the University Galleries and the Humanities Center here at University of San Diego, the Turning Wheel Project, and the Chicano Park Museum and Cultural Center. The exhibit will also go on to partner with local schools and thousands of other students who will go on to learn through the installation about the histories of the community through art, mentorship, and community based education.

33

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

East Asia on Eggshells: The Implications of U.S. Presence in East Asia, 1945-1953

PETER KIM and Michael Gonzalez

The end of World War II triggered the ascension of the United States as the leader in global affairs. Since then, the U.S. maintained a dominant presence in East Asia economically, politically, and militarily. World leaders and scholars have debated whether the United States has contributed to stability in the region. The latter half of the twentieth century saw armed conflict in the Korean peninsula, military standoffs between the United States and China, and political unrest in Japan and South Korea. Despite these events, the historical record shows that the United States played a vital role in preserving a fragile peace in a volatile region. The U.S. presence in East Asia successfully contained Communism in Japan, South Korea, and Taiwan. America has consistently defended her allies in East Asia and continues to do so today. However, America's foreign policies in East Asia have also brought upon unintended and undesirable consequences that have yet to be resolved. Namely, America's hegemony over East Asian politics, the enduring legacy of the U.S. military industrial complex, and the historical amnesia of Japan's war crimes during World War II in favor of rebuilding Japan as America's closest ally in East Asia. With all things considered, the United States has been necessary for stability in East Asia but with inadvertent ramifications.

34

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Construction of Race Through the Civil War

MAGGIE GHOTBI and David Miller

The Progression and Development of Race the Civil War Cultures are comprised of shared attitudes, values, goals, and practices that characterize communities. When thinking of the United States, it is hard to identify one singular culture as distinctly American, rather the nation is a melting pot of diverse cultures. The discrepancies of cultures, the social construction of race came to into existent to differentiate between individuals. Looking directly at early America, English colonialism favored a strong Protestant faith which created a societal bias, to appease their way of life. This is what scholars have distinguished as 'white' superiority. Before 1830, being classified as a white person meant that you were of the British and Protestant population. However, following the Civil War the definition became broader and more similar to our present day conception of whiteness. Looking at Irish-Americans, German-Americans, and African-Americans, who were considered to be non-white prior to the Civil War. Each group participated heavily in the Civil War, however had very different outcomes in regards to how society perceived them. Irish and German Americans were able to be accepted as white Americans and received the benefits society and government handed to them. African Americans, on the other hand, were not seen equal to the white community and today are still struggling for this equivalent perception. In this way we must consider why Irish and German Americans became white through their participation in the Civil War, but African American were denied this privilege, even though they shared the same contributions, I would argue greater, than the Irish and German Americans. Thesis Statement Why through the Civil War, were the Irish and Germans accepted into the white American society, while African Americans were not?

35

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

A New-Found Nationalism: The Consequences of Versailles that led to World War II 1918-1939

ANTHONY MEJIA and Michael Gonzalez

The Versailles Treaty was one of the most destructive events that occurred in the twentieth century. It is important to note that no nation would not be able to endure such a harsh reality that Germany had to pay. The gravity of the situation that people often overlook is that it aided in the resurgence of nationalism in the 1920s. Nationalism was resurged through Revanchism and Occidentalism to mend the wounded pride of Germany, Italy, and Japan following WWI. Many scholars overlook the treaty itself to be the key reason that fueled the fire for WWII. By exploring what happened at the end of World War I (WWI), many historians wonder or even question why it had led us into World War II (WWII). The defeat of the Central Powers gave rise to economic and political problems that ended up setting the fuse for WWII. WWI was said to be "the war to end all wars," but a second world war still happened. With WWI's conclusion, many Germans, Italians, and Japanese had felt that their national pride had been stripped from their identities. There were also many more people who believed that there should have been more inclusion from the Italians and Japanese considering their involvement during the war. With this broken spirit along with political problems a feeling of loss had settled in. The treaty shattered German, Italian, and Japanese pride. Nationalism that was in the hearts of the people was suppressed because of the treaty. The Treaty of Versailles hurt Italy and Japan equally as much as Germany who was a losing combatant of the war. This was due to the promises that Italy and Japan did not receive for their parts. No matter which country's national pride was hurt, resentment emerged which would bring about a tremendous impact. The Versailles Treaty aided the start of WWII through nationalism which then led to militarism.

36

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

An Airplane is Only as Good as its Ace: How Pilots Redefined Combat Through Air Power in the World Wars

EMMALEA MCNAY and Kathryn Statler

When it comes to warfare in the 20th century, there is a consensus that the introduction of aerial combat was one example of how belligerents measured success or failure in a campaign, established superiority, and in general understood how modern combat has evolved. Especially in the case of the World Wars, historians tend to argue that the reasons for these outcomes have to do primarily with technological developments and advancements, and that these factors ultimately determined results on the battlefield. These sources are limited however in that they tell of the significance of technology, but they rarely tell why it became significant in the first place. In analyzing primary sources, it becomes clear that there is another factor that determined this success or failure in aerial combat and therefore contributed to how war has developed in the modern era. This is called the "human factor." From this perspective, technology, no matter how superior or inferior it was compared to its adversaries, may not have been the only factor that determined how conflicts were resolved. Instead, these sources assert that the human factor played a truly vital role in aerial warfare and ultimately earned the aircraft's fame recognized by historians today. In this classic case of man versus machine, the evidence points to the assertion that it was not simply the airplane, but also the person behind the airplane, that determined success or failure in aerial combat, and therefore contributed to changes in modern warfare for the next century.

37

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

The Dark Side Of The Sistine Chapel: Aesthetics and Ethical Flaws

ANTHONY MARCIANTE and Nick Riggle and Molly McClain

Since 1512, for over five centuries, the magnificent artistic achievement of Michelangelo's Sistine Chapel ceiling, considered one of the greatest works of art history, has enthralled millions of enthusiasts from all different backgrounds. This singular masterpiece, sponsored by Pope Julius II, is lauded for its exceptional aesthetic value of elegance and ideal beauty, reflecting the optimism of the intellectual and emotional power that characterized the High Renaissance. My research examines the philosophical dilemma of appreciating art that possesses moral flaws, specifically in regard to Michelangelo's ninth ceiling panel, the "Drunkenness of Noah." While artistically appreciated and enjoyed, it presents a severe ethical flaw that arguably diminishes the painting's aesthetic value. The overlooked dark side is that it propagandizes the harmful and erroneous precept of the Curse of Ham, which espouses that God has cursed people of color and validates the justification of their enslavement and oppression.

38

Thursday, April 11
Session I; 12:00 - 12:50 pm
UC Forums

A Legal and Ethical Examination of Photorealistic Videos Created Using Artificial Neural Networks

NIKTA SHAHBAZ and Atreyee Phukan

The development of photorealistic (or fake) videos created using artificial neural networks (ANNs) poses alarming ethical and legal consequences in regards to individual rights. There are two distinct types of fake videos: one is made by manipulating existing videos (DeepFakes) and the other by creating new videos of situations that never took place (Deep Video Portraits). ANNs have come about as a result of advancements in Deep Learning—a type of artificial intelligence technology. One does not necessarily need specialized knowledge to create a fake video; one can use an accessible application called "FakeApp" or independently create a photorealistic video using, for example, a few high-resolution images or a short video of a person. My research examines how society's notion of reality has changed over the course of intellectual movements from the Enlightenment, Modernism, and into Postmodernity. I then focus on the concept of reality with reference to Postmodernist thinker, Jean Baudrillard. I particularly analyze the term, "hyperreality," coined by Baudrillard in his book, *Simulacra and Simulation*. Through a study of the law, my research explores the possible legal implications for individual rights in cases where photorealistic videos are created using ANNs. Presently, no laws claim that the process of making fake videos is illegal; however, their creation may lead to civil wrongs—such as Defamation. Since rapid development of technology often outpaces government policy, an inquiry into how the law and our philosophical understanding of reality may adapt to photorealistic videos is important for society at large.

39

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Havelian Presidency: A Study in Political Theory

CHELSEA JOHNSON and Timothy McCarty

Despite former dissident and Czech president Václav Havel's widespread influence, his presidency has not been seriously considered as a framework for how one should head a government. Havel is known for and evaluated most in terms of his sweeping moral principles and philosophical treatises, but I wish to know whether his presidency passes the test that he provides so clearly in his written works and speeches. Specifically, I will examine how Havel's philosophical ideas translate to his political acts as president. I will select one international, one domestic, and one economic policy that Havel actively advocated for and instituted, and which prima facie appears to contradict his political philosophy. I will then examine these policies through the lens of his prior-written plays and philosophical treatises to determine whether his political theory works in practice, whether his actions can be justified in the terms of his theory, and whether it constitutes a viable method of governing. Essentially, it will be a study in theory and practice. My lens is rather narrow as I will be looking at specific presidential acts of Havel's and how they relate to his worldview. In doing these things, I hope to ascertain the practical manifestations of and/or inconsistencies in Havel's conception of a good president. The end result of my thesis will either confirm scholarly suspicions of Havel's presidential mediocrity, or prove the opposite and thereby serve as an externally applicable framework for morally and politically sound action.

40

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

"Stop Children What's That Sound?": The Role of Music and the Vietnam War

KATHERINE BYRNE and Kathryn Statler

During the twentieth century, music played a pivotal role in a number of different events and social movements by capturing people's emotions and uniting individuals under a common battle cry. The Vietnam War was no exception. There was already an active progressive movement prior to 1965 concerned about the Cold War and civil rights. Artists such as Pete Seeger and Bob Dylan expressed these concerns through their lyrics. As the war in Vietnam continued, American public opinion increasingly turned against participation in the conflict. In August 1965 only 24% of Americans thought that it was a mistake to send troops to Vietnam. By the time American ground troops left Vietnam in 1973, that number increased to 60%. American music reflected these increasing antiwar sentiments. Before 1965 antiwar messages were primarily contained within the folk music genre. After 1965 these messages extended to more mainstream audiences through rock n'roll music, as seen with bands like Creedence Clearwater Revival. With this expansion, many more Americans tuned in to the horrors in Vietnam. Although scholars have primarily focused on anti-war music as either propaganda or as a reflection of public opinion, this essay argues that anti-war music was used to unite different groups of people, provide an escape from reality, and create a way for future generations to remember the conflict.

41

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

CIA and Mind Control: The Search for the Perfect Soldier

REEM ALBUDOOR and Michael Gonzalez

With the rising political tensions between the United States and the USSR in the 1950s, the U.S. government launched several CIA programs in an attempt to diminish the looming threat of communism. One of the most notable programs was project MK-ULTRA (Manufacturing Killers Utilizing Lethal Tradecraft Requiring Assassinations), launched in 1953. The program experimented on unsuspecting human subjects through the use of psychoactive drugs in an effort to discover mind control tactics to be used against Soviet spies and intelligence officers. The aim was to find drug cocktails that would bring out deep confessions or wipe a subject's mind clean to reprogram him or her into the CIA's vision of a "perfect soldier," who was in effect a manufactured killer. The CIA attempted to produce a "truth serum" for interrogation purposes, but ultimately violated the human rights of the very citizens it was meant to protect. My thesis will investigate how government agencies, through such programs, gave themselves license to conduct illegal activities on U.S. citizens as unwitting test subjects, administering drugs without the subjects' knowledge and enabling experimenters to use verbal, physical, and sexual abuse towards subjects.

42

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Rce: Perceptions From and Toward People with Albinism

ALEXEE SILVA and Victoria Rodriguez

Albinism is a genetic mutation that strips those affected of the pigment in their skin, hair, and eyes. This alters the appearance of the affected and at times, subjects them to ostracism when interacting with their ethnic group(s.) Albinism affects less than 1% of the population and it is for this reason that understanding their attitudes and opinions on their identity is important. The goal of this study is not only to gather these attitudes on ethnicity and race, but to spread awareness of the mutation once the data has been collected. This will be done by surveys and interviews based on the survey responses. Although the findings have yet to be made, they will prove to be one of the few psychological studies on Albinism. This study's findings also aim to provide information to families of those with Albinism to better care for an individual who has it.

43

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Gift of Sexuality: Promoting Healthy Sexuality in Christian Higher Education

SYDNEY PIDGEON and Rebekah Wanic

In the years surrounding young adulthood, individuals are challenged with new perspectives, ideas, and understandings of the world and their place within it. In this time of transition, young adults desire to be in a community to affirm and stand beside them in their questioning. Higher education institutions play a vital role in mentoring these students through their transition and equipping them with the knowledge and support. One component of curiosity during the transitional years is a person's sexuality, and how their sexual being fits within their identity. Higher education institutions have not done nearly enough to provide a space for students to discuss this integral part of their identity, and this is especially true for religious higher education institutions. The Christian tradition has been notably silent on issues of sexuality, and for students pursuing a degree at a religious institution, the topic of sexuality often creates shame and confusion. In order to properly support an individual's personal development and relationship with God, these institutions must introduce conversations about sexuality, especially in relation to humans being created in the image of God. Human sexuality is intimately linked the image of God, and it is essential to affirm and explore the sexual being of every person. This thesis will explore the link between sexuality and faith and the role of religious higher education institutions in promoting this dialogue on their campuses.

44

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Measuring Imitation in Parent Child Interaction Therapy

MCKENNA SAKAMOTO, YESSICA GREEN ROSAS, KELSEY KEHOE, Geri Zerr, Raymond La, May Yeh, and Kristen McCabe

Parent-Child Interaction Therapy (PCIT) encourages parents to imitate child behaviors in order to convey approval of their child's actions and to foster the development of crucial social, cognitive, and language skills. However, the Dyadic Parent-Child Interaction Coding System (DPICS), used to measure parent and child progress in acquiring skills taught during PCIT, does not include guidelines for coding parent-child imitation, making it impossible to determine if PCIT increases imitation or whether parent and child imitation frequencies are related. The current study addresses this problem by utilizing video recordings of 10 families from a previous PCIT clinical trial to develop guidelines for coding imitation. We are currently using those guidelines to code pre- and post-treatment DPICS segments from 40 families. We hypothesize that imitation will increase from pre- to post- treatment, and that parent and child imitation will be positively correlated. Preliminary analyses of 22 subjects coded to date indicate an interrater agreement of 97%. Parent imitation frequency increased marginally (pre-M = .73) (post-M = 3.45; $t[21] = 1.82$, $p = .089$), while child imitation frequency increased significantly from pre (M = .41) to post-treatment (M = 1.23; $t[21] = 2.51$, $p = .020$). Parent and child imitation frequencies were significantly positively correlated ($r = .31$, $p = .04$). Results suggest that PCIT does increase child imitation, and to a lesser extent, parent imitation, and that parents who imitate their children more have children who imitate them more in return. However, gains were small, suggesting more attention should be paid to coaching imitation in PCIT.

45

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

How Diet Choice and Weight Affects Person Perception

NICOLE TIBBITS and Rebekah Wanic

Previous studies have explored how overweight targets are perceived and the physical and psychological characteristics commonly used to describe them. The current study experimentally investigated the relationship between a target's weight and his or her diet choices, and the characteristics used to describe him or her. The participants were exposed to one of four situations (overweight/unhealthy diet, overweight/healthy diet, average-weight/unhealthy diet, average-weight/ healthy diet) where they were shown a picture and a short description of the target. It is likely that overweight and unhealthy diet targets were rated lower on questions pertaining to physical health. Regardless of weight, healthy diet targets will likely be rated higher than unhealthy diet targets for positive psychological attributes. Overall, overweight/unhealthy diet targets will likely be rated the lowest in all three categories (positive psychological attributes, negative psychological attributes, and physical attributes).

46

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Behavioral Characterization of a Rat Model of Alzheimer's Disease

ALEXANDRA UNAPANTA, Bronwyn Butuk, Jena B. Hales, and Rachel E. Blaser

Alzheimer's Disease (AD) is a form of dementia that negatively affects cognitive abilities and worsens over time. Two genes that play a role in neurodegeneration in humans are the APP (amyloid precursor protein) and PS1 (presenilin 1) genes, both involved in early-onset familial AD. We examined a transgenic rat model with mutations in these two genes to determine whether they experience cognitive decline with age that might be comparable to humans. The Traveling Salesman Problem

(TSP) is a spatial task involving the selection of an efficient route between multiple targets, and it has been used to study spatial cognition and memory in both humans and non-human animals. Our goal was to 1) characterize the change in control rats' TSP performance with age and 2) determine if their trajectory differs from that of AD rats. We first familiarized and pre-trained groups of control and transgenic rats to human handling and the TSP task. Then, rats were tested in a series of target configurations which varied in the number and spatial arrangement of baited targets. Their behavior was video-recorded and later coded for measures including latency, revisits per target, and percent above optimal. Our results indicated that the transgenic AD rats were generally impaired on the TSP compared to controls. The study also suggests that there is a significant effect of gender on performance, with the effects of genotype significantly stronger in females than males. Overall, these findings provide further insight on how a naturalistic task such as the TSP can be useful when examining the cognitive deficits seen in Alzheimer's Disease.

47

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Aging in San Diego: A Content Analysis of the Current Communication Strategies for Alzheimer's Disease and Dementia

TIFFANY ZHANG and Jillian A. Tullis

Alzheimer's disease is the third leading cause of death in San Diego County and by 2030, 38% of the population will be 55 and older and at least 10% of those people will have Alzheimer's disease or dementia. With the Internet being the first source that the public uses for health information, it is imperative to have accessible and inclusive language for addressing brain health. To understand if the current communication strategies are supporting both the patients and caregivers, I conducted a thematic analysis of the quality and quantity of the online brain health materials available on the top five organizations serving San Diego. These include AARP, Alzheimer's Association, Alzheimer's San Diego, Shiley-Marcos Alzheimer's Disease Research Center, and San Diego County Aging and Independent Services. Each site was coded for content of information being presented, types of imagery used, quantity of programming, and overall thematic quality. Barriers like health literacy and cultural competence will also be addressed. Based on the interdisciplinary approach of neuroscience and communication studies, this analysis will identify components of effective health communication and offer practical and equitable strategies for Alzheimer's disease and dementia communication.

48

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Maternal Structuring and Toddler Learning During Didactic Interactions

SARAH WEEKS, Sarah Dempsey-Prioleau, Sydney Pidgeon and Adriana Molitor

Evolving conceptualizations of effective parenting styles argue that behaviors reflecting parental structure (vs. ambiguity) should be distinguished from those reflecting parental autonomy support (vs. control) as they are often confused with each other. Yet both appear necessary to facilitate children's motivation and competence. Moreover, while much research has investigated autonomy supportive parenting, far less is known about parental structuring behavior and its benefits to children's social and cognitive skills, especially in achievement settings. For example, some research indicates that clarity of maternal expectations improves a child's self-regulated learning. In addition, maternal consistency of consequences improves child compliance. Nonetheless, we do not yet know whether the timing of structure is also important for toddler cooperation and learning. The present study explores whether maternal structuring is beneficial to child performance during two teaching tasks, board lacing and a multidimensional shape puzzle. Specifically, mothers of 30-month-olds were rated on behaviors previously identified as components of parental structuring and presently adapted for interaction with toddlers during teaching situations: clarity of guidance, informative feedback, rationale, opportunity, resourceful leadership, and consistency. The present study additionally coded for maternal coordination as a subcomponent in order to capture each mother's moment-to-moment ability to cater to the structuring needs of her child. Analyses examine the association between maternal structure and child performance measures such as accuracy and persistence.

49

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

A Comparison of Child vs. Mother Influences on Maternal Responses to Toddler Negativity

SOPHIA WOOLERY, NADEEN ALLAH WERDI, Brooke Campbell and Adriana Molitor

Experts agree that parenting practices can promote or undermine the development of coping skills as toddlers learn to manage challenging situations. Researchers also agree that individual differences in parenting stem from factors that include both child and parental characteristics. Nonetheless, predictors of specific parenting strategies remain unclear, particularly for positive parenting practices among non-risk samples. The present study examined whether adaptive versus maladaptive parenting strategies (e.g., problem-focused coping vs. distress or wish-granting) were related to aspects of toddler temperament or to maternal emotional-social skills or cognitive attributions. As part of a broader investigation, mothers of 2-3 year-old children completed self-report measures of: 1) toddler temperament; 2) maternal cognitive attributions for unsuccessful interactions with a hypothetical child; 3) maternal emotional-social intelligence; and lastly 4) maternal likelihood of using various coping strategies in hypothetical scenarios with one's toddler. Overall, maternal responses to toddlers during challenging situations appeared less related to children's dispositions or maternal cognitive attributions than to mothers' emotional-social competence. Specifically, mothers with poorer emotional-social skills reported greater reliance on ineffective or undesirable reactions (e.g., distress, wish-granting, punitive responses) as their toddlers faced hypothetically challenging situations. Those with greater emotional-social competence reported using more problem-focused strategies.

50

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Selective Serotonin-Reuptake Inhibitors (SSRIs): Mechanism for Treatment of Depression and Relationship with Suicide Risk

CAROLLO ERIN and Jena Hales

In 2017, suicide was found to be the second leading cause of death for people aged 10 - 34 in the United States. At least 90% of suicides are found to be comorbid with mental illness, most commonly: depression. Research suggests depression develops due to a combination of environmental, psychological, and biological factors. Imbalances in neurotransmitters, specifically serotonin (5-HT), is one of the leading hypotheses for the biochemical basis of depression. On this basis, selective serotonin reuptake inhibitors (SSRIs) are the most commonly prescribed antidepressant and have been shown to be an effective treatment for moderate to severe depression. However, in 2004, the FDA mandated that SSRIs be given a "black-box" label warning indicating the relationship between the medication and increased risk for suicidal ideation and behaviors. This literature review seeks to investigate the available research on the mechanisms of SSRIs in the treatment of depression, and their highly contested relationship with suicide risk. I aim to make sense of this data and determine where the evidence points in regard to the costs and benefits of prescribing SSRIs, as well as the kind of future investigation needed to fully understand these drugs.

51

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Effects of Sleep Deprivation on Neural Circuits Underlying Decision-Making

CATHERINE SHORB and Divya Sitaraman

Lack of sleep has many negative cognitive and behavioral implications, however, it remains unclear if and how sleep deprivation alters neural circuits involved in these processes. The goal of this study is to characterize the effects of sleep deprivation on neural circuits underlying decision-making using genetic model organism *Drosophila melanogaster* that is amenable to multiple experimental approaches. Specifically, we analyzed decisions critical to species success by evaluating the frequency of courting, number of eggs laid, and the type of nutritional media in which to oviposit (egg-lay). Our experiments show that sleep deprivation in wildtype males leads to reduction in courtship behavior which can be mapped to male-specific neural correlate, P1 neurons, but how decision-making processes are altered in sleep deprived female flies is largely unexplored (Mowrey, W et al.). Further, we have developed and validated a binary decision-making behavior in female flies that involves choice of nutritional substrates for oviposition. In the results presented here, we use genetic, pharmacological, and mechanical sleep deprivation protocols to establish the link between distinct modes of sleep deprivation that produce varying sleep needs and decisions. These studies pave way for a more in depth understanding of how different modes of sleep deprivation perturb circuits involved in decision-making processes at the level of neurons, circuits, and overt behavior.

52

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

TIME IN THE HIPPOCAMPUS: A NOVEL APPROACH TO EXAMINING THE FUNCTION OF TIME CELLS

NINA TABRIZI, GREER MARSHALL, ALI MCLAGAN, LINDA LEIJI, and Marta Sabariego, Jena Hales

Space and time are both essential features of episodic memory, for which the hippocampus is critical. The involvement of the hippocampus in spatial processing was first described following the discovery of neurons, known as place cells, which fire with spatial-specificity (O'Keefe and Dostrovsky, 1971). More recently, the existence of hippocampal neurons that fire at successive moments in temporally structured experiences has been reported. These cells were dubbed time cells because it was suggested that they represented time (MacDonald et al., 2011). While spatial tasks have been used for the study of place cells, the tasks used for the study of time cells do not use time as an independent variable and therefore the behavioral relevance of this cell firing is unclear. In order to directly study the role of the hippocampus in processing elapsed time, we created a novel time duration discrimination task suited for the study of the function of time cells in memory. Twelve rats were tested on a figure-8-maze and experienced a 10- or 20-second time delay at the end of the center arm. During this delay, a 2000Hz tone played for the 10- or 20-second duration. Rats learned to make a decision to turn left or right out of the delay box depending on the associated tone duration (10 seconds = left turn; 20 seconds = right turn). Once the rats reached criterion performance of 90% correct on two out of three consecutive days, they received either an excitotoxic hippocampal lesion or a sham lesion surgery. After recovery, rats were tested to determine hippocampal involvement in discriminating time duration. Results from the time discrimination task will be discussed in terms of the involvement of the hippocampus in the processing of elapsed time.

53

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Effects of Full and Partial Hippocampal Lesions in Rats on the Traveling Salesman Problem

ELIZABETH PETTY, Gequasha Collins, Kiran Long-Iyer, Jessica Paul, Rachel Blaser, and Jena Hales

The Traveling Salesman Problem (TSP) is a spatial navigational task that differs from many other behavioral techniques because it allows the observation of behavior in a more naturalistic setting. The goal of the task is not to verify if an animal can do a certain behavior, but to record how the animal behaves in natural foraging conditions. This task involves a variety of cognitive functions, such as spatial processing, memory, attention, route planning, and decision making. Given the established role of the hippocampus in both spatial processing and spatial memory, we examined how hippocampal damage affects rats' performance in the TSP. The rats were trained on the TSP, which involved learning to retrieve bait from targets in a variety of spatial configurations. Rats were then divided into two groups, matched for performance, with one group receiving a hippocampal lesion and the other a control sham surgery. After recovering from surgery, the rats were tested on eight new configurations. A variety of behavioral measures were recorded, including distance traveled, number of revisits, span, and latency. The results showed that the sham group outperformed the lesion group on most of these measures, with the lesion group demonstrating more pronounced impairment on the more complex configurations. Based on histological tissue analysis of each group, we determined that the hippocampus appears to be involved in finding efficient routes, particularly in complex versions of the TSP.

54

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

U.S. MEXICO SOCCER RIVALRY: WHERE IS THE AMERICAN HOME FIELD ADVANTAGE?

OLIVIA HAYS and Nadav Goldschmied

We conducted an archival research study and found that despite the predicted home-field-advantage, the U.S. Men's National Soccer Team (USMNT) does not appear to benefit from playing on American soil against Mexico in the 30 games played between the two teams during the 'modern era' of U.S. soccer (1991-2018). We also analyzed environmental factors and found that as game attendance increased, the away Mexican team was likely to score more goals relative to the U.S. squad. We thus concluded that it was wise for the USMNT to schedule games at smaller venues such as the Columbus Crew stadium where they can also control ticket sales. The nested nature and limited data availability serve as limitations on the current exploration.

55

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Biometric Authentication through Deep Learning

MATTHEW STANDLEY and YIWEN GU and Eric Jiang

Biometrics are the unique human characteristics that can be used to verify a person's identity for access control. Deep learning and A.I. are growing fields that allow computer technology to learn and recognize patterns of individuals for authentication. The project applies deep learning methodologies including CNN (convolution neural networks) and various data generating strategies such as data augmentation to develop an accurate biometric authentication system that is based on multiple personal identification data. The developed system can be applied to personal mobile devices, access control and management tools, and a few other areas such as financial transaction authentication.

56

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Perimeter Security Defense System

JACQUES YOUSSEFZADEH and JACOB WAHL and NICHOLAS WAHL, MATTHEW ROTH and Eric Jiang

This project is to develop a security alarm system for a local engineering firm, Clarity Design. The proposed system involves four components: the gateway which aggregates the physical devices, the serverless backend that allows for communication between platforms, the web application which assists with setting up the device while having access to all features, and a mobile app which will provide security guards and other personnel with the tools to monitor the physical devices. More specifically, the gateway is written in Python and developed through API Gateways hosted by Amazon and the mobile and web app have their own API Gateway to monitor and change settings on the device. In summary, the developed alarm system would securely aggregate multiple devices in the gateway, allow for complete communication between the gateway and the cloud, and enable mobile and web applications complete control with the cloud.

57

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

FantomRF 3D Vector Predictor

JAMES PONWITH, PATRICK HALL, TREY VON GORTLER, CHRIS EARDENSOHN, OM KANWAR and Eric Jiang

This project is to develop a software system that can provide accurate human pose estimation through walls and other obstructions. It is based on the fact that WiFi frequencies traverse walls and reflect off of the human body. Using a deep learning approach, we parse radio signals and combine computer vision models to estimate the 2D pose of humans, regardless of any obstacles between our device and the human. The training process will use a student and teacher network training model. After the training phase, the model will be capable of only using radio signals to estimate human pose. More specifically, during training, we will synchronize wireless and visual inputs to accurately identify a human exoskeleton. As a result, our project will aim to illustrate that radio-based systems can be almost as accurate as vision-based estimation systems. In addition, our developed radio-based system will be able to estimate 2D poses through walls despite not being explicitly trained in such scenarios. Applications of a radio-based pose estimation system are numerous, including: security, surveillance, patient monitoring, and rehabilitation.

58

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Bounds on The Number of Elastic Collisions in D-Dimensional Space

KILEY SPRIGG and Lukasz Pruski

This interdisciplinary project focuses on improving the lower bound for the number of collisions of a finite system of n-balls in d-dimensional space. This is an open problem in mathematics whose solution might also be applicable to modeling collisions between particles in liquids and gases. However, our study goes beyond traditional 3-dimensional models known from physics. We developed software that computes all possible collisions between a system of balls with given initial positions and velocities, including collisions in positive and negative time. Building on the computation of collisions, we analyze various configurations of balls and their velocities in order to find configurations that produced more collisions than others. My research yielded a minimum of 8 collisions for a system of 4 balls in 3-dimensional space, a configuration which has never been published before.

59

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Tone and Text: A Phonetic Comparison of Shakespeare's Sonnets

TIM HOLDSWORTH and Satyan Devadoss

What gives a piece of poetry its aesthetic? Poets string together words to tell a story, but also string together phonemes to create a certain aesthetic of sound. Traditional methods of textual clustering use words as the base unit for comparison. In this project, we explore alternative methods of clustering using phonemes as the basis of comparison, including an adaptation of the Word2Vec algorithm. Although methods could possibly give a quantified analysis of the similarity of any two given poems, our focus will be on the 154 Shakespearean sonnets. Using the neighbor-joining algorithm, a phylogenetic tree is created as a tool to compare these poems.

60

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Investigation of Specific Domain Responsible for Calcineurin B Homologous Protein (CHP) Isoform Specific Function

SHANE DAVIS, Mark Wallert and Joseph Provost

Mammalian cells ubiquitously express the Sodium-Hydrogen Exchanger Isoform 1 (NHE1) a membrane transporter responsible for intracellular pH, motility and proliferation. Calcineurin B Homologous Protein (CHP) regulates activation and kinetics of the NHE1. CHP has two isoforms, CHP1 and CHP2, whose physiological function remains unclear but both have a unique role in nascent tumor survival. There is a signature domain

(CHP1:RPIED-NEKSKDVNGPEPLNS & CHP2:RPVEDEDTETQDPKKPEPLNS) in the sequence of an otherwise homologous structure between CHP1 and CHP2 that we believe is responsible for CHP isoform specific function, including regulation of NHE1. The purpose of this study is to investigate how these CHP unique regions (CUR1 & 2) of both isoforms contribute to CHP isoform specific regulation of NHE1 and cell function, specifically cell proliferation and location. Using site directed mutagenesis, we focused on the creation of four epitope-tagged variants: CHP1 ΔCUR1, CHP2 ΔCUR2, CHP1 (CUR2), and CHP2 (CUR1). These mutants consist of a deletion of the CUR region (ΔCUR) and a domain swapped region (ex: CHP 2 (CUR1)). These mutations will be expressed in CCL39 and PSN fibroblasts so they may be further investigated both in the presence and absence of NHE1 for their impacts on cell proliferation and location. We hypothesize that the CUR domain is critical for CHP isoform specific function and NHE1 interactions in lung fibroblasts.

61

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Synthesis and characterization of starch-dibromomaleimide conjugates for delivery applications

TINTIN LUU, Nathan Lorentz, Jonathan Tran and Joan Schellinger

Starch and its derivatives have a myriad of biomedical and industrial applications due to their attractive physicochemical properties such as biodegradability and biocompatibility. In addition, they are readily available, cheap to acquire and are chemically modifiable. The chemical versatility of starch allows for the synthesis of hybrid constructs with polymers and other biomolecules, such as protein and peptides, more accessible. Different functional groups such as aldehydes and alcohols on starch can be modified to other functional groups or used to covalently link other molecules. Selective modification of the reducing end of starch to an alkyne provides an orthogonal conjugation strategy through copper-catalyzed azide-alkyne cycloaddition or click chemistry. This research aims to synthesize and characterize a novel hybrid conjugate consisting of peptides, a hetero-functionalized dibromomaleimide linker, and starch for peptide delivery. Attachment of a versatile small molecule linker such as, dibromomaleimide, to the reducing end of starch provides an attractive scaffold for the intracellular delivery of peptide therapeutics with increased stability. This work shows the optimal synthesis and characterization of starch functionalized with dibromomaleimide-based linker. The prospective work also includes investigating optimal click reaction conditions to prepare the starch-linker complex and 19F NMR experiments to further analyze and confirm the synthesis of the starch conjugate. These well-characterized constructs serve as precursor molecules for the preparation of hybrid starch-peptide bioconjugates for applications such as drug delivery.

62

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Cysteine quantification and labeling to examine SIKE protein interactions

MADISON MANSFIELD and Jessica Bell

Suppressor of IKKepsilon (SIKE) is associated with the type 1 interferon response of the innate immune system by acting as a high-affinity substrate for TANK-binding kinase 1 (TBK1). A previous study investigating SIKE function revealed that SIKE forms direct interactions with the cytoskeletal proteins, tubulin and α -actinin. Accordingly, SIKE may function to mediate cytoskeletal rearrangement to promote innate immunity as well as function to associate TBK1 with the cytoskeleton, supplying a direct link between cytoskeletal proteins and innate immune signaling pathways. Furthermore, reciprocal immunoprecipitation studies revealed that the SIKE:tubulin interaction is sensitive to the phosphorylation state of SIKE, providing a possible mechanism to regulate and sensitize the interaction through TBK1-mediated phosphorylation. However, SIKE function within the innate immune response still remains unknown. The goal of this study was to determine the binding affinities of SIKE for tubulin versus α -actinin. Our approach will use fluorescence polarization of a fluorescently-tagged SIKE to monitor changes in SIKE solution properties plus and minus binding partners. To tag SIKE, up to 3 available cysteines will be modified through maleimide chemistry with a fluorophore. To accomplish this, cysteine residues in SIKE in both the native and denatured state were quantified with Ellman's Reagent (DNTB). Immobilized TCEP disulfide reducing gel was used to reduce any disulfide bonds or modified cysteines in SIKE in order to determine the number of cysteine residues available for modification. Comparison of SIKE experiments with a cysteine standard curve suggest six available cysteines, although SIKE only encodes 3 cysteines. Further refinement of our Ellman's assay is ongoing with the goal of using the maleimide modification to modify SIKE with a unique fluorophore for interaction studies.

63

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Understanding the Interactions and Physiological Impacts of the Suppressor of IKKepsilon

TIMOTHY MARSHALL JR and Jessica Bell

The common cold is a viral infection that most people have experienced many times throughout their lives. Once we have obtained this cold, our immune system works endlessly to fight off this virus and recover our health. This natural process occurs without any conscious effort, but it is a very complicated process. A virus infects the body by inserting its genetic code, as double-stranded (ds) RNA, into our cells to hijack the cell's machinery and replicate the virus. While the virus is spreading throughout our body and we begin to feel sick, our body starts to recognize that the virus is present and starts fighting back. Specific receptor proteins in our cells begin to recognize the viral dsRNA, and send off signals throughout the body. These signals lead to the interruption of the viral replication, thus ending the infection. One of these signals leads to the modification of suppressor of IKKepsilon (SIKE). Although it is known that SIKE is involved in the anti-viral response, the specific functions of SIKE are currently unknown. Previous experiments have shown that SIKE forms direct interactions with the cytoskeletal protein alpha-actinin. Analyzing the effects that SIKE has on alpha-actinin may help discover the functions of SIKE. My research aims at determining the functions of SIKE through its interactions with alpha-actinin, and understanding the role SIKE plays within the anti-viral response.

64

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Determination of Hygroscopic Growth and Deliquescence Point of Secondary Organic Aerosols

ANTONIO ROJAS and Richard Gardner, Dr. Devoun Stewart and David De Haan

We know that models assume Secondary Organic Aerosol (SOA) particles to be amorphous, semi-solid mixtures. As relative humidity (%RH) increases these aerosol particles begin to take up water. The hygroscopic growth of SOA's changes the size, morphology, phase, chemical composition and reactivity of the particles. Here we demonstrate how we measure the hygroscopic growth rate and deliquescence point of various SOA's. We measure this by developing a system to send wet aerosol through Nafion tubes to control the RH of aerosol particles over a large range of humidities. We atomize solutions into wet aerosol particles and send through a %RH controlled Nafion tube, and send RH adjusted aerosol particles to Condensation Particle Counters (CPC's). A Microorifice Uniform Deposit Impactor (MOUDI) measures the bounce factor of these aerosols to determine at what %RH these SOA's are deliquescing. We have tested inorganic salts, organic salts, and SOA's. We will report on the hygroscopic growth and deliquescent point of various SOA's in the future.

65

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Mechanistic Studies of the Iridium-Catalyzed ortho C-H Borylation of Benzylic Amines

NATALIE CHUANG, Timothy Clark

The diverse synthetic processes afforded by reactive carbon-boron bonds make C-H borylation reactions valuable for a number of applications. It is known that borylation of benzene or its derivatives can be achieved using an -

- iridium catalyst. A mechanistic study of directed C-H borylation reactions such as that developed by the Clark group has not previously been reported; doing so is important for the improvement of synthetic design methods and reaction efficiency as well as generalization of the reaction for its application in other reaction conditions. This study determines the rate law of the ortho C-H borylation reaction as $\text{rate} = k[\text{substrate}]^1[\text{B}_2\text{pin}_2]^1[[\text{Ir}(\text{COD})\text{OMe}]_2]^1$, with the iridium catalyst and substrate showing saturation kinetics. In conjunction with a Hammett study and kinetic isotope effect study, a detailed mechanistic pathway for this chemical transformation will be discussed.

66

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Iodinated Native and Modified Starch Granules as Reservoirs for Antimicrobial Agents: Release Kinetics and Antimicrobial Properties

MELISSA TRAN and JORDAN CASTRO and Peter Iovine

The objective of our research is to study the sustained release of antimicrobial iodinated species from both starch granules and a hydrogel matrix. Starch granules are naturally found in seeds and roots of plants, and play an important role in storing energy over long periods of time. We have incorporated iodine within the starch granule and have assessed the release kinetics of iodine from the granule over time. In order to deliver and slow the release of iodine from the starch granule, we have also prepared an alginate hydrogel containing the micron-sized iodine-stained starch granules within its matrix. Hydrogels are an important class of biodegradable and biocompatible soft materials that are used widely for various biomedical applications, such as tissue engineering and wound healing. Our polysaccharide-based hydrogel was synthesized by ionically cross-linking alginate with a calcium and D-glucono- δ -lactone (GDL) system, which allows a uniform hydrogel to form. The slow gelation rate of the ionically cross-linked alginate hydrogel has potential for greater control for use as an injectable hydrogel. The release kinetics of iodine from the hydrogel matrix has also been evaluated. The antimicrobial properties of iodine has been assessed via various microbiological studies. These studies include determining the biocidal properties in liquid cultures of bacteria, such as *Staphylococcus aureus*, and in biofilms.

67

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Electrochemical Oxidation of Methanol and Ethanol with a High Surface Area Pt-decorated Ni Foam Electrode

CRISTINA GUIJON and Eleanor Gillette

The threat of climate change has prompted a search for cleaner energy sources. One promising technology is direct alcohol fuel cells, which take advantage of electrochemical reactions to produce energy much more efficiently than combustion. Here, methanol and ethanol oxidation was studied in a three-electrode cell with a Pt-decorated Ni foam working electrode, a Pt mesh counter electrode, a Ag/AgCl reference electrode, and Na₂SO₄ supporting electrolyte. The Ni foam provides a high surface area to volume ratio to increase the efficacy of the electrode while keeping it at a reasonable size. Since Ni alone does not oxidize the alcohols, the Pt nanoparticles provide an active surface for the desired electrochemical reactions to occur. These electrodes were studied under SEM to observe their structure and optimize the size and coverage of Pt nanoparticles. To study the oxidation of the alcohols, cyclic voltammetry was performed at a range of pH values (pH 10 to pH 13) in order to determine if this may have an effect on the reaction mechanism. For methanol, the CV's indicate that there is a change in the oxidation mechanism between pH 12 and pH 11. In ethanol, there appears to be a less significant change in mechanism, but the oxidation of the alcohol is more scan-rate dependent at lower pH values. In addition, there is significantly less current generated at lower pH values. The CV's of the methanol and ethanol were also compared, indicating that there is a different mechanism for the oxidation of each alcohol.

68

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

An Ecological Examination of the Aquatic Invertebrates in Anza-Borrego Desert State Park

ZACHARY SCHAAF, Farhan Ahmed, Sophie Dunkelberger, Taylor Rusak, Lauren Musial, Natalie Constancio and Kate Boersma

Desert springs and streams experience natural cycles of flooding and drying. However, climate change is increasing the frequency and severity of droughts in desert regions, altering natural precipitation patterns. These changes affect aquatic invertebrate communities. My study seeks to understand the effects of severe drought on aquatic invertebrates in Anza Borrego Desert State Park (ABDSP), California, USA. Over the course of two years, we collected aquatic invertebrates from 5 sites. We identified the organisms and conducted statistical tests to determine if environmental differences affected community composition. We found that species richness was affected by temperature but not pH, dissolved oxygen, or depth. This information suggests that desert aquatic organisms are adapted to survive in extreme environmental conditions but are sensitive to temperature. These findings will help us predict future community responses to a changing environment in order to enact restorative measures to protect desert aquatic habitats.

69

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Metal Toxicity Effect on Ion Regulation in Acidophilic Fish

JAD SHAMI and Richard Gonzalez

Metal toxicity was investigated in two pH tolerant species of cichlids, Tapajos cichlids (*Geophagus* sp.) and Oscars (*Astronotus ocellatus*) from the Rio Negro, an ion-poor acidic blackwater water. We measured rates of Na⁺ uptake and loss during exposure to dissolved copper, and silver. Exposure of Tapajos cichlids to 1000 µg/L Cu²⁺ inhibited Na⁺ influx by 45.5% and stimulated Na⁺ efflux by 23.9%. Exposure to 1 µM Ag⁺ completely inhibited Na⁺ influx of Tapajos while increasing efflux threefold, and 200 mg/L Ni²⁺ increased efflux by 43.8%. These metals and others will be looked at on *Astronotus ocellatus*. These results indicate cichlids show high resistance to copper and nickel, but Ag⁺ completely inhibits Na⁺ influx and causes leaky gills.

70

Thursday, April 11 Session

I; 12:00 - 12:50 pm UC

Forums

Sexual Dimorphism in the Feeding Mechanism of Jackson's Chameleon

MICHAEL GLORIANI and Nicole Danos

Sexual dimorphism is a commonly selected trait in nature. It describes the differences in a variety of traits between males and females. The Jackson's chameleon (*Trioceros jacksonii*) is an example of an organism that exhibits sexual dimorphism. Looking at appearance, males display horns while the females do not. This type of sexual dimorphism is geared toward sexual selection, where females would choose their mate based on which male displays the best horns. There are also traits that are not ornamental that show sexual dimorphism. These traits might be selected for a competitive advantage. A competitive advantage would be essential to any organism in nature. It has been observed with preliminary data of a small sample size that in another species of chameleon (*Chamaeleo calyptratus*), females -

have a larger feeding mechanism proportional to body size than males. Sexual dimorphism has not been studied in the feeding mechanism in Jackson's chameleons before. I hypothesize that females will have larger hyoid compared to body size than males because it gives them a competitive advantage. I will test this by taking a large sample of specimens and measuring proportions of hyoid to body length. I will also be analyzing kinematic data such as velocity and acceleration to see if there is a correlation. Results supporting these hypotheses would indicate that there is an underlying reason that chameleons would demonstrate sexual dimorphism in something not sexually selected for.

71

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Evaluating GFRP as a Potential Negative Feedback Regulator in the Nematode *C. elegans*

TATIANA MORENO and Curtis Loer

Tetrahydrobiopterin (BH4) is a cofactor found in all tissue types of most eukaryotes. It is required for a variety of biochemical reactions including the synthesis of neurotransmitters serotonin and dopamine, and the conversion of phenylalanine (Phe) into tyrosine (Tyr). Its synthesis has been characterized in mammals as a four-step reaction pathway catalyzed by three enzymes. The first and rate-limiting enzyme in the pathway is GTP-cyclohydrolase I (GTPCH1). The pathway undergoes negative feedback regulation mediated by a complex comprised of BH4 and the regulator protein GTP-cyclohydrolase I feedback regulatory protein (GFRP). This complex binds to an allosteric site of GTPCH1 to inhibit enzyme function. Phe can also form a complex with GFRP that allosterically stimulates GTPCH1. Proteins required for BH4 synthesis have been identified in the nematode and model organism *C. elegans*, including likely GTPCH1 and GFRP homologs encoded by the genes *cat-4* and *gfrp-1*, respectively. Our study aims to evaluate the potential feedback regulatory function of GFRP in *C. elegans*. We have observed an increase in serotonin (a proxy for BH4 levels) in *gfrp-1* mutants, which suggests regulation of GTPCH1 is impaired when GFRP is damaged. We have also treated worms with 2,4-diamino-6-hydroxypyrimidine (DAHP), a BH4-mimicking drug. We observed a decrease in serotonin, suggesting that DAHP forms a complex with GFRP to inhibit GTPCH1. Preliminary tests have also shown an increase in serotonin following exposure to Phe. We are working towards documenting the effects of DAHP and Phe on a *gfrp-1* knockout mutant to further evaluate GFRP function in worms.

72

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Sodium Regulatory Mechanisms in *A. ocellatus* Fish Native to the Ion-poor Water of the Rio Negro

LONDON MAHAFFEY, DANIEL REBAGLIATI and Richard Gonzalez

The cichlid family of fish are native to the acidic and ion-poor blackwater of the Rio Negro, a major tributary of the Amazon River. The *Astronotus ocellatus*, or Oscars, are a member of this family. In a series of flux experiments, we examined the influx of radioactive sodium isotope as pH and sodium concentrations are altered. From this flux data, the Oscars showed an ability to regulate sodium despite the pH dropping to extremely acidic conditions. Furthermore, at high sodium concentrations, the Oscars showed increased ability to downregulate sodium ion intake via gill transporters. To further our research, we conducted immunohistochemistry to investigate and isolate the location of Na⁺/K⁺ transporter and H⁺-ATPase location on the fish gills. Location of these transporters were located in normal conditions then reevaluated after fish had been exposed to low pH as well as low sodium levels. The movement of these transporters in response to extreme conditions is thought to be a key factor in Oscars' tolerance.

73

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Evaluating the Effect of Sex Determination on *S. Dorsalis* Growth Rate

SASIWAN SPAHR and Sue Lowery

The development of economically and environmentally sustainable aquaculture requires an understanding of the genetic basis of traits that can limit or enhance the growth or health of target species. Genomic resource development is of particular interest for *Seriola dorsalis*, commonly known as the California Yellowtail, as economically valuable traits such as growth rate or response to aquaculture procedures may be linked to sex. Specimens of *S. dorsalis* from an exercise enhanced growth study at the Southwest Fisheries Science Center (SWFSC) were dissected and DNA extracted. Individuals can be identified as male or female using sex-specific genetic markers for *S. dorsalis*. Growth rate data from the SWFSC study will be analyzed for differential response by males and females. This research aims to examine the effect of sex on the growth rate of *S. dorsalis* and may shed light on whether males or females respond differently to specific aquaculture procedures.

74

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Establishing a Monitoring Program to Estimate Urban Parrot Populations in San Diego

MAISY FEELEY, MAXWELL JOHNSON, and Janel Ortiz

Though parrots from Mexico, South and Central America, and other countries have become naturalized in Southern California, their presence is not reflected by ample study or literature. The impacts of these non-native species on their new environment are thus unknown. The urban environments of Southern California serve as residence of at least thirteen parrot species. Given there is no standard protocol for surveys of introduced parrots, we will estimate population size by conducting point-counts with a double-observer dependent approach. This approach will increase detection probability and decrease duplicate or false detections. The primary and secondary observer will alternate between point-counts over the course of approximately one mile transects. We will conduct five ten-minute point-counts with a 200m fixed radius per transect, totaling to seven transects. These methods may change, likely to roost surveys as we determine more efficient ways to monitor large roosts during winter. By monitoring these parrots, we will be better equipped to determine changes in population size and use of an urban environment.

75

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Methods of Na⁺ Influx Regulation by *Astronotus ocellatus* Using Carbonic Anhydrase

ROGER HSU and Richard Gonzalez

We investigated the role of carbonic anhydrase (CA) in Na⁺ uptake in an acid-tolerant Amazonian cichlid, the Oscar (*Astronotus ocellatus*). It is proposed that carbonic anhydrase in the gill epithelium combines CO₂ and H₂O to form HCO₃⁻ and H⁺. The H⁺ is then exchanged for Na⁺, replacing Na⁺ lost by diffusion across the gills. We measured rates of Na⁺ influx in the presence of compounds that inhibit CA, to test its role in Na⁺ uptake. Exposure of Oscars to 100 microM acetazolamide had little effect on Na⁺ uptake but exposure to 100 microM Ethoxzolamide inhibited Na⁺ uptake by 50%. These results indicate that Na⁺ uptake in the Oscars involves the production of H⁺ by carbonic anhydrase to be utilized in exchange for Na⁺ influx. The difference in effectiveness of the two compounds can be explained by the higher affinity of Ethoxzolamide for CA.

76

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

CHARACTERIZATION OF THE POLYMERIC IMMUNOGLOBULIN RECEPTOR IN LEUCORAJA ERINACEA

JAMES RICKETTS and Valerie Hohman

The protection of mucosal surfaces against pathogens is mediated in part by antibodies of the secretory immune system. The polymeric Immunoglobulin receptor (pIgR) has a key role in this defense against unwanted invaders, by transferring antibodies across epithelial cells and into mucosal secretions. pIgR has been identified in many different vertebrate classes, including mammalian, avian and reptilian, amphibian, and teleost species, but not in cartilaginous fish. Antibody secretions have been identified in various organs in cartilaginous fish, however, the proteins mediating this transport have yet to be identified. In this study, we have isolated a partial gene sequence from *Leucoraja erinacea*, a cartilaginous fish, that demonstrates homology to other pIgR sequences from various vertebrate species. This novel discovery in a Chondrichthyes species may provide insight into the characteristics of the primordial adaptive immune system and how defenses against pathogens at mucosal surfaces first occurred in lower vertebrates.

77

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Paper-Based Controllable Illumination For Multi-Mode Microscopy

SIMREN KAUR and Ryan McGorty

A paper-based microscope makes for a rugged and versatile solution to bringing science and science education to a variety of settings including those that are resource-scarce. This has been well demonstrated by the Foldscope project. Here, we describe an extension to that idea. We designed a paper-based method to control the sample illumination in a portable microscope. Controlling the illumination of the sample allows us to employ a variety of microscope imaging modalities including bright-field, dark-field and phase contrast. With this instrument, students can explore those different techniques. Additionally, it can be used to perform advanced imaging, including quantitative phase imaging, in the field, away from advanced and costly instrumentation.

78

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

How crosslinking actin filaments influences the microscale viscoelastic properties of actin-microtubule composites

MADISON FRANCIS, Shea Ricketts and Rae Anderson

The strength and mobility of cells is dependent upon the interactions between two protein filaments that comprise the cytoskeleton: actin and microtubules. These proteins form entangled networks that can also be chemically crosslinked to enable a wide range of mechanical properties. Here, we use optical tweezers microrheology to determine how varying concentrations of actin crosslinkers influences the viscoelastic properties of actin-microtubule composites. We create equimolar co-entangled networks of actin and microtubules with varying concentrations of actin crosslinkers. We use optical tweezers to apply both oscillatory and constant speed microscale strains over a range of rates and distances while simultaneously measuring the force the networks exert to resist these strains. We quantify the frequency-dependent complex viscosity, the nonlinear stress response, and the relaxation dynamics following strain. Surprisingly, we find that increasing the concentration of crosslinkers yields a decrease in network elasticity and stiffness.

79

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Quantifying the surface tension of non-equilibrium colloidal fluids

CAROLINE RIEDSTRA and Ryan McGorty

Through the use of a colloid-polymer system employing temperature-sensitive pNIPAM microgel colloidal particles, we observe the nucleation and dissolution of colloid-rich liquid droplets. We use light-sheet microscopy to observe the formation and dissolution of colloid-rich droplets in three-dimensions and with optical sectioning. Our colloid-polymer system allows us to precisely tune the equilibrium state--mixed or demixed--by adjusting the sample temperature. With videos obtained from the light-sheet microscope, we perform image analysis of fluctuating droplets to extract the surface tension.

80

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Quantum Kinetic Equilibrium

HEATHER HODLIN and Chad Kishimoto

The quantum kinetic equations (QKEs) are quantum master equations that account for both coherent quantum mechanical evolution and kinetic evolution induced by scattering. We solved the QKEs for a simple two-state neutrino system in the hot and dense early universe where both neutrino flavor oscillation and scattering are important in the evolution of the neutrino states. We found that solutions to the QKEs point toward an approximate "equilibrium" solution where the quantum effects balance the kinetic effects. In this poster, we will assess the validity of this approximation.

81

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Quantitative Phase Imaging Using Structured Illumination

SHANE VOSS and Ryan McGorty

This project aims to demonstrate quantitative phase imaging using structured illumination. We construct a microscope with the illumination provided by a programmable electronic paper display. We project a specific illumination pattern, such as an array of dots, onto the sample plane. Due to refractive index variations within the sample, when we image the sample onto our camera we record a slightly altered illumination pattern. By tracking how the image of our illumination pattern is modified by the sample, we can back out the optical path length of the specimen. Prior work has validated the use of structured illumination to determine sample refractive index, but our work shows the benefit of a programmable illumination pattern that can be easily implemented.

82

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Scientific Journalism on a College Campus

LUKE GARRETT and Chad Kishimoto

To render understandable the complex and often times jargon heavy topics of science to The University of San Diego community is the goal of this research. Throughout the semester 5-8 scientific articles will be published in The USD Vista, covering various scientific topics. The articles themselves will balance both the media writing style and the communication of scientific theory in order to explain a certain phenomena to the general public. Through this research project a mastery of science writing will be achieved, the impact of which will be tracked through a multi-media dissemination of articles through an email newsletter, social media, and paper copy of The USD Vista. Furthermore, the method of science writing along with the tracked impact of the science articles themselves will be the results of this research.

83

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Spatial and Temporal Changes in Copper, Zinc, and Lead in Mission Bay, San Diego, California from 2015-2018.

JAMES HUSSEY and Eric Cathcart

Anthropogenic metals within the sediments of marine environments have significant impacts on biota and ecosystems. In particular, lead, zinc and copper can result in mortality, weight alteration, changes in enzyme activity, and modification of behavior in various aquatic species. This study examines the temporal and spatial variability in copper, zinc, and lead within the sediments of Mission Bay, San Diego, California from 2015 - 2018. A total of 48 locations were sampled using an Ekman grab sampler and all sediment was analyzed on a Innov-X systems X-5000 X-Ray Fluorescence machine. The concentrations of each metal are compared to the SQiRTs (Screening Quick Reference Tables) tables and changes in metals concentrations over time are reported. Long term data sets of marine ecosystems, specifically estuaries are crucial for understand the source of metal input and to understand exactly what effects this increase has on the surrounding ecosystem. Broad data sets on metal concentration are crucial for future high-resolution studies on marine ecosystems in Mission Bay.

84

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Grain size and organic matter as indicators for benthic community composition and distribution in Mission Bay, San Diego

LESLIE GOBEL and Michel Boudrias

As a prime source of revenue for the tourist industry in San Diego, Mission Bay is a crucial part of the city's economy. Therefore, it is important to understand how certain factors, both natural and anthropogenic, could alter the ecological health of the bay for both marine organisms and humans. As an extension of an ongoing project studying the benthic composition of Mission Bay, my project focused on how benthic meiofaunal communities vary in abundance and diversity spatially throughout the bay in response to abiotic factors such as organic matter and grain size. Using sediment samples dyed with Rose Bengal, I quantified and identified taxa of meiofauna from 14 sites. I used the Shannon-Weiner and Simpson's indices to quantify species richness and evenness for each site. Results indicate that grain size is a greater driving force than organic matter for species richness. Sites composed of 75% or more sand showed richness values less than 0.3, while sites composed of 30% or less sand had values greater than 0.9. Furthermore, any change in abiotic factors affecting grain size, like water flow and dredging, changes the patterns of distribution and abundance. Therefore, contrary to the broader scientific perspective, geography of Mission Bay does not seem to be the driving factor of the benthic composition. Instead, grain size seems to have the greatest effect on the diversity of these estuarine communities, although further analysis is necessary to fully understand the natural and anthropogenic factors that contribute to varying grain size across Mission Bay.

85

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Human-wildlife Conflict in Tanzania: Environmental Justice Impacts of East African Colonialism

KIANA LINDSAY and Marlene Brito-Millan and Christian Kiffner

As human encroachment continues to threaten wildlife populations, there is a greater need for humans and wildlife to coexist. Wildlife functions as an important revenue source for East African nations, with wildlife tourism and game hunting driving many regional economies. Local biodiversity is currently threatened by global climate change and rapid human population growth. After a century under colonial rule, contextualizing these environmental issues into the postcolonial framework is a crucial in assessing local responses. Furthermore, understanding public perceptions of wildlife is key to implementing effective wildlife management and conservation techniques. To assess the way that humans perceive local mammal species, an analysis of perceived damages, benefits, and the suggested management for those species was conducted in three districts of Northern Tanzania using structured interviews (n = 385) containing questions about 26 local mammal species. The three study areas differ in ethnic composition, local economies, land use practices, and the wildlife management techniques of protected areas. When suggesting management, most participants desired the implementation of damage prevention or compensation rather than the reduction of the population size. Therefore, taking preventive measures to ensure that wildlife does not damage the livelihoods of local people would be beneficial to improving the local attitudes towards wildlife and lowering the desire to decrease the population size of many species. The highest levels of tolerance were found in the study area that actively participates in a Wildlife Management Area, a conservation program specifically emphasizing local engagement, suggesting this methodology as a potential solution.

86

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Regional Assessment of Tropical Ascidians and Bivalves in Urban and Rural Dock Settings in Bocas del Toro, Panama

RAEHEL HILL, Alaina Eckert, Brooke Torjman, Madison Correiro, and Carolyn Kovacs

Ascidians and bivalves demonstrate complex relationships through competition for space and mutual predation by sea stars. Ascidians often out-compete bivalves and other organisms for space when nutrient levels are high, such as around urban centers. Bivalves can struggle to settle where there is increased boat traffic and competition, and therefore can be found in higher abundance in rural areas. This study investigated the difference in abundance of bivalves and ascidians and the difference in species distribution of ascidians between urban and rural dock pilings. In April 2018, ten sampling sites around the Bocas del Toro archipelago of Panama were used to conduct the study, five sites being urban and five rural. This study aimed to determine how distance from the urban center of Bocas town affected these invertebrates and to infer overall ecosystem health in these artificial habitats. Overall, there was no relationship between ascidian and bivalve density, but there were significantly denser populations of bivalves found on rural pilings compared to urban pilings. An even distribution of prominent ascidian species was found through both urban and rural areas. The difference in bivalve distribution could be caused by differences in anthropogenic disturbance, suggesting that urban boat traffic and increased competition may have a large impact on the bivalve community. The even ascidian species distribution suggests a well-established artificial habitat that closely resembles local coral reefs and mangroves. Some urban and rural dock piling communities may then be positively contributing to the marine biodiversity and health in Bocas del Toro, Panama.

87

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Juvenile barnacle settlement and subsequent growth and mortality in the Southern California Rocky Intertidal

ZOE VIRTA and Nathalie Reysn

Barnacles develop as larvae in offshore waters before returning to the coast and settling onto intertidal rocks. Monitoring the settlement rate of barnacles and then tracking growth rate and mortality gives insight into temporal variation in population dynamics. This study was conducted in three 21 day periods in March 2017, December 2017, and June 2018 by taking photos of 1 cm² plots in Bird Rock, La Jolla, California. The photos were processed using imageJ software to track individual barnacles from when they first arrived appeared on the rocks (settlement) and over the next 21 days to monitor subsequent growth and mortality. Time series of temperature were also collected within the study site for each 21 day trial. We compared temporal patterns in growth rate, mortality, and settlement with changes in temperature for each trial. In general, individual growth rate and settlement was higher in summer months when compared to fall-winter months. Additionally, mortality was lower in summer months when compared to fall-winter months. This study shows how collecting individual high-resolution data can be used to give insight into population dynamics.

88

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Navigating Traditional and Western Medicine in Villages in Phnom Kulen National Park, Cambodia

SAMANTHA ALFARO and Zhi-Yong Yin

Cambodia's Phnom Kulen National Park is historically known as a source of medicinal plants for traditional Khmer medicine. This study aimed to determine factors that influence choices between traditional and western medicine in three villages located within the boundaries of the park. It focused on initial treatment methods as well as the factors influencing choices for prenatal and postpartum care. Thirty semi-structured interviews were conducted in the villages of Anlong Thom, Tmar Chruonh, and Ta Penh. A total of 40 respondents, 30 women and 10 men ranging in age from 20 to 84 years, contributed to the results. Respondents indicated a wide variety of perceptions of each healthcare system, with 85% of respondents using western medicine in their initial methods of treatment. The only remaining condition with widespread use of traditional medicine was reproductive care, a condition in which 83% of respondents reported using traditional medicine. Factors such as cost, distance, health center limitations, and perceived efficacy were shown to be common factors influencing decisions. For reproductive care, culturally-specific perceptions of childbirth, mistrust in health care professionals, and parental influence played primary roles in determining methods of prenatal and postpartum care. In contrast to other studies, this study doesn't find traditional medicine to be the primary method of treatment. Instead, results suggest that previous work overemphasized the presence of traditional medicine for treating illnesses and underestimated its use in reproductive care. This lack of awareness is then reflected in national health policies that fail to serve the needs of Cambodians.

89

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Chumming for Great White Sharks: Investigating how Shark Size Influences Interaction with Chumming Vessels

KAITLIN GASPER and Steven Searcy

Chumming for Great White Sharks: Investigating how Shark Size Influences Interaction with Chumming Vessels This study was performed through field observation of the white shark population around a Cape Fur Seal colony in Mosselbaai, South Africa. Behavior between different sized great white sharks around a baited vessel was investigated during a two-month period during winter 2018. It was hypothesized that smaller white sharks would interact with a chumming vessel more frequently than larger sharks. Data was collected from a research vessel using bait heads and chum to attract sharks to the boat. Shark interaction was classified by how long the shark remained near the boat, number of baits consumed, and number of times the shark physically came in contact with the boat. Although the hypothesis could not be supported due to high variability in the data, smaller sharks generally interacted with the boat more often and larger sharks spent more time around the vessel. White sharks are pivotal in maintaining a healthy ecosystem and therefore understanding their behavior is crucial when interacting with humans. The growing ecotourism and research industries surrounding these apex predators is growing rapidly and in order to coexist, it is important to understand how human activity could alter the future population of great white sharks.

90

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Stormwater Pollution Prevention Plans and Best Management Practices

CONNOR RIDGE and Eric Cathcart

Continued population growth and increased development in coastal areas dramatically alters watershed dynamics. Prior to the implementation of Best Management Practices (BMPs), required by the Clean Water Act, urban runoff and development activities lead to increased sedimentation in marine ecosystems due to grading activities from construction sites. In the US Virgin Islands, multiple studies show increased sedimentation from developed watersheds limiting coral growth and development. Individual communities, specifically in Coral Bay, St. John, US Virgin Islands, are beginning to implement BMPs and manage stormwater runoff to control erosion and mitigate sedimentation; however, implementation of BMPs are not regulated in the region. In San Diego, all construction activities are required to follow established BMP regulations (ex. settling ponds, straw wattle, sand bags, silt fences, and hydraulic mulch) as part of Stormwater Pollution Prevention Plans (SWPPP). Data from implemented SWPPP in San Diego indicates the effectiveness of BMP implementation in mitigating stormwater runoff. We hypothesize that through proper implementation of BMPs in Coral Bay, sedimentation levels would decrease and would have a positive effect on coral growth and development. This study proposes the implementation of a SWPPP in Coral Bay to mitigate sediment runoff that leads to increased sedimentation and accumulation of pollutants and contaminants in the marine ecosystem. Through supporting the importance of BMPs in tropical marine ecosystems, communities like Coral Bay would experience the impacts of reduced sedimentation on the biological, chemical, and physical aspects of the environment.

91

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Dissolved Uranium in the Groundwaters of the Western Peninsular Ranges Batholith, San Diego County, California

ALICIA KELLEY, Scott Snyder, and Eric Cathcart

Detectable levels of dissolved uranium can be found in most municipal and private potable water systems; however, ingestion of levels above the Maximum Contaminant Level (30 ug/L) have been shown to cause kidney issues as well as other health effects. Although public water wells are tested at least annually for water quality, private water wells in rural areas are not tested as frequently, if at all. Recently, dissolved uranium in excess of state and federal standards has been discovered in the groundwater in and around the Descanso region of San Diego County. This area is located within the Western Peninsular Ranges Batholith and is characterized by moderately fractured Cretaceous igneous intrusions with multiple late Cretaceous pegmatitic dikes. Based on reviews of mine claim data and field observations, the uranium deposits (uranophane) occur as a rind or film on weathered surfaces of the fractured pegmatite intrusions. Available data suggests the groundwater is fracture controlled and stratified as wells proximal to each other have highly variable uranium concentrations. In this study, chemical data from multiple municipal and private wells are compared to the state and federal limits on uranium and the effectiveness of insitu mitigation techniques utilized in the region are also assessed. The results of this study show that more stringent testing of private wells in the region may be necessary.

92

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Educational Environmental Programs and Their Scarcity in Elementary, Middle, and High Schools

WILLIAM PARKS and Zhi-Yong Yin

Educational campaigns were conducted in southern California elementary, middle, and high schools to engage students with local environmental issues. The project was focused on supplying resources for teams of elementary, middle, and high school students to identify and solve water issues in their areas. The campaign was coordinated by Grades of Green, a non-profit based in El Segundo, CA. Teams were located worldwide but heavily concentrated in the Southern California area. This an effective form of introducing environmental issues to young students because it allows them to take charge on an issue that matters to them and see the payoff of their work. The campaign was broken into four different phases where teams researched, found issues in their community, found solutions to those issues, and presented those solutions to community groups. The key indicator in the judging of each teams work was the gallons of water conserved and the engagement each team had with the community. It was found that there are thousands of gallons of water to be conserved by solutions created by campaign teams. In questionnaires sent to each team, a wide range of teams that spoke to the fact that these campaigns and issues are something that are not normally addressed in classes, specifically in public education. This project shows that there is a large need for more environmental education programs in elementary, middle, and high schools. Solutions to environmental issues can come from people of all ages as long as they are exposed to the topics.

93

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

How does a managed care living environment for Atlantic Bottlenose Dolphins, *Tursiops truncatus*, affect their behaviors and health?

Caleb Bills and Zhi-Yong Yin

For many years zoological facilities have been criticized for housing wild marine mammals in managed care living environments. Through this proposed physiological study we will investigate the levels of stress and social behaviors that Atlantic Bottlenose Dolphins exhibit in their managed care living environments. Additionally, we also hope to communicate the daily husbandry and training methods that the trainers and dolphins perform together to educate the greater scientific community. We will use the two separate populations of Atlantic Bottlenose Dolphins located at SeaWorld San Diego for this study. We will analyze and quantify behaviors of the dolphins before and after training sessions. One population of dolphins participates in shows (Dolphin Amphitheater Population) and the other population participates in human in water interaction programs (Dolphin Point Population). Previous studies have analyzed the stress related hormones cortisol, aldosterone, and adrenocorticotrophic that can be collected from blood samples. By examining these study results, we hope to identify a good approach that is appropriate for the animals in the proposed study, in which we will compare the two populations to determine which one is more impacted by their specified programs in terms of stress. From the future analysis of the animal behaviors and blood results, it is hypothesized that the dolphins in both populations exhibit low amounts of stress in these managed care environments. Additionally, it is hypothesized that the dolphins that live at Dolphin Point exhibit lower levels of stress than the dolphins at Dolphin Amphitheatre. From this study, we hope to discover ways for marine mammals in managed care facilities to live in healthy, low stress, and stimulating environments

94

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Environmental Justice in Postcolonial Central America: Indigenous Voices in Modern Environmental Movements

KIANA LINDSAY and Kevin Guerrieri

For nearly three centuries, Central America existed under Spanish colonial rule. During this time, the land functioned as a source of raw materials, ultimately invested back into the Spanish Empire. Activities such as mining, monoculture, and deforestation disrupted vital nutrient cycling, polluted crucial resources, and displaced the native peoples. The language surrounding the exploitation of both the environment and the indigenous people stripped the rights from both bodies. The significance of the environment was simplified to a resource and the native peoples were not recognized as decision-making agents capable of managing their own land, with their claims to the land declared null. The legacy of colonialism in Central America began a dialogue that negated traditional land-use practices and removed the voices of indigenous peoples in the decision and policymaking processes. The lack of representation regarding land usage and the exploitation of natural resources under colonial rule has culminated in environmental injustices pervasive today. By examining the historical context that has resulted in these environmental issues, new solutions can be formed to include the voices of indigenous groups and address modern environmental problems. With several Central American and Caribbean nations consistently ranked as some of the nations most vulnerable to the effects of global climate change, there is a pressing need for effective and equitable policies that emphasize comprehensive cooperation.

95

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Distribution of Bryozoan Larvae in the Near Shore

NICOLE YAMADA and Nathalie Reynolds

Marine invertebrates have a complex life cycle consisting of both a dispersive larval and adult benthic phase. For these organisms, larval transport is crucial in ensuring settlement and recruitment into adulthood. In waters off the coast of La Jolla, CA, bryozoan *Membranipora membranacea* live in a planktonic larval stage called cyphonautes. With physical processes impacting larval transport, we hypothesized that cyphonautes distribution would vary based on changes in annual and seasonal thermal stratification. We analyzed the distribution of cyphonautes larvae off the coast of La Jolla, CA from May 2014 to September 2016 in response to annual and season thermal stratification. By collecting samples from seven different stations with depths ranging from 4m to 14m in 2m increments, this allowed us to examine the vertical distribution and cross-shore distribution of the larvae. We found that the concentration of cyphonautes was highest in 2016, but cyphonautes had the deepest distribution during 2014. This is possibly in response to differences in the temperature of the water, as large-scale oceanic disturbances impacted southern California in 2014 (?The Blob?) and El-Nino (2015) bringing excessively warm water to the region. This study provides insight on how larval dispersal might be impacted by environmental conditions.

96

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Temporal Change of Microplastic in Mole Crabs

GEORGINA CASEY and Steven Searcy

Microplastics are small plastic particles (<1mm) that are a dominant form of marine pollution in marine and coastal environments. Microfibers, a form of microplastics that come from sources such as clothing and rope are commonly found in marine sediments. Despite this, little is known about whether marine organisms are ingesting these microfibers, and once ingested if microfibers are impacting growth and reproduction. This is a concern, because in addition to potentially interfering with feeding and digestion, microplastics often contain hazardous chemicals. In this study, we examined microplastic ingestion in mole crabs (*Emerita analoga*) monthly from June–October 2018 in Mission Beach, San Diego. Mole crabs live in the swash zone of sandy beaches, burrow in the sand and filter feed on plankton and detritus using their feathery antennae. Their antennae may inadvertently collect microfibers from the water column. Each month, a minimum of 30 mole crabs were collected, measured for length and weight and dissected to examine egg weight and the number of microplastics ingested. Overall, there was a temporal trend in microplastic ingestion with the highest levels found during July, which is the peak tourist season in San Diego. In addition, there were non-significant trends toward larger mole crabs ingesting more plastic fibers and after controlling for size, mole crabs with more microplastics had smaller egg weight. This study is a critical first step towards understanding how microplastics may be impacting our local marine organisms. Future studies should address issues of the potential effects of microplastic on different tropic levels.

97

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Effects of Abiotic factors on the Spatial Distribution of Zooplankton in Mission Bay, San Diego

THOMAS CALLAHAN and Michel Boudrias

Mission Bay is a manmade body of water that receives water from three separate creeks and the Pacific Ocean. Because of its unnatural shape, the bay has a high variation in some of its abiotic factors, like temperature, turbidity, and flow patterns. These abiotic factors have an impact on the distribution and abundance of planktonic organisms within the bay. In order to analyze the impact of these abiotic factors on zooplankton communities, we collected plankton from nine locations throughout the bay while measuring a suite of the abiotic factors at the same locations. The zooplankton were then sorted and counted and standardized in order to be compared to each other and the abiotic factors for the given site. The zooplankton were in a bloom during the time of the collection, with most stations averaging around 10 million zooplankton per sample. The station with one of the lowest turbidity measures also had very low zooplankton abundance. Some of the stations with higher turbidity had up to ten times more zooplankton. Most stations were also dominated by *Acartia* copepods, leading to a fairly low diversity of other zooplankton and very low abundance and diversity of phytoplankton. In past studies, Mission Bay has been categorized into three regions based on location. The data collected in this study suggest that flow regimes and key abiotic factors like turbidity are better predictors of the patterns of abundance and diversity on Mission Bay.

98

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Engineering Component Framework via Data Analytics and Machine Learning

CHRISTOPHER JUNG, AUSTIN FOXWORTH, and Eric Jiang

A local defense company has expressed the need to reduce component variance in a number of engineering designs, chiefly regarding a bulk of rigid coaxial cables found on large motherboards. This project involves creation of a standardized framework for design prototyping, collection of an organized part dataset, and analysis of trends and opportunities for cable optimization. Employing data analytics and machine learning techniques, we construct a information base and UI to locate redundancies and create, delete, search, and modify component information. Such a framework aims to resolve the vast cable variance used in applied hardware, eliminate components that are functionally-identical, and improve production efficiency.

99

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Future of Smart Home Technology: How a Robot Can Mow the Lawn

MARIELLA SAVIOLA and Venkat Shastri

The presence of technology in everyday tasks is ever increasing, and consumer electronics are spreading into the area of household devices. Similar to an iRobot or Roomba, the Picket is an autonomous lawnmower that can operate without the supervision of a human operator. However, a major difference and improvement is the Picket's capability to follow a path and avoid obstacles without the presence of a physical barrier such as a wall or fence. The design for the navigational system includes three main technical parts; a Wheel Encoder, an Inertia Measuring Unit (IMU), and an Arduino Uno microprocessor. The Encoder measures the distance a wheel travels, and then the IMU relates the Picket's position to time that allows for measurements of acceleration and velocity. These systems then feed information to the Arduino that uses an algorithm to drive the robot in the desired direction towards the

- desired position. As technology becomes more common in the lives of the general population, more consumer electroni products are entering the realm of household items. There are cameras in refrigerators that display its contents to a home owner's phone, security systems that can unlock a front door with the tap of a screen, and sound systems that play different music in different rooms from the same control panel. We will consider how the increased applications of technology services will help to form new standards of living for the public looking into the future.

100

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Testing the effectiveness of machine learning on an optical fiber based interferometer

BRANDON HARDY, JACKSON HERGET, TAYLOR WONG, MIKE MENCEL and Shastri Venkat

The purpose of our project is to research the machine learning capabilities related to the calibration of a control system for a fiber optic interferometer. Currently, control system parameters are set manually by an L3 operator. This is often a time consuming task, and requires a high level of operator expertise. Hence, L3 Photonics would like us to explore the use of machine learning and autonomous configuration of the three control parameters used in their interferometer system: phase, amplitude, and polarization. Since the most crucial parameters are phase and polarization, precise control of these factors are necessary. For design iteration simplicity, proper phase control will be implemented first followed by polarization. Machine learning requires a large pool of relevant and consistent data in order to choose control parameters in a reliable and repeatable fashion. A critical factor for developing an autonomous parameter adaptation system is reliable data collection for the characterization of the operating conditions of the interferometer. Environmental factors, such as temperature and vibration, must be compensated for in phase and polarization to obtain consistent interferometer control. After comparing our control system to a traditional PID method, machine learning will be implemented for conclusive comparative results. It is expected that machine learning control will greatly reduce the time required for the preparation of the interferometer system. By using machine learning to aid in calibrating the controls, difficulty and length of the tuning process may be reduced.

101

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

A new plasma discharge device for fundamental research with electronegative plasmas

ALEXANDER RAMIREZ and Gregory Severn

Two main species of plasma, the 4th state of matter, exist, ?electropositive? (consisting of electrons and positive ions) and ?electronegative? (consisting of negative ions, electrons and positive ions). Since its discovery as a new state of matter in the 1920's, research in plasma physics has driven the creation of advanced technology (e.g., discharge fluorescent lighting, Large scale (VL and UL) integrated circuit fabrication, and magnetic confinement fusion) and has deepened our understanding of the universe. Where plasma encounters material boundaries, a thin region near the edge usually forms to isolate the plasma from the boundary, permitting the plasma overall to remain charge neutral. This thin region is called the sheath. Understanding sheaths and associated phenomena is fundamental to understanding all bounded plasma. Many properties of the sheath are still not well understood or experimentally verified, especially in electronegative plasma. Experiments to be performed in a new plasma discharge device being built at the University of San Diego (USD) will answer questions such as whether internal double sheaths form near the boundaries for sufficiently electronegative plasma, and whether Bohm's criterion for sheath formation is satisfied there for the first time. We describe here a new device (Pyrex vacuum chamber, 6" tubing) and diagnostics (emissive probes for plasma potential measurements and tunable diode laser-based laser-induced fluorescence for ion velocity measurements) designed and built to test these questions. We report on the progress of fabrication and the first plasma potential measurements in the new device, initiated with nitrogen discharges.

102

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Human Movement Evaluation Tool

ERIC ROSENBERG and DANIEL TOVSTYKA and JESUS AYALA-LUCIO and AMIN AMIN and Bryan Cornwall and Gordon Hoople and Venkat Shastri

There is an important problem in the world of dancing. Most (if not all) of the feedback dancers receive regarding their performances and movement is highly subjective and still insufficient for a dancer to improve his or her movement. When the choreographer or instructor provides necessary feedback to the student, the feedback is compiled and processed verbally based on what the experienced choreographer or instructor sees. What lacks in the feedback are visual aids to help emphasize and correspond to the verbal feedback. Our focus has been primarily in evaluating technologies that can potentially assist choreographers and instructors to provide objective feedback to their students. These technologies include state-of-the-art 3D motion capture and weight distribution foot pressure sensors. From the data provided by these technologies, we have developed algorithmic software to detect human movement patterns and provide the objective feedback dancers can really take away and improve over time faster.

103

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Thermo Fisher Label Remover

KYLE THOMPSON and STEVIN DIBA and JOSE IBARRA and HAOGUANG MAI and FAHEL MOHAMMED and Bryan Cornwall

Thermo Fisher Scientific, receives approximately 500 antibody vials per day which they redistribute from multiple suppliers to vendors. These vials must go through a re-labeling process to keep the supplier information private, and the documentation controlled. Currently, the entire process is done by hand. The company's goal is to develop an efficient and reproducible process for re-labeling vials which is automated. Our focus is on the initial removal process each vial must undergo. This process involves removing labels which are wrapped around cylindrical vials; however, this is not without its challenges. A primary challenge we faced is removing the labels from the vials without damaging the label or the vial. Additionally there are sensitive products contained in the vials, so we can not alter the temperature of the vials. Finally, the entirety of our removal process must take place under 15 seconds. We are solving these dilemmas by automating the process of removing each label, while also minimizing the involvement of the operator in the process. This is done by running an adhesive tape around the vial and providing enough friction force to remove the label and have it stick onto the tape. Once removed, the tape can be cut and easily placed onto the proper documentation. This design utilizes common materials making it easy to maintain, yet still precise. Overall, we believe the benefits of adopting this system will outweigh those of the current manual based solution.

104

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Semi-Autonomous Drone for Unmanned Delivery

ERICKSON GOFF, CAL FERRARO, MARCELO LICEAGA, GREG SAMPSON, ANAS SALAH, DEVIN ASHLEY, and Subramanian Shastri

This project introduces a semi-automated drone with the capability to carry a payload and travel to pre-designated points. Currently distribution methods are wasteful and inefficient, most industries use automobiles to carry out deliveries. This method often produces more CO2 emissions into the atmosphere, also increasing costs to the company. Drones are an effective delivery method that not only avoid adding to traffic but also reduce CO2 emissions, streamlining the delivery process. The drone will contain subsystems for navigating, sensing obstacles, and handling a payload. The complete product will be loaded with a payload and given a location for delivery within range then returning to starting location.

105

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

'Picket' Fences and Greener Grass: Patenting an Autonomous Lawnmower Invention Designed Around Reciprocating Cutting Blades and Teachable AI

AUSTIN HIRSH and Frank Jacobitz

According to the California EPA, one gasoline-powered lawn mower run for one hour can produce as much emissions as 40 automobiles (Mow Down Pollution, 1999). Additionally, the average U.S. home owner with a lawn spends 66 hours on lawn care annually (American Time Use Survey, 2018). Existing robotic lawnmowers that aim to address these two issues have mostly failed to catch on in the United States due to a handful of technical drawbacks. For the past year, I have been working with a team of engineering students to develop a fully-autonomous lawn mower that can produce the same quality and efficiency of work as a human. For this project, I explored the nuanced process of drafting a traditional patent to protect my autonomous lawn mower invention. I first analyzed more than 50 related patents available in the U.S. Patent & Trademark Office (USPTO) database. I evaluated each patent based on criteria such as the status of the patent's protection, the recent activity of the patent holder, and the similarity of the patent's claims to my own invention. Additionally, I investigated tactics that inventors and lawyers use to create strong, legally sound patents. This research gave me an idea of where my invention stands in the existing patent landscape and how to best protect it. My end result is a draft of a traditional utility patent which, when reviewed by an attorney and submitted to the USPTO, will legally protect my invention by proving that it is novel, useful, and non-obvious.

106

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Modular Upcycled Electric Vehicle

GLENN MOSS, PETER BROWN, GEORGE DELISLE, RAFAEL BRENNAND, and Daniel Codd

As the issues with the environment continue to grow, cities around the world are beginning to implement bans on internal combustion engines. This means that older cars and classics will now be confined to a garage or showroom instead of being enjoyed from the driver's seat. Our solution is to convert a classic car to electric by reusing batteries and electric vehicle components. By designing a modular system of adapting these components to a classic car, owners would be able to enjoy their classic cars without the drawbacks of outdated performance and poor reliability. Our modular approach differentiates us from the competition by affording a shorter conversion time and the ability to use newer electric vehicle components that haven't been used in the past. This process can be applied to pre-smog vehicles and other classics so they can be enjoyed by their owners on the road again, just as they were meant to be.

107

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

u o 8 † ° h u

DANIELLE GADBOIS, ELISE RICCIO, ZOEY MAU, SHAANAN SAK and Frank Jacobitz and Yaal Lester

FZWEV aX9S[^WS^ea] ` ai ` Se>S] W- [` WMI [eS XWZi SWI^S] W^ ;eSWIZSf [e_ S] ` kXV Xa_ fZWadS` D[hWl Xa_ @adZ fa EagfZz3 VV[f[a` S^kl [f dWVhV[dMf bM]b]fSf[a` S` V` S^WS^Xai` Xa_ ` WYZTad` Y^SdWWez; eSWIe @Sf[a` S^I` S^Wl5Sd[hWVhM^i S^Wlfa fZWbabg^Sf[a` aX^eSWXa_ fZ[e^S] W^XdSTagf #^, aXIZWlag` fdkle Vd`] [^ Yi S^Wl` WWezFZWEV aX9S[^WS^ea egbb^W^i S^Wlfa fZW- [^ Ya_ aX^adS` SeS dMg^f aXS` SYdWV Wf W^ST[eZW [^ #++&fZSf S]_ efa efdWYZW; eSWIe WefWl ` WYZTad^ES^ [^ W^bd` YeS` V^fZWSk^W^aX^eS^f fZSf fZWS] W e[fea` U^SgeW S dM^f hWk Z] YZWLa` UWf dSf[a` aX^LZ^ad^WV` fZW S^Wl dM^f hW^a afZW XWZi S^Wl^S] Wfz: ai W^Wl ; eSWIe S^hS` UW Wfe [^ W^S^ [^ Sf[a` W^V fa W^e aXS dM^S` UW^` fZWS] W^adVd`] [^ Yi S^Wl` W^ [^ Y^fZWbabg^Sf[a` [eLa` eg_ [^ Y_ gLZ W^eS^f fZS` T^W^ad^fZ^W^h^W^S^i S^Wl^cgS^ [fk aXIZWS] W^eLa_ b dM^W^e[hWk_ a` [fadV Tk ? W^adaf; eSWIe fab SYWUk Xidi S^Wl` S` SYW Wfz? [UaT] a^aY [efeS` VUZW [efeLa` f]` gS^k UZWU XadXadMY TaV [W^i S^Wl US^fkl eS^ [fkl S` VafZ W^US^W^ad^W^fZSf Uag^V fZ dM^f W; eSWIe i S^Wl egbb^kz; ` fZ[e b d a W^h i S^Wl V] dM^f k Xa_ fZWEV aX9S[^WV [^TW^S` S^kl W Xadah W^S^cgS^ [fkl S` VSLa_ b dM^W^e[hWf dM^f_ Wf b d a W^e i [^TW YW^SfWz

108

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

K k † ° u

ALEC AGUILERA, MICHAEL BENNETT, AMANDA KENNEDY, LINOR SERLIN, NAOMI ORBAUM, JAYDEN YEOMAN, and Yaal Lester, Frank Jacobitz

The State of Israel is renowned for its advancements in water; an imperative given its geographic situation and arid climate. Out of this scarcity, abundance has been engineered through a combination of proper management, cooperation with regional and global partners, and technological innovation. The River Jordan, a stream imbued with religious significance, is among the major freshwater resources utilized by Israel and its neighbors. Flowing 250 km from its source through the freshwater Sea of Galilee and terminating in the hypersaline Dead Sea, the Jordan's flow directly affects five political subdivisions: Israel, the West Bank, Lebanon, Jordan, and Syria. The strain of high politics in this basin has historically trickled down into numerous conflicts over the shared water resources. However, despite the challenges faced, relations in the Jordan River Valley have been alleviated through the aforementioned innovations in the water sector by Israeli actors. This project centers on an academic partnership for capacity building between the Shiley-Marcos School of Engineering in San Diego, California and the Azrieli College of Engineering in Jerusalem, Israel. Utilizing existing water treatment techniques, one sample of water from the River Jordan was treated to potability. This hands-on approach required the unique physical, geological, chemical, and biological features of this water source to inform its treatment. Mimicking the trials of the early innovators of water technology, this exercise allows for further consideration of the challenges faced in the Jordan River Valley; including overdrawn resources and resultant strain on ecosystems and economies.

109

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Venturi ToolKit

ABDULLAH ALHAMMAD and HUMBERTO BRINGASTREJO and ABDULMAJEED ALZAHIRANI and ALI ABUALHASAN and Matthew McGarry

The whole idea behind this project is to present a clear concept of what is going on inside a venturi meter. Students studying fluid mechanics may know how different variables affect the flowrate of a pipe. However, in this project specifically we will be helping students visualize exactly how different components such as temperature, pressure and velocity affect the flow rate of a venturi meter. We started gathering information on different designs of venturi meters. For example, we studied the smooth, jagged, sharp and eccentric type of angles and how the geometric factors affect the flow rate. The smooth angle was the most common and we decided to go with this type as of our main design. We made calculations, geometries and schematics of the venturi meter in order to ensure that our model works. The second part of our project is to work and create our design for the students to work on. We will be using Fluent to create our design. Our vital deliverable to the students using our design would be the manual instruction we would provide at the end of our project. The manual instruction would allow any student to follow directions step by step in order to find the desired variables such as pressure, temperature or velocity. The most significant goal of the lab manual is that any student can use this instructions even if they have no prior knowledge of the Fluent software.

110

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Contamination of Israel's Coastal Aqueduct

JEFF WEBB, Jeff Keeler, Nathan Sauer, Liron Kanisberg and Frank Jacobitz

This paper presents an analysis of groundwater taken from the coastal aquifer off the coast of the Mediterranean Sea in Israel. The geological makeup of the coastal aquifer of soft sandstone bedrock makes the water easy to access, but at risk for pollution. Water from the coastal aquifer can potentially become polluted with nitrates, chlorinated solvents, and seawater intrusion, making the water more costly to clean and potentially damaging the aquifer beyond repair. The aquifer resides in an area bounded by the Carmel range and Sinai Peninsula to the north and the Gaza Strip to the south. The aquifer supplies clean water to numerous nearby residents. Residents of the Gaza Strip are almost entirely reliant on the coastal aquifer for their fresh water supply, and it also supplies to Egyptians, Palestinians, and Israelis. Despite the contamination, the withdraw rate exceeds the natural recharge rate. With our visit to Israel, we hope to analyze the water from the aquifer to better understand the ongoing contamination due to pollution and overpumping. Our analysis will include the chemical makeup of the contaminants in the water sample and possible solutions the water authority may be able to implement to improve water conditions. Additionally, we aim to learn about water purification practices which would benefit water authorities and their operations here in America. While developing our own solutions for decontaminating the sample, we will work in conjunction with our classmates to share ideas which may aid other groups with developing solutions for their sample.

111

Thursday, April 11 Session

I; 12:00 - 12:50 pm UC

Forums

Wastewater Analysis and Treatment

ERICA JENKINS, MOLLY MCGARVEY, YISHAY SHMUEL, MICHAEL SWEEN, Yaal Lester, and Frank Jacobitz

Wastewater is any water that has been affected by human use, including industrial, agricultural, or domestic activities. Wastewater can contain a wide range of pollutants, including chemical, physical, and biological contaminants. In developed countries, after wastewater is produced, it generally enters into a sewage system and is transported to a treatment facility. At these facilities, the wastewater undergoes a sequence of physical, biological and chemical treatments and the treated water is then referred to as reclaimed water. Many wastewater treatment facilities do not treat the water to a drinkable state, but instead for use in agriculture or to be discharged back into the environment's natural water resources. Israel is currently the world leader in reclaimed water, with more than 80% of wastewater being reused. Tel Aviv serves as a striking example, as 100% of sewage is reclaimed and reused in irrigation for agriculture and other public works. Historically, reclaiming wastewater for agriculture has been a key part of Israel's strategy to become a water plentiful country in the middle of a desert. Israel's example should serve as a goal for other countries to strive for as water issues continuously worsen across the globe. Our team has the privilege of being comprised of students from the University of San Diego as well as the Azrieli College of Engineering in Jerusalem. This work describes the analysis of a wastewater sample and proposes a suitable treatment process for agriculture reuse.

112

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

The Doctor is Out: Mobile Work Station

GERRITT DEITERS, LAUREN MOHRMAN, ELI ROSEN-DURAN, MAARON TESFAYE, and Gordon Hoople

We are presenting the results of our senior engineering capstone project that revolved around a user centered design for Dr. Austin Choi-Fitzpatrick, an author and professor here at the University of San Diego within the Joan B. Kroc Institute for Peace and Justice. For our project, we created a sustainable customized all-terrain standing workstation in order for Dr. Choi-Fitzpatrick to conduct his office hours outside or anywhere around the USD campus. This mobile standing desk will be custom fit to sit at Dr. Choi-Fitzpatrick's standing height, featuring reclaimed wood for its desktop, caster wheels to move across campus terrain, a UPS power source so that he and his students may charge their devices on the go, as well as a GPS tracker so that students and faculty may locate Dr. Choi-Fitzpatrick whenever he is not in his office.

113

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Optical Elements in Augmented Reality

CHRISTIAN YEE-YANAGISHITA, MATTHEW CARTER, and Ernest Kim

With Augmented Reality (AR) on the rise and Microsoft's HoloLens in its final stages of development, there is a strong push to create packages that can accurately emulate physical phenomena in AR environments. Currently there are no programming packages available for the Microsoft HoloLens AR device that accurately represent the refractive properties of optical elements. Optical engineers and scientists at Sandia National Laboratories (Sandia) are interested in using the AR features of the Microsoft HoloLens to visualize and improve their understanding of the internal functions of their optical instruments. In order to do so, Sandia has asked us to develop a rudimentary refraction package in Visual Studio and Unity, the hosting software for the HoloLens, that has the capability of stacking multiple lenses in succession in order to simulate the optical properties of real, physical lenses in real time via the Microsoft HoloLens.

114

Thursday, April 11 Session

I; 12:00 - 12:50 pm UC

Forums

The Negev & Arava Aquifers: An Ironically Sweet Solution

TEHILA ABISTRIS, VALERIYA FOX, AARON MEYER, ARIEL SHASHA and Yaal Lester and Frank Jacobitz

Within Israel, there are two main sources that saline (brackish) groundwater is derived from: the Negev and Arava Aquifers. It is estimated that these two aquifers can store hundreds of billions of cubic meters of water at max capacity. Both aquifers are in the South-Eastern region of Israel, the country's most arid climate due to its location and lack of rainfall in the region. These aquifers are made up of three main units, each comprised of various rocks. Nubian Sandstone comprises much of The Kurnub Group while limestone, dolomite, and Shales can be found at The Judea Group. The Hatzeva & Dead Sea Groups contain sedimentary rock as well as clay, with all three dating back to varying geological time periods. Unfortunately, these aquifers have fallen victim to excess pumping which provides water to the Southern Arava valley. This excess pumping overwhelms recharging rates, which primarily rely on water discharge from fossils found in the units. As a result, water levels in these aquifers are declining at an alarming rate. A joint effort between our team from The Shiley P. Marcos School of Engineering in San Diego and The Azrieli College of Engineering in Jerusalem will analyze water samples obtained directly from these aquifers with the goal of developing an effective desalination process. Subsequently, this may potentially help consolidate the number of small-scale desalination plants scattered throughout the hot & arid region, which could in turn see energy savings in the coming years as well as a decrease in aquifer depletion rates.

115

Thursday, April 11 Session

I; 12:00 - 12:50 pm UC

Forums

Does racial discrimination by salary exist in Major League Soccer?

IAN FORD and Alyson Ma

A former player, Eddie Johnson, recently came out with accusations of racial discrimination in Major League Soccer. He stated that there are plenty of other examples of this happening to minority players. Racism is a problem in soccer that has persisted since long before the sport's rise in the United States. Additionally, there are distinct social and economic issues associated with racial discrimination in salaries. Salary discrimination by race results in teams overpaying for nonblack players compared to black players of equal ability. Using salary data from the league, this project analyzes the possibility of such discrimination. If the problem is as widespread as accused, the league's upcoming Collective Bargaining Agreement could work to address the problems of racial discrimination by salary.

116

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

MexLog Saddle

BADR ALOUHALI, Guillermo Ortega, Jeffrey Webb, Samuel Melin and Daniel Codd

MexLog, a company specializing in the initial delivery of semi-trucks from production to sales, requires a simpler, smaller, and lighter weight system for the transportation of modern semi trucks. MexLog currently uses two saddles: The FES saddle (Rhino) and combo saddle. The combo cannot be used in the US for highway trucks due to height. The Rhino weighs 2200 lbs and is roughly 24 ft long. Therefore, MexLog cannot ship back more than 18 saddles due to a 39,500 lb limit, which means MexLog has to spend more money to return saddles than anything else. The new proposed design is constructed with I-beams and the same material the Rhino is made from (carbon steel) but shortened by about 10 ft from the back beam of the Rhino to make it roughly 14.2 ft long. In addition, the design of the connection point has been changed to include the head of a combo saddle to the end of the beam. Furthermore, to reduce the high moment that the kingpin might experience, a support beam has been added to the rear end of the semi truck frame. The estimated total weight of the proposed design is 650 lbs, which allows MexLog to ship 60 saddles.

117

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Density Dependence of Nucleopolyhedrosis Virus in *Agraulis vanillae* Larvae

RAMON SOLIS and Arietta Fleming-Davies

Density-dependent diseases spread faster in high host density populations, compared to low density populations. Nucleopolyhedrosis virus (NPV) is a pathogen that causes deadly disease in the larvae of *Agraulis vanillae*, the Gulf fritillary butterfly. To determine if NPV transmission demonstrates density-dependence in this species, I conducted a field experiment to manipulate plant density within a natural population of Gulf fritillaries. Six potted plants per treatment were placed at a field site in high (0.12 plants/m²) and low (0.013 plants/m²) density treatments. Egg counts, healthy and virus-killed larvae (n=108 total), were recorded over 35 days. Both treatments exhibited NPV outbreaks. Due to higher oviposition on the low density plants, both treatments had similar larval densities (0.01 and 0.009 healthy larvae/m²). Thus, the field data did not provide information to determine density-dependence. A stochastic mathematical model was fit to field data and simulated using the software R to model the NPV outbreaks.

118

Thursday, April 11

Session I; 12:00 - 12:50 pm

UC Forums

Copepod Ingestion of Aggregates formed from Phytoplankton at Different Growth Phases

GRACE CAWLEY and Jennifer Prairie

Marine snow are sinking aggregates made from the combining of phytoplankton particles. These particles are heavier and sink quicker making them a dominant feature in process of bringing carbon into the deep ocean. Some organisms do feed on these aggregates thus releasing that carbon back into the surface ocean to be released back into the atmosphere and continue its cycling. Previous studies have shown that these organisms like zooplankton do indeed feed on these particles. However, little research had been done on the effect of the growth phase of the phytoplankton on the ingestion rate of these zooplankton. In this study, we investigated the ingestion rate of copepods on three different growth phases of phytoplankton. Using phytoplankton cultures rolled into aggregates in cylindrical tanks on a rolling table, we then conducted feeding experiments using copepods. The copepods were then retrieved and their gut content released into acetone and measured as an indicator of ingestion rate.

Session II: 1:10 - 2:00 p.m., Poster Presentations

1

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Made You Look

NINA MONTEJANO and John Halaka

Made You Look is a series of three large-scale graphite drawings that explore themes of perception, reality, and uncertainty. Originally inspired by the theological belief that God is something that we will never be able to fully comprehend, my work was also motivated by aspects of art history and the psychology of perception. Each drawing contains scenes based on real environments that mimic the everyday, but contain peculiarities within their many details. Parts of each scene defy gravity, repeat, or do not make logical sense to symbolize the disruption of the ordinary, which I believe is an experience comparable to the one that I underwent as I contemplated my own uncertainty about God. Each drawing contains dramatic lighting and careful placement of objects and figures to create a quiet tension between the familiar and unfamiliar.

2

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

"Export Processing Building": An Analysis of the Otay Mesa Border Region

PETER WALHOUT and Can Bilse

My Research focuses on the area of Otay Mesa along the U.S. - Mexico border in Southeastern San Diego County. I critique the optimization and economization of the built environment and the bodies of the inhabitants of Otay Mesa. I explore the phenomena which I have identified in this region as part of global trends, but choose to primarily represent my findings at human scale, highlighting the inhuman character of our networked material world and social condition when they are canalized through infrastructure space and supply chain logistics. I propose a critique not only of the disparities in the movement of bodies in this landscape, but also the multitude of social and psychological checkpoints administered in the same landscape. My project comments also on how the government and private interests use the condition of the border for their own advantage: typically, in this region, it operates as an instrument for these interests' economic gain. The concept of the threshold is crucial, in reassembling the components of this region into a critical intervention in the form of architectural design project.

3

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Environmental Racism in Chicano Park

VICENTA MARTINEZ GOVEA, AJIAH GILBERT, SOPHIA OCHOA, MY LY NGUYEN, SOPHIA ESTEBAN, and Alberto Pulido

The ETHN 343 class is working on a project called "The Turning Wheels Project." This project would be a mobile classroom situated in Logan Heights and working closely with the community to bring awareness to the issue of environmental racism which affects the surrounding area. The ETHN 343 class has an ongoing curriculum being designed to be taught via the mobile classroom. Such curriculum will be centered around the issue of environmental racism and include a variation of lectures and different interactions with the community as a means to communicate just what environmental racism is and what it creates. This will spark discussion and allow for a gathering space for community members to share their stories and experiences and thus key issues involving Logan Heights will be heard and known of. Environmental racism is often ignored or a topic unknown of to many, we must acknowledge its presence and make a conscious effort to change this reality. The curriculum will contain recent research conducted about Logan, San Diego's most polluted city, the groups of people which inhabit the neighborhood, as well as the surrounding communities and other key parts which make up Logan Heights. Taking into consideration the all the industrial buildings taking up the area.

4

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Musician's Muse: A Review of Motivation and its Implications for Percussion Pedagogy

AMANDA N. EZELL, Jeff Malecki (mentor), and James Fabionar (mentor)

In order to best advocate for music in schools, educators must understand what motivates students to become involved in music and continue pursuing it so that pedagogy will best meet the needs of their students. To this end, I set about conducting a literature review to assess the current body of knowledge as it pertains to the relationship between motivation and student music engagement. The results of this study highlight important correlations and trends that can aid educators in improving the quality of music education, as well as providing suggestions for areas of research that can deepen our understanding of the key role motivation plays in music education. One area in particular is the experiences of percussion students, which can differ significantly from those of their peers who chose other instruments, leading to differences in motivation and musical development. I propose that further exploration of this subject will improve the quality of music education for percussion students and the musicians with whom they interact.

5

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Staging Science: Enhancing Scientific Communication through Theatrical Performance

EMMA DICKSON and Monica Stufft

In contemporary America, scientists struggle to convey both their discoveries and the rationale behind them. Because of the difficulty in conveying scientific ideas to a general audience, scientists must expand their communication strategies. One way to do so is by using creative art forms like theatre to convey ideas. Indeed, Theatre has already begun to engage with science; many prominent playwrights have written works about science which range from biographical dramas to elaborate metaphorical explorations of scientific concepts. This project examines how different ways of engaging with science on stage affects the audience's understanding and perception of the concepts presented. Instead of surveying a vast quantity of science-themed plays, I focus on an in-depth analysis of several key examples of the genre. As the audience experiences plays as live performances, this project treats them as such, rather than as purely written texts. Therefore, in addition to scripts, this study also incorporates insights gained from critical reviews of key productions. By drawing on these sources, I can determine how the plays have been received both when they were first produced as well as in contemporary society (where applicable). From this, I will extrapolate what dramatic strategies are the most effective for theatrical works to communicate scientific ideas to an audience. These conclusions will form a basis for further collaborative efforts between scientists and theatre artists to help ameliorate the current crisis of communication which modern science faces.

6

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Study of a Forgotten Medium: The Importance of the Architecture of Wood

REBEKAH FURR and Juliana Maxim

The architecture of wood is considered to be the oldest form of construction, and at the origin of all subsequent architecture. Despite its privileged place in history of architecture, the study of wood as a medium has remained marginal, neglected, and unimportant. The study of architecture predominantly focuses on durable structures, stone, masonry, brick, or concrete. Such permanent artifacts have historically been associated with certain locations as well as with the needs and tastes of the upper-classes and cultural elites. By contrast, the perishable medium of wood promises to deliver a history of architecture with a different geographic focus and about different people. My plan is to conquer this disregard through highlighting, discovering, and linking all aspects of wood in architecture, by looking specifically at Scandinavia, Eastern Europe, and Russia. These regions are especially rich in the tradition of timber construction but have remained largely outside conventional discussions of architecture. Through this focus I will also be able to expand the research of architecture- the history and significance. To this end, I created a series of visual essays that illustrate the universe of wood structures and construction techniques from the regions of Scandinavia, Eastern Europe, and Russia. Furthermore, in collaboration with Dr. Juliana Maxim from the Architecture program, I intend to submit this material for peer review and possible publication on the Global Architecture History Teaching Collaborative website (GAHTC.org), a digital repository of record for novel teaching content with an expanded global content.

7

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Economic Determinants of FDI in ASEAN Member Stated

Mari Stadlander and Alyson Ma

I am researching the Economic determinants of Foreign Direct Investment by Multinational Enterprises in The Association of Southeast Asian Nations by using Stata and the Bloomberg Terminal.

8

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Role of Empathy in Leadership

MICHAELA ELLIS and Johanna Hunsaker

Leadership can take on many different roles depending on the context. One thing however that leadership always has at its core is an effort to move a group or organization toward a collective goal. In this paper I intend to look at qualities beyond traditional characteristics of a leader and see how they affect an organization's success. I intend to look into qualities such as empathy and vulnerability and where they fit in in leadership, and corporate management roles specifically. I predict that these, along with other elements of emotional intelligence will have a positive impact on one's ability to manage a group of people. This is an important topic, as these personal qualities are not often viewed as necessary in a business setting and changing that perception can greatly improve the success of an organization. I anticipate that this will be true for leaders and organizations regardless of which field or level they may be in.

9

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Investigating the Factors that Affect Student's Success in Portugal

ALISSA BROWN and Alyson Ma

A variety of socioeconomic and demographic variables impact students academic success in Portugal's secondary school. The schooling is three years long and succeeds nine years of primary school, making it the equivalent to high school in the United States. Compared to other countries in the European Union and the United States, Portugal struggles with their academic performance, with a dropout rate of approximately 40%. This dropout rate is significantly higher than most countries in the European Union and the United States. When students drop out of secondary school, they are ill prepared for tertiary education or for the workforce. Secondary education gives the acquisition of knowledge that increases productivity and improves quality of life. The growth in productivity contributes to new sources of development that promotes the economic growth of a country. Additionally, the chance of juvenile delinquency and teenage pregnancy becomes considerably greater. The data being used in this study was collected by Paulo Cortez and Alice Silva from the University of Minho. The information was collected from two different secondary schools in Portugal. The final dataset had 396 students and was collected in the 2005-2006 school year. Correlation, t-test, and OLS regression were utilized to determine significant predictors of student success in secondary school.

10

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Basic Income and Consumption in the U.S. Economy

VIJAYRAJ P. PATEL and Alyson Ma

As millions struggle to make ends meet, the provision of a Basic Income can not only be critical to survival but can also empower individuals and eventually strengthen the economy. This project studies the practicality, plausibility, and specific impact of a Basic Income scheme on Consumption in the U.S. economy. The project will be using times series data on U.S. Consumption and would be manipulating the income figures in order to arrive at a predicted level of Consumption post the implementation of Basic Income scheme. This is done with the expectation that a Basic Income scheme will positively increase Consumption, aid consumer sentiment and potentially help the overall financial strength of the economy. Essentially, this research will provide crucial insight into understanding the full-scale economic impact of Basic Income schemes in developed economies.

11

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Financial Markets as Predictive Indicators of Economic Cycles

HENRY CHOW and Alyson Ma

Economic cycles are an integral part of every capitalistic economy. This is due to many factors such as supply and demand, availability of capital, and consumer expectations. With financial markets such as the NYSE and the NASDAQ being a bigger and bigger part of the economy, they have become better predictors and indicators of consumer expectations. Using this we can use specific stocks and etfs as indicators for the economic cycle. In combination with traditional variables that define our economic cycles and using the financial markets as a representative of consumer expectations, we can better predict and understand recessions and how they come about.

12

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Key Performance Indicators: Tracking Company Performance

SHEA REBECCA and Alyson Ma

Financial metrics are crucial to determine what companies are doing well, what they are doing poorly, and how they should change. It is an ongoing problem of managers to focus on key metrics in order to track their company performance well and be able to focus on how to improve their bottom line. This paper determines which financial metrics best track the performance of a company by evaluating various metrics which companies can use to track their performance measured against their market capitalization. I expect that an increase in the debt to equity ratio will be associated with an increase in a company's market capitalization. This paper studies ten companies from the biotechnology industry. Utilizing data from the past ten years will allow the study to cover the Great Recession and examine how the financial metrics performed both during the recession and during the recovery of the economy. Knowing which metrics are more telling of a company's performance allows the company to spend more time in the necessary areas, thus saving a great amount of time and resources. Analyzing what constitutes a healthy performing company is telling of past performance, current performance, and where the performance will likely be in the future.

13

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Economic Impact of the U.S. Housing Market on Homelessness

JULIANA LOPEZ and Alyson Ma

In 2018, the homeless population in the United States rose for the second year in a row after a seven-year trend of decline. Previous studies have looked at prior fluctuations in the number of homeless and have pointed towards factors ranging from mental illness to income inequality, but there lacks research as to what provoked this most recent change in US homelessness. The purpose of this study is to investigate the economic factors contributing to this recent setback in the country's progress towards reducing homelessness. To explore the economic determinants of homelessness, a regression analysis will be used with data provided from national surveys, such as reports made by the Department of Housing and Urban Development. The results should compare this recent trend to those fluctuations from the past.

14

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Correlation Between Optimal Capital Structure and Growth Rate within Publicly Traded Companies Within the Technology Sector That Have Emerged Since the Year 2000.

VALENTIN HUERTA and Alyson Ma

Optimal Capital Structure varies from industry to industry. A booming one today is our very own technology sector. Therefore, taking a dive into the tech companies and their financials could shed light on their success and hopefully serve as a type of growth policy for future companies to come. The technology sector has contributed immensely to the structural change of our economy and has been attributed with job growth. Thus, the question is asked if there is a correlation between a firm's optimal capital structure and its growth? Growth, in the economic sense, will be measured by a % change of the number of employees. And it will be regressed against its company's financial data such as a debt, equity, revenue, cash, etc. All data will be taken from the Wharton School of Business Data Base and each company's websites. Erik Stemmerberg and Karl Wennberg's The Role of R&D in New Firm Growth will serve as a backbone to my empirical as well as theoretical framework. Whereas these authors look at R&D and growth, my contribution is from a financial/capital standpoint. Additionally, their study was European and I focus on American companies such as Yelp, PayPal, Facebook, Twitter, etc., My hypothesis that there will be a positive correlation between company growth and a high debt to equity ratio due to the fact that in order to grow more debt must be occurred.

15

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Environmental Externalities of Us

CAMILLE COHAN and Alyson Ma

Over 7 million people die every year, globally, from causes directly related to air pollution; that is roughly 19,200 people per day. A reason for this could be that 9 out of 10 people breathe polluted air daily (World Health Organization). By knowing the extreme effects of pollution, it makes it easier to understand why some children are dying prematurely, and why some nations are not taking measures as drastic as others to reduce their own air pollution. To estimate the impact of population pressure on carbon dioxide emissions, I will be measuring many countries against one another in terms of population size, GDP per capita, whether the country is developed or not, as well as adding variables as I see fit to my regression as research continues.

16

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Financial Inclusion and the Middle-Income Trap

MATTHEW ETZWEILER and Alyson Ma

This paper examines the relationship between income per capita and financial inclusion in countries that are classified by the United Nations Development Program as middle-income. These countries are susceptible to the "Middle-Income Trap", a phenomenon where a country is able to grow to middle-income status, however, is not able to grow to a high-income level. Panel data has been sourced from 156 countries and estimated with a panel fixed effects regression model. It is expected that the results will show a positive correlation between measures for financial inclusion and GNI per capita in middle income countries. The results from this research could suggest that increasing the level of financial inclusion in a middle-income country would allow the country to grow to a high income level, therefore, escaping the "Middle-Income Trap".

17

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Bible Beating Crime: The Effects of Religiosity on Crime

ALLISON THOMPSON and Alyson Ma

The Bible's stance on committing crime is clear. No matter the religious denomination most churches that teach and believe the Bible would agree that committing crime is wrong. It would then stand to reason that communities that are more religious, in that they believe the teachings of the bible, would have less crime. Previous research has shown that religious commitment plays a role in the determination of crime (Ellis, Hartly, Hoskin, and McMurry 2017) and that a negative relationship exists between Christian church membership and crime in both metropolitan and rural areas in the U.S. (Olson 1990). This study aims to show the effects of religiosity on crime rate in cities across the United States. While much research has been done on the factors that affect domestic crime in the U.S, this paper focuses specifically on the relationship between bible-mindedness of cities and the crime rate of those cities. A model possessing both city-specific demographic and socio-economic variables as well as a variable that captures the religiosity of a city will be used to show the full picture of what effects crime rate focusing specifically on the relationship between religion and crime. If legislation and law enforcement were the entire solution to the problem of crime, crime would have ceased to exist by now. Despite all the laws and policies meant to deter criminal behavior, crime still exists. While there may not be one singular solution to eradicate domestic crime completely in the U.S., learning how factors such as religiosity effect crime in U.S. cities is a step towards finding more solutions to the problem of crime.

18

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Urban Resurgence and Gentrification in U.S. Cities

GRADY KOEPELE and Alyson Ma

Urban resurgence and gentrification are phenomena occurring throughout US cities. Many cities previously in states of decline and disrepair have experienced remarkable turnarounds where the standard of living increased dramatically after years of decline. While the increase in the quality of these neighborhoods is a good thing on the surface, it can also pose problems, such as the displacement if low income residents. If it is possible to identify which neighborhoods are likely to experience gentrification, then municipalities will be able to take measures to protect low income residents, without discouraging the economic growth associated with gentrification. Using census data from US cities, an economic model of gentrification can be built, and the model can be used to predict future gentrification and urban resurgence.

19

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Income Inequality and Biodiversity Loss

GREGORY GIBSON and Alyson Ma

Biological diversity levels are crucial to human health and the global economy, yet human activity is driving high rates of biodiversity loss. Past research indicates certain socioeconomic factors may magnify or mitigate the degree to which mankind impacts biodiversity; one of these factors is economic inequality. While increased economic inequality has been directly related to poor public health, it has also been associated with conspicuous consumption practices and increased ecological irresponsibility. This research will test the strength of the relationship between economic inequality and-

Biological diversity levels are crucial to human health and the global economy, yet human activity is driving high rates of biodiversity loss. Past research indicates certain socioeconomic factors may magnify or mitigate the degree to which mankind impacts biodiversity; one of these factors is economic inequality. While increased economic inequality has been directly related to poor public health, it has also been associated with conspicuous consumption practices and increased ecological irresponsibility. This research will test the strength of the relationship between economic inequality and

20

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Children are Children: Applying the Rights Given to Defendants in Juvenile Court to Minors in Removal Proceedings

CAROLINE MCLEOD and Del Dickson

Under Donald Trump's presidency, immigration policies involving children have become more restrictive and publicized. Without the rights given in juvenile court, particularly the right to free counsel for indigent defendants, minors are unlikely to remain in the country. Upon returning to their native country, many immigrant children face severe economic, social, and physical hardships, all of which could be avoided if they remained in the United States. This paper examines the ways in which rights given to defendants in juvenile court can be applied to minors in deportation hearings. It does so by tracing the philosophical history of immigration court, which parallels the philosophical history of juvenile court. In both cases, court philosophies transferred their emphasis from the rights of the state to the rights of the individual, leading to the increased advocacy for or application of due process rights for juveniles. The paper ends by acknowledging the challenges to providing these rights to minors, the most poignant of which is financial cost. Although the cost is high, the moral and societal benefits of providing free counsel to indigent immigrant minors outweigh this financial burden.

21

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Birth of Korean Beauty: A Look into the Use of Marketing Channels for the Creation of K-Beauty

MARIAH SHOTTS and Maria Kniazeva

K-beauty: myth or reality? My project looks into the modern construction and conceptualization of a culturally specific type (Korean) of beauty ideal. I aim to explore how marketing channels contribute to the creation of the construct of Korean Beauty. Termed K-beauty, the trend encompasses beauty perceptions rooted in the skin-care products developed in Korea and based in traditional Asian beauty techniques. The discovery of made-in-Korea products and the creation of the desirable ideal of beauty in the West have been taking place recently. For this project, I will use the ideals of American beauty as a basis for understanding how culturally specific types of beauty are being constructed. Applying qualitative methodology, I will analyze visual data that will be collected in the form of pictures taken at the marketplace, copies of the print ads, and posts on social media. These images and accompanying text will be analyzed in order to conceptualize the marketing contribution into the construction of the newest beauty ideal. The objective of this research is to contribute to theory development in the area of how to conceptualize a culturally specific type of beauty and how it is designed and manufactured. As well, it will provide insight for marketers on how to manipulate these techniques of manufacturing beauty and apply them to different cultures.

22

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Executing Justice: Catholicism and Capital Punishment in the United States

REBECCA LANCASTER and Kate DeConick

In this project, I will examine the evolution of capital punishment in America using the disciplines of history, religious studies, sociology, law, and art. The primary questions driving my project include: How have Christian ideas about sin and redemption influenced American notions of crime and punishment across history? How do Catholics regard the use of capital punishment in our nation today? And, what can contemporary attitudes toward the death penalty teach us about the relative value that American Catholics place on different human beings' lives?

23

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Ecological Effectiveness of Protected Areas in Tarangire-Manyara Ecosystem, northern Tanzania

FRANCESCA SPRUIELL and Zhi-Yong Yin

Protected areas in Tanzania, while plentiful, are not routinely monitored. So, little insight into the areas' successes or failures in the meeting of their goals for animal population maintenance is produced. This study assessed the conservation efforts of protected areas in the Tarangire-Manyara ecosystem through the monitoring of population densities of five species: elephant (*Loxodonta africana*), giraffe (*Giraffa tippelskirchi*), zebra (*Equus quagga*), wildebeest (*Connochaetes*), impala (*Aepyceros melampus*). We drove terrestrial line transects seasonally- dry, long rains, and short rains- from 2011 to 2018 in four conservation areas of varying protection levels: Tarangire National Park and Lake Manyara National Park, Manyara Ranch, and Mto wa Mbu game controlled area. Using statistical software Distance 6.0, we fit detection models to the sightings of each species determining the probability of observation. In addition, we used statistical program R to fit general linear models to test the effects of year and season on density estimates: zebra and wildebeest showing greatest seasonal fluctuations. For most of the species studied, we found highest densities in Tarangire National Park and Manyara Ranch; two areas of higher protection levels and high connectivity. Furthermore, a few species showed decreasing trends in Lake Manyara National Park, an area nearly isolated due to human activities and encroachment and in Mto wa Mbu game controlled area, an area of high human population and few restrictions. These results point to the importance of both the strictness of protection level and connectivity between protected areas in sustaining species populations within this ecosystem.

24

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Impact of Advertising Social Justice Issues on Consumer's Brand Perception

ISABELLE SUAREZ and Aarti Ivanic

Recently, prominent brands have made headlines due to advertisements that take a stand on social justice issues, such as race and gender. These advertisements often spark dialogue as well as mixed reactions among the brand's consumers. This research project explores how these advertisements have affected the consumer's perception of the brand. Companies have an extremely valuable and influential platform with the ability to quickly reach a great number of individuals. -

Advertisements about social justice issues often stimulate broader conversations regarding the issues at hand and draw more attention to the topics addressed in the advertisement. In addition to a literature review, I will conduct a content analysis of data found on Facebook and Twitter and I will utilize Word Clouds and Linguistic Inquiry and Word Count to gauge the general reactions to various advertisements. The results of this study will inform companies interested in releasing such advertisements of the risks and rewards involved in doing so. Further, using the analysis, I will provide some recommendations of best practices to release purposeful and effective social justice advertisements. If this project shows that thoughtfully crafted advertisements impact brand perception, companies should be encouraged to provide messages that will motivate the public to recognize and address the social justice issues of today's world.

25

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

A Literary Inquiry into Class Inequalities and the British Legal System

KATHRYN QUERNER and Jeanie Grant Moore

Literary, legal, and historical texts from the fourteenth to nineteenth centuries have provided a broad basis for me to explore the role of the British legal system in structuring and reinforcing social class inequalities. In my project, I focus particularly on literary presentations of the implications of specific laws and legal proceedings, and how these laws are shaped by, and in turn shape society. From the fourteenth century through the beginning of the Victorian era, I examine pieces of literature from each period in order to determine how these literary works present the social and legal elements of class-related laws. Many authors represent the legal system's ineffectiveness by satirizing laws and legal proceedings, demonstrating appalling conditions and treatment of the poor, present alternative legal solutions to poverty and crime, and challenge common perceptions of the lower classes. After this general, comprehensive analysis of the British legal system's reciprocal exchange with societal norms and perceptions, I focus in more narrowly on the Victorian-era legal system and related literature. An in-depth analysis of works of Dickens, Gaskell, and others has provided me with an understanding of the detrimental effects of the class-related laws of the time. Tracing the development of laws and social perceptions through a literary frame of reference has illuminated the function, effectiveness and development of class-related laws in Britain, and, indirectly, America.

26

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Remembering Francisco Franco's Spain: The War, The State, and The Legacy, 1936-Present

CARMEN HANSON and Clara Oberle

Almost eighty years after the end of the Spanish Civil War, there are still many Spaniards who associate the resulting military dictatorship of Francisco Franco with a period of order and economic prosperity, in contrast to the preceding decades of political turbulence. While there is more widespread consensus among the public and researchers regarding the 1936-1939 war and its horrific violence, the state of government that followed remains much more shrouded in mystery and is thus, more controversial. However, with the increasing number of scholars attempting to reverse the 'collective amnesia' experienced by the Spanish through the recording of personal narratives and survey data, it becomes evident that Franco's regime was indeed severely repressive and did more harm than good for the nation. The presence and activities of Francoist organizations such as the fascist Falange or Catholic Fundamentalist Opus Dei show that repression, control, and uniformity were at the forefront of Franco's government policy. Furthermore, the Francoist focus on extreme nationalism- culturally, linguistically, and politically, repressed Spain's long history of cooperative regionalism. This paper will address the nature of memory by investigating why, despite overwhelming evidence pointing to Franco's repression, Spaniards still remember the 'reign' of 'El Caudillo' fondly.

27

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Inexperienced Imperialists: Colony in the Belgian Mind, 1875-Present

KENDALL HENRY and Michael Gonzalez

An estimated 10 million people died in the Congo Free State under King Leopold II between 1885 and 1908. The brutality attracted international attention. While Leopold was rightfully disowned by the international community, his Belgian populace escaped any kind of blame. Even though the Belgian government controlled the Congo for the majority of its existence, the Belgians have not been viewed as culpable in the events that transpired in the Congo. The traditional narrative denotes Belgians as "reluctant imperialists" who never truly bought into imperialism as a practice. This typical narrative misrepresents the presence that empire had in the lives of everyday Belgians. The Belgian public distrusted empire at first, seeing it as economically frivolous and potentially harmful. Through manipulation, propaganda, and distraction, this attitude shifted towards one of moderation; the average Belgian was aware of empire, but they were not passionate imperialists. Following annexation, the Belgian government worked tirelessly to create fervor for empire but failed due to a lack of Belgian nationalism. However, in trying to achieve this, the Belgian government rewrote their own colonial history and this rewriting led to a "collective amnesia" regarding the atrocities in the Congo that has still not been addressed to this day. Belgians were not simply "reluctant imperialists", as they have been portrayed, but rather had a unique and complicated relationship to empire that evolved through time and resulted in the forgetting of the truth in favor of a more nationalistic narrative.

28

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

A Tale of Two City-States: Comparing Ancient Greek Polis and Renaissance Italian City-States

NICOLAS MOCERI and Michael Gonzalez

Archaic Greece and Renaissance Italy have long been regarded as culturally prolific civilizations. Beyond their organization as city-states, what elements did Archaic Greece and Renaissance Italy have common that may explain the attributed greatness. Historians have frequently discussed aspects individually- what is unique about this paper is that assertions of historians will be compared. This paper will investigate three broad categories: economic organization, political structure, and geopolitical context. Besides looking at historical explanations, it will analyze primary opinions, including hard records as well as thoughts of contemporaries on why their societies were successful. Where possible, it will look to legal and economic documents, attempting to gather solid evidence of similarities. This paper will focus on a few of the many city-states but is not limited to them. For Greece: Athens, Sparta, Corinth, Thebes. For Italy: Milan, Venice, Florence, Bologna. The evidence will show that capitalism, bold militant patriotism, and democratic adherence to the law, explain the greatness of both societies.

29

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Decolonizing Language, Sexuality, and Identity: The Development of Colored Women's Feminism

VICTORIA ZOMALT and Michael Gonzalez

Chicago is one of the most diverse, yet segregated cities in the United States. Using Geographic Information Systems, GIS ArcMap, this project will question, or debate the experience of feminist African American women, nor feminist Chicana woman in the United States, and rarely are the two groups of women compared for parallels on the grounds of intersectional oppression. While there is no existing debate, that does not mean Chicana and black women were not and are not active players at the forefront of American feminism. Gloria Anzaldúa, and bell hooks are two women of color whose literature and academic contributions changed the way in which feminism is seen and studied today. Anzaldúa, and hooks both identify gender as a socially constructed ideal that is used to oppress women as well as men. Their stories, and experiences are reflective of a wider reality for women of color in America. Here feminism will be defined as the advocacy for all women's political, social, and economic equality to their male counterparts. This project is not meant to reverse the hierarchies nor is it meant to advance women at the cost of men. Rather, this project will examine the ways in which Anzaldúa, and hooks both used language and sexuality as a form of resistance against patriarchal oppression within society, within education and within the family. This project will further discuss the evolution of feminism using the historical context from the lives of Anzaldúa and hooks.

make connections between Chicago's racial past and how it affects the present day through creating food deserts.

30

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

From One Side of the Pacific Ocean to the Other: Filipino Immigration to San Diego, 1940-1990

ALEXA DIMACALI and Molly McClain

On July 4, 1946, the Philippines was granted independence from the United States after being under occupation since 1898, the end of the Spanish American War. Despite this change in state and relationship, Filipino immigration continued to the US in even larger numbers. While the destination of where they settled varies, since 1940 many Filipino immigrants settled in San Diego. Many scholars have examined the history of Filipino immigration to the US as a whole, without focusing on a specific region or time period. However, there are cities in the US, such as San Diego, that have a large Filipino population and reflect the many pull factors that attracted Filipinos to leave their homes. Furthermore, 1945 marks the start of the third and largest wave of Filipino immigration as more than 500,000 Filipinos arrived in the country during this period. This wave differed from the previous two because of the number of immigrants and the relationship between the Philippines and the US. To understand the history of Filipino immigration to San Diego, one must take into account the pull factors including: demand for laborers and professionals, the presence of US military bases, the appeal of already established Filipino communities, and the possibility of reconnecting with family members. San Diego is home to the second largest Filipino population in the US with more than 180,000 Filipinos, this reflects the third wave of Filipino immigration, the Filipino presence in San Diego, and the growing history of Filipino communities in the United States.

31

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

On to the Next: The Struggle for the Pacific Theater During World War II, 1941-1945

CHRIS ANDRADA and Michael Gonzalez

The battle for the Pacific during World War II was wrought with violence as the Allied forces hopped from one Japanese-controlled island to the next. From the attack on Pearl Harbor in December 1941 to the dropping of the atomic bombs on mainland Japan in 1945, the Pacific theater was a battle for control as the Allies desperately pushed back against Japanese aggression. Many historians have struggled with the idea that of the islands that were captured not all were necessary for the Allied success. Some historians believe that all islands captured played a vital role, whether in strategic value or in contribution to doctrine for future operations, while others argue that some islands were too costly and insignificant in the push towards Japanese surrender. To understand this debate, one must look at the strategic importance of the islands in question in relation to the Pacific Theater, the time committed to planning each operation, and the cost of human life and military logistics in attaining the island. While this debate covers a variety of islands, this argument will be focused on the islands of Tarawa, Peleliu, and Iwo Jima as islands unnecessary for the success of the Pacific island-hopping campaign due to their insignificant strategic role, time consuming effort to capture, and their bloody cost.

32

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Islam Under Occupation: Nationalism, Resistance and Political Identity in the Northern Caucasus and Iran

ADAM BARTELL and Michael Gonzalez

Scholarship on the Middle East and central Asia has long examined the role of Islam in the development of political institutions and the rise of Islamism - that being activism rooted in the belief that Islam should govern the contours of public and political life, not necessarily the implementation of Sharia as popularized by western media. A common trend in these analyses is the presence or imposition of a foreign ideology that pushes Islamic communities towards political interpretations of Islam - helping foster a sense of nationalism and distance from the outside force. Where emphasis is often placed on twenty-first-century retreats to fundamentalism, there is little scholarship that contrasts the selective approaches to Islamic tradition that manifest in the Northern Caucasus (specifically Chechnya) and the nation of Iran. Both Chechnya and Iran represent significant increases in nationalistic resistance under foreign pressure, and it is through these two distinct socio-political movements that we can examine how occupations (both physical and economic) in Islamic communities are inextricably tied to a population's increased attachment to the political and social orders of Islam.

33

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

"Christ: Life, Death, and Resurrection" an Exhibition on Leave From the British Museum

MOLLY LINDSEY and Derrick Cartwright

Christ: Life, Death, and Resurrection an Exhibition on Leave From the British Museum Research Collaborators: Research Project Abstract I am researching previous utilizations of the Hoehn Family (Founders) Galleries space and providing curation plans and research for a future exhibition: "Christ: Life, Death and Resurrection" on lend from the British Museum. As a liaison between the British Museum and the University of San Diego, I plan to conduct interviews and research addressing the topics of lending, curating, and transporting pieces internationally. Additionally, I will craft a floor plan, write labels, investigate security features for and research on the featured artwork. The exhibition itself focuses on three stages of the life of Christ beginning with his incarnation at the Nativity scene, his death via crucifixion and lastly, his resurrection. "Birth" has a celebratory tone and recalls episodes from the Nativity story. Within this section the viewer will observe and study the ways in which Renaissance artists attempted to convey Christ through sketches and finished works alike. "Death", in contrast to "Birth", embodies suffering. Through drawings and prints scenes of Christ's incarnation are portrayed. Finally, "Resurrection" is shown and Easter is examined through pieces ranging from the 15th to late 16th centuries. Scenes of a biblical nature were popularly depicted by Renaissance artists. While motivations varied, some artists producing works to make the bible more access and others crafting works for places of worship, artists shared a common goal: evoking emotion and making a connection to and with the viewer.

34

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Promise to Make America Great Again: The Power of a Political Narrative

CASSANDRA CYPHERS and Timothy Wyman McCarty

"Make America Great Again" (MAGA) is a slogan, a rallying cry, and a political narrative that has emerged as both rhetorically powerful and personally meaningful for supporters of President Donald Trump since the commencement of his 2016 presidential campaign through today. As a narrative, MAGA tells a story about American history, American values, and the American way of life. However, narrative is more than a story. From a psychological perspective, narrative is essential to human thinking and conceptualization of the world, and in a political context it proffers a particular understood pattern of political reality that is socially constructed and reinforced through shared understandings of causality and interrelationship between background, events, and characters. I will first examine the meaning of MAGA as a political narrative that highlights ideas of American exceptionalism, economic anxiety, and cultural shocks, as well as its function in affecting the political behavior of those who buy into the narrative. I will also address MAGA as a counter-narrative, that is, contrary to or coexistent with a more dominant or mainstream narrative, with an eye toward whether it can be or is viewed as an insurgent narrative by its subscribers and by the public.

35

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

A Model of Climate Change Education at the University Level

KATELIN MAATZ and Zhi-Yong Yin

College students represent the future leaders of a world that will face the impacts of climate change. However, classes on sustainability and climate change typically are not mandatory for university students. Previous studies indicated that there is currently a gap in climate change education at the college and university level. While many colleges offer elements of climate change education in lower level earth science courses, most students are not required to take these courses. This literature review examines perceptions and beliefs of college students and the general public using results of surveys by the Climate Education Partners (CEP) and Jamelske et al. 2015 to inform a proposal for a climate education model at the university level. The proposal is informed by the methods of the CEP in creating the 2050 Report and uses the Tripartite Integration Model of Social Influence (TIMSI) as a theoretical framework for social psychology and behavior in order to implement a structure that is compatible with university students' responses to information. The proposal details a framework for a climate change education model for university students in all steps of planning and implementation. The proposal also includes a pre- and post-education survey as a measurement of effectiveness for the framework of climate change education.

36

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Whom Should We Hire : Do American Applicants Who Are Not Fans of the U.S National Team get hindered?

NOOR AL JASSIM, SAMANTHA O'BRIEN, and Nadav Goldshmeid

Past research (Rivera, 2012) indicated that hiring processes may include cultural matching between candidates and evaluators. Thus, employers consider personal characteristics of candidates beyond their experience and education. The current study aims to explore whether when making hiring decisions, a candidate who is a fan of the U.S. National soccer team is preferred over an identical candidate who is a fan of the Mexican National soccer team, and whether this decision is impacted by the position they are applying to: CIA Analyst (a U.S. National security position) or a U.S. Agency for International Development Researcher (a non-National security position). Contrary to our hypothesis, we found that when applying for the National security position, participants chose an applicant regardless of his fandom; but are more likely to hire an applicant who is a fan of the U.S National team for the international AID position over a supporter of the Mexican National team.

37

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Family and Femininity: an Exploration of the Creative Nonfiction Genre

MACKENZIE MENDEZ and Brad Melekian

Creative nonfiction is a relatively young genre. Unlike other literary genres, the edges of creative nonfiction are not clearly delineated; Lee Gutkind, the founder of the Creative Nonfiction Magazine, defines creative nonfiction as simply "true stories well told." My purpose in undertaking this project is to firm up this definition - what do we mean when we talk about "creative nonfiction"? What are the best practices within the genre? What tensions result from combining the words "creative" and "nonfiction" in a single phrase, and how do we navigate them? My project addresses these questions in two parts: one analytical, and one creative. The analytical piece first considers the origins and development of the genre. It then evaluates the aesthetic and ethical challenges that creative nonfiction writers face, and finally considers how a variety of successful creative nonfiction pieces address these challenges. The conclusions I draw in this essay are ultimately used to generate a working definition of "creative nonfiction," which I use to inform my approach to the creative component of the project. In the creative component, I apply what I learned in the analytical piece to my own writing. Through the subgenres of profile writing and memoir, I explore the changing ideas and ideals of femininity within one family over the course of three generations. I draw on the aesthetic techniques ethical guidelines identified in the analytical piece to guide my writing, seeing what this newly formed definition looks like when put into practice.

38

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Chicano Park and Logan Heights: Gentrification through a Social Justice Lens

VALERIE JAIMES, MICHAELA TYUS, BIANELLE VASQUEZ, JOSHUA WALKER, MENZA BOLAMBA and Alberto Pulido

Ethnic Studies 343: Chicano San Diego is working closely with a new initiative at the University of San Diego entitled "Turning Wheel." Turning Wheel is a mobile classroom project that will work in the community to teach young and old about specific issues impacting on their neighborhood. Our project presents a curriculum based on the community of Logan Heights and issues of gentrification through a social justice perspective.

39

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

What Can Congress Do: The Second Amendment versus the Commerce and Equal Protection Clauses

PITRINA GILGER and Del Dickson

This research project explores the Second Amendment debate through the lens of Congress's power to enact legislation. It evaluates whether or not Congress has power through the Commerce Clause and/or Equal Protection Clause to create gun control legislation, placing these rights and powers in conversation with Second Amendment rights. This paper provides a legal groundwork for gun control, using case briefs, law reviews, and Supreme Court rulings. It analyzes the implications of precedent on the legal response to potential future legislation regarding gun control. With this framework, a response to case history will provide a legal argument for why Congress can, and should, pursue reasonable gun control regulations. My thesis statement is that Congress, by powers enumerated in Article I, Section 8 of the Constitution (the Commerce Clause), and to protect rights laid out to citizens in the Equal Protection Clause of the Fourteenth Amendment, can constitutionally enact federal gun control legislation in America. This project is significant because it provides a specific and actionable legal outline for federal gun control.

40

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Stereotyping Chicana images in film and their impact on the Chicana community

Ivonne Salas and Dr. Alberto Lopez Pulido

The purpose of this research is to bring attention to the fact that Hollywood has drawn their images from the dominant white community in the United States that perpetuate the "American Dream." As Hollywood diversifies, these master narratives and images are being called into question as people of color enter Hollywood and seek accurate representation of their communities that mirror their lives.

41

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Women's Tertiary Education Attainment on Fertility Rates in OECD Nations

URSULA EISINGER and Alyson Ma

A recent concern in OECD countries is fertility rates falling below the replacement rate and how this decrease in the population will affect economic growth in the long run. Previous literature indicates income inequality, women's labor force participation, and urbanization all contribute to the observed decrease in fertility rates. Focusing more directly on women's tertiary education attainment, this issue becomes centered on social changes in gender roles and how this impacts the choice to have children. The regression model proposed suggests women's tertiary education attainment will be negatively associated with fertility rates in these OECD nations. Theoretical analysis of 36 OECD nations from 2007 to 2016 indicates women with tertiary education have fewer children. With these results, policies can be implemented to promote raising fertility rates to the replacement rate to continue the economic success in OECD nations.

42

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

How to Study Creativity

KEELEY COPELAND, CASEY SCHERER, ALEXANDRIA STUBBS, VANESSA MORALES and Veronica Galvan

Creativity can be defined as the increased ability to create a novel and useful product using convergent and divergent thinking. Although highly relevant, creativity can be difficult to objectively measure due to its complex and subjective nature. Because of this, choosing an effective assessment is one of the biggest challenges in creativity studies today. According to current research, there are three main levels at which creativity can be measured: the product, the person, or the process itself. The vast majority of assessments are designed to measure the creativity of the product or the person, but newer methodologies have been created to assess the creative process itself. The purpose of our study is to assess the measurements currently available in order to determine if there is a superior method in evaluating creativity. Future implications of our research include assessing the relationship between creativity and social media use.

43

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Neural Circuitry Behind Simple Decision Making in *Drosophila Melanogaster*

ZANI MOORE, NATALIE NORTH-COLE, and Divya Sitaraman

Decision making processes dictate the lives of every living organism. How organisms evaluate choices and make decisions is poorly understood at the level of single genes, neurons and circuits. By studying these processes in experimental, model systems with reduced complexity such as *Drosophila melanogaster*, we can make critical insights into how the nervous system supports decision making. Here, we used *D. melanogaster* as a model to understand the neural circuit mechanisms underlying decision making by studying the effects of neuronal manipulation on oviposition-site selection behavior in female flies. Using an assay apparatus designed by the Sitaraman lab, we compared oviposition on different substrates and found a strong standing preference for plain agarose over sucrose and yeast. By using reverse genetic techniques we targeted gustatory receptors involved in sugar sensation to further understand the mechanism by which *D. melanogaster* chooses an oviposition site. The aversion to sucrose yeast agarose persists despite specific gustatory knockdowns, suggesting alternative mechanisms, such as olfactory receptors or a different family of gustatory receptors. Additionally, we found that food deprivation may play a role in oviposition behavior, causing females to withhold egg laying when hunger persists. Together our findings allowed us to create a high-throughput protocol for oviposition testing that will be used in future research projects.

44

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Stigma and Eating Disorders: How Perceptions are Impacted by Diet and Diagnosis

Sophie Abber and Rebekah Wanic

Individuals with eating disorders (EDs) are often stigmatized by the public and healthcare professionals, with consequences for treatment and recovery. Prior work exploring this stigma is limited, often including inaccurate or incomplete information, potentially biasing participants and failing to fully evaluate ED stigma. The present set of studies explores ED stigma related to diet and diagnosis while addressing prior shortcomings through longer, more accurate vignettes. Based on prior work, it was hypothesized that eating-disordered individuals eating a low-calorie diet without regard for the health of foods would be perceived less favorably than individuals eating a diet of foods that are considered healthy, but still low-calorie (Study 1). It was also hypothesized that individuals labeled with anorexia nervosa (AN) would be considered to have a more severe disorder than individuals diagnosed with the less familiar other specified feeding or eating disorder (OSFED; Study 2). In both studies, participants read about a college female with symptoms consistent with a restrictive eating disorder before completing questions about their impression of the individual; in Study 1, the vignettes varied the described diet of the individual, and in Study 2, the vignettes varied based on the presentation of a specific diagnosis for the individual. Results will be discussed and their relation to the potential impact of these perceptions on treatment seeking by sufferers and interactions with healthcare providers will be explored.

45

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Object-Based Discriminations Based on Elapsed Time in Rats

LARISSA OLIVAS, DANIELA ABOUCHEDID, RACHEL DAHLE, HILLARY GUERRERO, STEPHANIE ROESSLER, THOMAS WALKER and Jena Hales

It has been well established that the hippocampus is involved in the formation and retrieval of episodic memories, which contain critical features of space and time. The medial entorhinal cortex (MEC) links the hippocampus to other neocortical regions of the brain and is thought to be involved in the processing and learning of spatial information. It has also been suggested that the MEC is involved in hippocampus-dependent temporal processing, although its role remains unclear. Our research investigates the function of the MEC in temporal processing in memory. We have designed a novel time duration object discrimination task to examine rats' ability to learn an object discrimination based on elapsed time. During the task, rats are exposed to a 10-second or 20-second tone and learn to make a decision to displace an object, A or B, depending on the associated delay. Deciding to displace the correct object would demonstrate that rats have learned a specific response based on a certain amount of elapsed time. After rats reach criterion performance of 90% correct object discrimination, they will receive complete bilateral excitotoxic MEC lesions or sham lesions and will be retested on the discrimination task. Results will be discussed in terms of how MEC involvement in learning affects object discriminations based on elapsed time duration.

46

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Human Gut Microbiome and Obesity

MK CLANCY and Andre Der-Avakian

Obesity and the associated comorbidities such as Type 2 diabetes and cancer are a major public health issue. It is generally accepted that the root cause of obesity is a disproportionate amount of caloric intake to energy expenditure. However, recent discoveries have led to an increase in knowledge surrounding the trillions of bacteria living in and on the human body that make up the human microbiome. This has led researchers to shift their focus to examine the obesity epidemic in light of the bacteria that reside in the gut. The gut-brain axis is a plausible mechanism for explaining how the gut microbiome communicates with the brain to impact our physiology and cognition. When certain bacterial populations are too high or low, signals may be sent through the gut-brain axis that affect our feeding behavior. Specifically, skewed levels of the bacteria and phylums H. pylori, Firmicutes and Bacteroidetes may cause weight gain by influencing neurotransmitter signaling and fat storage. Although these studies need further examining through longitudinal studies, they provide valuable insight into how the gut microbiome impacts obesity, thereby providing possible means of therapeutic gut bacteria treatments.

47

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

How to be a Community Advocate and a Scientist

ALI MCLAGAN and Jesse Mills

Science as an institution has a history of exploitation of communities of color. There has been a lot of valuable literature outlining this history and critiquing the power imbalances that result from western understandings of science. These understandings are eurocentric in nature and have given scientists the power to claim inferiority of some people while being backed by their supposed objectivity. Many community knowledge bases have equally valuable knowledge describing our natural world and providing insight on the wellness of its community members. In this study, I will be exploring how some community advocates navigate being institutionally trained scientists in the fields surrounding community wellness while simultaneously being a part of a community that holds equally valuable ideas on wellness. I will be conducting interviews with community advocates from San Diego's East African Immigrant Community to explore how they navigate the power dynamics involved with the scientific institution in which they were trained and the community and which they are a part of and serve. My hope is that these interviews, along with some observation from actively doing work within the community organizations, will allow for some analysis that will give insight into how to engage with both science and community in a way which both recognizes and respects both knowledge sources as valuable to the health of a community.

48

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Reproductive Fitness of Long and Short Sleeping *Drosophila melanogaster*

POMAIKAI MURAKAMI and Divya Sitaraman

Sleep plays an essential role in physical and mental health. Sleep improves memory, increases creativity, and aids in decision making. Physically, sleep is important for maintaining hormonal balance, repairing cells, and ensuring a strong immune system. An insufficient amount of sleep can lead to emotional imbalance, difficulty problem solving, poor decision making, obesity, and increased risk of sickness. Thus, sleep is essential for proper functioning. Sleep researchers have discovered that between species, and even within species, sleep duration is extremely variable. Previous research with *Drosophila melanogaster*, commonly known as fruit flies, has established a genetic component to sleep duration through engineered mutations. Is there an advantage to having a higher or lower sleep need? This study explores whether differences in sleep duration impacts reproductive fitness in *Drosophila melanogaster*. Reproductive fitness is an individual's ability to successfully produce offspring that will survive and pass on its genes. To examine reproductive fitness, male courtship behaviors and female oviposition behaviors were tested in three populations of fruit flies with varying sleep needs: long, short, and normal sleepers. These experiments have identified a specific set of short sleepers named dGRP-38, where the males court significantly more than long and normal sleepers. We will present these ongoing findings and approaches to identify genes critical for the potential link between sleep and reproductive fitness.

49

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Correlation between Personal Creativity and Social Media Use

JULIANA LUCENA, NICOLE ARRA, CHAD MULHALL, ELLE JOHNSONG, and Veronica Galvan

50

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

USD Military-Connected Students' College Experience

ALEXIS NACHT and Veronica Galvan

At the University of San Diego (USD), we have a large military-connected student population that consists of over 750 students. A military-connected student at USD could fall into one of these categories; veteran, ROTC, or other commissioning program member, an active duty member, or a family member/spouse using the GI Bill benefits. Military-connected students differ from typical college students and may face challenges that make it more difficult to graduate. The results from a survey comparing the challenges that military-connected students and non-military connected students face will be discussed in three broad categories that may pose challenges: their transition period, academic experience, and social involvement. In addition, non-military students' perceptions of military students will be collected. I also want to learn which challenges are unique to the USD military population versus which challenges are shared with military-connected students at other universities. After data collection is complete, the survey information will provide crucial information pertaining to the well-being of our military-connected student population which can be used to offer more specific programs to these students and make USD's campus better suited for the military-connected student community.

51

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Overcoming Stereotypes: Perceptions of Single Parents Attending College

SARAH PETROVICH and Stephen Pearlberg

Stereotypical parenting roles in the workplace have been assessed, yet few studies have considered whether such stereotypes exist in higher education. Research has shown that parenting roles can influence whether a person is hired, their level of success at work, and their perceived job commitment. The purpose of current research is to examine whether certain perceptions exist for single parents attending college, and if this is moderated by gender. Based on prior research that shows mothers are perceived as less successful than fathers in the workplace, I hypothesize that female single parents attending college will be perceived as less successful than male single parents attending college. To test this hypothesis, college students read a description of either a single mother or single father attending college, then rate their level of success in college and afterward. I predict male participants will report that female single parents attending college are less successful than male single parents. Female participants will perceive no significant difference in success as a product of gender. The results of this research could have important implications for single parents attending college.

52

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The California Innocence Project

MADISON TUNNEY and Nadav Goldschmied

The California Innocence Project Volunteer Internship offers individuals the opportunity to work with attorney's who are dedicated to getting innocent people out of prison. This non-profit law firm provides a unique experience for interns to work with inmates and their families by responding to letters and phone calls asking for assistance in their case of innocence. Volunteers learn the in-depth intake screening process that is needed to organize the thousands of letters received by the organization every year. Interns carefully go through each document sent to the organization to gain evidence and build a case. This detailed process allows the interns to be the first point of contact for inmates and trains their writing, investigating and legal skills. The purpose of this incredible opportunity is to allow interns to gain legal knowledge, assist the attorneys in building a case and above all to help them free the innocent.

53

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The relationship between self-concept and self-handicapping behaviors among ethnic minority college students

TATIANA ZAMORA and Brandon Carlisle

The purpose of the present study was to examine the relationships between self-concept and self-handicapping among Latino college students. Self-handicapping involves actions or inactions that inhibit performance and provides an individual with an external explanation for potential failure. Two hundred nineteen Latino undergraduate students from a diverse Southern California university completed survey instruments measuring self-handicapping, ethnic identity, imposter feelings, and self-esteem. Academic self-handicapping was positively associated with experiencing imposter feelings and negatively associated with self-esteem and ethnic identity development. These relationships are further examined by exploring gender differences and other participant demographic information such as grade point average. The current research contributes to literature that aims to understand maladaptive cognition and behavior in academic settings as well as how they may relate to the psychological experiences of ethnic minority students. Implications for potential intervention are discussed.

54

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Violence in the National Hockey League (NHL): Do Participants' Online Ratings of Fights Reflect Fandom or Objectivity?

MICHAEL APOSTOL and Nadav Goldschmied

Violence has played an integral role in the NHL since its birth (Bernstein, 2006). We first, in-line with past research (Goldschmied & Espindola, 2013), show based on time analysis that fighting is not the result of frustration but possibly calculated behavior. In addition, the current study examines data from hockey fans who rate NHL fights online (i.e., hockeyfights.com and dropyourgloves.com). We show convergence validity between subjective ratings (e.g., "quality" of fight, who won) and objective measures of violence (e.g., punches thrown, punches landed, blood) such that fans evaluate the fight objectively rather than based on their support preferences. This archival investigation is a first step in an effort to debunk "The Spark Hypothesis" held by many players, which contends that triumphing in a fight, may shift game momentum and propel to victory.

55

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Reimagining Boundaries through the Port of Long Beach

CAITLIN FANNING and Can Bilsel

Industrialized sites largely exist as rigid and immutable spaces, with clearly defined borders. These sites become islands in the middle of vast metropolises, so their processes do not spill over their borders to sully the routine of daily life. Architecture plays a crucial role in the development and maintenance of sites such as these by materializing the concept of industrialized islands, whose cities are safe from harm on far-off shores. I chose to explore the Port of Long Beach, as it is an exemplar of industrialization that strives to remain separated from its city. Each site, such as the port, maintains a relationship with its surrounding city: one of possession and ultimately, one of disregard. The surrounding urban context dominates and creates choke points for the port that may not otherwise exist. I am exploring implemented strategies for seaport expansion in relation to the city to evaluate and propose a diagrammatic series of architectural suggestions for the Port of Long Beach. By investigating and rearranging the dynamic between ports and cities, the city fabric could be stitched together entirely anew. The port presents an opportunity to remove the rigid dichotomy in place through the tools which created the boundaries: namely architecture and planning. This thesis project will consist of a critical site analysis and architectural diagrams. My graphic diagrams aim to propose several solutions to the problematic sites of these industrialized islands.

56

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Johnson Controls Polling Application: A Software Solution for Decision-Making

CAITLIN FANNING, TEDDY HUNG, MIA KIM, NICHOLAS LOYD, RUIYOU MA, and Eric Jiang

Many companies such as Johnson Controls (a multinational provider of commercial building services) are often tasked with making a large range of decisions, from who will present at the next meeting to which product or path would be most suitable for any given project. Detailing a specific question with valid choices can be difficult in a purely oral form, and chain emails between different departments can easily be lost in a busy employee's inbox. Our proposed solution for simplifying the decision-making process is a Web-based polling application. It will allow employees to create polls and vote on topics with a multitude of features and options aimed at streamlining the decision-making process. Through this application, polling administrators will be able to collect topic-specific information from groups of employees efficiently and successfully on a wide array of topics, and succinctly redistribute the results. Our developed application will also give administrators the ability to keep track of decisions made by separate groups, and give them an overview of the various teams they have created. In summary, this polling application aims to simplify the oftentimes complex process of workplace decision-making to increase productivity and significantly improve office workflow.

57

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Web Interface for a Mobile Sketching Application

AVERY VANDENBERG, VINCE POWELL, MAYA MCAULIFFE, MATTHEW STANDLEY and Eric Jiang

SpatialVis is educational application that teaches sketching of 2D and 4D shaped developed by eGrove Education. Students sketch their assignment on an iPad or similar device, and this app automatically grades the sketch and interactively gives hints to students when they are stuck. The project is to create a well designed web-based portal for SpatialVis, to help instructors access and analyze data on the graded sketches from students. Spatial reasoning is a vital skill which extends far beyond the boundaries of engineering alone. By creating an easily navigable and usable web interface for instructors to use, the utility of the SpatialVis app will be greatly enhanced. Ultimately, it will help instructors effectively find where students need help and result in faster and more impactful learning for students.

58

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Next Dimension: Web- Based Visualizations of Cub Unfolding in 3D and 4D

ELIZABETH KRESOCK, DANIELLE VELASQUEZ and Lukasz Pruski

The purpose of this research project is to use the mathematical power of abstraction to create web visualizations of 3-dimensional cube and 4-dimensional hypercube unfolding. The term "unfolding" means representing an n-dimensional object in (n-1)-dimensional space. The ability to create visuals of a 4-dimensional object is important because such an object cannot be seen in the real, 3-dimensional world. A 3D cube unfolds into six squares; a 4D hypercube (tesseract) unfolds into-

eight cubes. In order to solve the problem of hypercube unfolding we first developed a program that visualized the unfolding of a 3-dimensional cube. We designed an unfolding algorithm for the 3D cube, which allowed only the legal moves and produced all possible shapes of the resulting 2D object. We then generalized the 3D algorithm to the "next dimension," 4D, and obtained a program that allows the user to produce and see all legal tesseract unfoldings. The algorithm uses an innovative approach based on the concept of an associated (hyper)cube graph. To develop the fully interactive Web-based application that can be accessed from anywhere in the world we used Javascript, HTML and CSS.

59

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Unfolding Regular Convex Polytopes

ANDREW NELSON, NICHOLAS BAIL and Satyan Devadoss

In the summer of 2017, a group of students working with Professor Satyan L. Devadoss established that in arbitrary dimensions, any cube unfolding guarantees a net. Motivated by them, our work is an investigation into the unfolding of n-dimensional regular polytopes with simplicial facets. By combining combinatorial and geometric properties to create an unfolding algorithm constructed using simplices, we are able to establish a novel proof that any unfolding of an n-simplex yields a guaranteed net. Using our proof for an n-simplex as a starting point, we attempted to find another proof demonstrating that any unfolding of an n-orthoplex also yields a guaranteed net. Although this investigation is still ongoing, we have outlined what seem to be the major hurdles for finding such a proof, namely finding a meaningful way to link the geometry and combinatorics of an n-orthoplex. This link is rather trivial for n-cubes and n-simplices, but the n-orthoplex presents unique challenges. Completing a proof for the n-orthoplex will leave only three cases of 4-dimensional regular convex polytopes out of all regular convex polytopes in infinite dimensions needing demonstration of a guaranteed net.

60

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Commodity Prices as an Indicator of Unemployment

MATTHEW TIZIK alyson ma

The goal of this project is to show if there exists a relationship between commodity prices and the unemployment rate of the United States. As commodity prices rise, we would expect to be in an expansionary business cycle, leading to a lower unemployment rate. Thus, the prices of commodities and unemployment would be negatively correlated. I will be gathering data from the World Bank and Kaggle. If this research shows the commodity prices indicated future unemployment rates, then the Fed and governments should use the pricing of commodities in order to make decisions on policy.

61

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Effect of Polyglutamine Repeat Proteins on Actin Structure in *Drosophila* Photoreceptors

VU ANNIE and Adam Haberman

Huntington's Disease (HD) and Spinocerebellar ataxia type 3 (SCA3) are fatal inherited neurodegenerative diseases characterized by deteriorating physical and mental abilities, caused by a polyglutamine (polyQ) expansion either in the huntingtin (Htt) gene or the ATXN3 gene. The gene causing Huntington's Disease and Spinocerebellar ataxia have a region where three of the bases, CAG, is repeated many times. Little is known about which pathways are affected by the Htt and ATXN3 protein expression, so to gain a better understanding about the pathways and regulation involved, the Htt and ATXN3 genes have been studied in the fruitfly *Drosophila melanogaster*. We have shown that expression of long form HTT and ATXN3 genes disrupt the morphology of neuronal dendrites in various polyglutamine diseases, such as Huntington's disease and SCA3. The defects observed were found to be caused by the disruption of the F-actin cytoskeleton which could be rescued through Rac signaling. Rac is a GTPase known to regulate actin structure by interacting with Formins, like Form3, which are actin nucleating proteins that help promote the development of linear actin filaments. The *Drosophila* is an excellent model for studying this pathway as we can target expression of the genes to the photoreceptors, which are not important for fly development in a laboratory setting. Overall, this research is important because we were able to model actin regulation in dendrites in *Drosophila* photoreceptors as the actin regulation pathway is similar.

62

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Development of Novel Stimuli-Responsive Materials in Organic Chemistry

ANDREW SAIZ, Jake Hughes, and Peter Iovine

Interfaces between chemistry with other disciplines, such as materials, require the creation of structure- function relationships where cycles of make-and-measure uncover new properties and allow researchers to optimize target physical properties. Our research interests are centered in synthetic organic chemistry and mechanochemistry, which is the sub-field of chemistry that explores the force-induced activation of molecules. Our research has a particular focus on making polymers that respond to mechanical force to undergo chemical transformations. Triazolines are formed by the cycloaddition of an azide and a suitable dipolarophile such as maleimide or norbornene under mild conditions and without catalyst. Herein we present the synthesis of main-chain poly(triazoline) linear polymers using bis-maleimide and difunctional azido building blocks. We investigate the poly(triazoline) stimuli-responsive behavior given the propensity of triazolines to ring contract into an aziridine under photochemical and thermal treatment. Various polymer structures and model compounds have been synthesized to study the reactivity of triazoline species. Utilization of the 1,3-dipolar cycloaddition, an example of click chemistry, has been a reliable synthetic technique. Spectroscopic and quantitative data supporting the formation of triazoline units and aziridine units in the backbone of the polymer after photochemical treatment will be presented. The research being conducted has the potential to change scientists' perspectives on materials science, and it stretches the bounds of conventional chemistry.

63

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Synthesis and Evaluation of Peptides as Co-factors for the RNA World Hypothesis

MATTHEW LUCAS, ESTEFANIA MARTINEZ VALDIVIA and Joan G. Schellinger

Life is believed to have developed as the descendant from simple organisms that lived during early Earth, in which ribonucleic acid (RNA) carried genetic information and catalyzed its own replication. This is described by the RNA world hypothesis, which also holds that these organisms evolved to incorporate DNA and protein into their biology, eventually leading to modern life. Core components of this hypothesis are ribozymes, or RNA polymers that can catalyze chemical reactions and propagate genetic information. Further investigation of ribozymes may indicate how RNA world organisms could have existed. Conditions that may allow the prebiotic synthesis of nucleotides also generate amino acids, therefore ribozymes were likely surrounded by amino acids and peptides. This study addresses the question whether the presence of peptides could improve the function of ribozymes in a prebiotically plausible scenario. To test this question, we are collaborating with the lab of Uli Müller (UCSD) where the function of triphosphorylation ribozymes is assessed in the absence and presence of peptides. This work focuses on the synthesis and characterization of sets of peptides containing prebiotically plausible and canonical amino acids. The syntheses were completed using Fmoc/ tBu chemistry and solid phase peptide synthesis techniques, the characterization was performed with reverse-phase high performance liquid chromatography and mass spectrometry (LC-MS). The peptides will be co-incubated with ribozymes to determine the structure-activity relationships between the two. The results of this investigation may introduce insights regarding the chemical interactions between macromolecules and processes that ultimately led to the origins of life.

64

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

A More Environmentally Friendly Polymerization of Positively Charged Monomers Using a Microwave

JONATHAN TRAN, Amanda F. Ennis, Ella M. Giles, Alexandra Jameson, TinTin Luu, Alisson Mae Magsumbol, William Sherwin, Rachel Anderson and Joan Schellinger

Polymers are an integral part of modern life. It is a part of electronics, living beings, clothes, floors, etc.. Both natural and artificial polymers have been created and utilized by modern society. Natural polymers come from nature and are safer for the environment but can also have limited uses. Artificial polymers are more versatile but may last years without decomposing. The goal of this project is to create a semi-artificial polymer that would decompose more readily while still having a wide array of uses. Amino acids, a component of proteins, are one monomer of interest. This project focuses on optimizing the reaction conditions by using monomers that mimic the side chain of the amino acid lysine, N-(3-Aminopropyl) methacrylamide (APMA) and N-[3-(Dimethylamino) propyl] methacrylamide (DMAPMA). The polymerization is a Reversible Addition-Fragmentation Chain Transfer (RAFT) polymerization that is carried out in an aqueous environment under microwave irradiation. Microwaving the reaction allows for more environmentally friendly conditions. After polymerization, some tests are carried out to make sure the polymer still have the key features of a RAFT polymer. The results of this project will allow us to create more environmentally friendly polymers and will allow us to combine our project with another project in our lab. This polymer may have potential uses in medicine, and oil recovery.

65

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Development of Antimicrobial Films: Amphiphilic Starch Graft Polymers for Iodine Delivery and Tissue Engineering

JAMES YOUNG and Pete Iovine

Recent advances in disease prevention have brought a plethora of new products to the biomedical market. However, the majority of this research has been surrounding the use and improvement of antibiotics in clinical settings. Research regarding the natural antimicrobial properties of elemental iodine has been scarce as the same marketable products have been in use for over twenty years. One main goal of our research is to improve the efficacy and duration of antimicrobial films to aid wound care by focusing on elemental iodine as a naturally occurring antimicrobial agent. We are seeking to synthesize a starch graft polymer film capable of delivering iodine in a dose-dependent manner with a sustained release for antiseptic biomedical applications. This is done using Triazabicyclodecene (TBD) to catalyze a novel, single step, transesterification of starch with polycaprolactone to produce a homogenous biodegradable film. Herein we present the optimization of reaction conditions and characterization of our films in addition to the initial release studies of the films when soaked in iodine solution. Furthermore, using the novel starch-TBD reaction conditions, we explore other applications for this transesterification chemistry with starch and poly(methyl acrylate) for tissue engineering purposes.

66

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Generation of CHP - Fluorescent Fusion Proteins for Evaluation of NHE Regulation in Cancer Cells

SARA DESALEGNE and Joseph Provost

The integral membrane protein Sodium Hydrogen Exchanger 1 (NHE1) plays a critical role in pH regulation. NHE1 exchanges an intracellular hydrogen ion for an extracellular sodium ion to prevent cells from becoming too acidic and is therefore a pH regulator essential for a cell's survival. Calcineurin Homologous Protein 1 and 2 (CHP1 and CHP2) are G proteins that are key regulators of NHE, but little is known about what this entails. To better understand NHE1 regulation, I have cloned the gene for a fluorescent protein (either GFP or RFP) into a pAAVS1-CHP plasmid to create a fused protein (either CHP1-RFP or CHP2-GFP). This summer we have learned how to purify and detect plasmid DNA, conduct a restriction digest, and we have been working on restriction enzyme subcloning and Gibson cloning to create these products. By creating the one fused protein to code for two genes, we will have beneficial insight as to CHP's function in a cell while interacting with NHE.

67

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Palmitoylation and Phosphorylation – Impact on NHE1 Transport

CLARE BAKKER, Moriah Hovde, James Foster, Mark Wallert and Joseph Provost

Lung cancer stands as the second most diagnosed, and leading cause of death in the western world. The inherent hypoxic and serum starved environment of metastasizing cancer cells reveals a mechanism for NHE1 to alleviate the low intracellular (pHi) strain from the Warburg effect. If we are able to determine the effects upon the transport due to the regulatory mechanisms of phosphorylation and palmitoylation then a novel way of halting the progression of cancer can be linked to NHE1 modification. Beyond cancer, NHE1 is involved within cell motility, invasion, growth, gene expression, cell anchorage, and proliferation. Connections to multiple diseases, including lung fibrosis have also been linked to NHE1's regulation on cell homeostasis. By researching the post translational modifications of NHE1, it also allows for a better overall understanding of basic protein functioning and modifications upon structure and function.

68

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Lysosome Dysfunction in a Fly Model of Alzheimer's Disease

MACKENZIE MINEHAN, Maya Hall and Adam Haberman

Alzheimer's Disease (AD) is an irreversible cognitive disorder involving memory disruption and is associated with the accumulation of amyloid (β plaques). This disrupts neuronal communication in the central nervous system. Previous studies have shown that amyloid aggregates reduce lysosome function in neurons. This study investigates the impact of β plaque exposure on lysosomal proteolysis in *Drosophila melanogaster* photoreceptors. *Drosophila melanogaster* were induced to express A β in the eye to study the impact of β on the endolysosomal pathway. Lysosome function was analyzed by measuring relative levels of processed Cathepsin via Western Blot. Inactive Cathepsin is cleaved into a smaller, active form in the acidic organelles within the cell. Therefore, an accumulation of the larger form of Cathepsin indicates diminished endosomal trafficking or lysosome maturation. Preliminary results showed that Hk RNAi, which speeds up protein trafficking to the lysosome, partially rescued lysosomal function in AD neurons. We seek to further analyze the lysosomal pathway in this fly model of AD, in hopes that this research gives way to potential drug targets for Alzheimer's Disease.

69

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Generalism and Specialism in Armored Scale Insects

CLARICE MARTINEZ DECASTRO and Geoffrey Morse

Armored scales are a large group of parasitic herbivores of the superfamily Coccoidea in the family Diaspididae. They are common variety garden pests and can be found on most vascular plants. Armored scale insects are traditionally defined as generalists, meaning that they feed on a large variety of plants. As opposed to monophagous organisms, polyphagists can have more flexibility in feeding habits and greater diet breadths. Previously held ideas constrained insect diets to either generalism or specialism, dismissing the notion that diet breadth might be on a spectrum. More and more studies are showing that many species can be considered specialists to some extent. The goal of this research is aimed at elucidating the possibility of limits to armor scale insect generalism. This study observes the relationship between a species of armored scale insect and *Comarostaphylis diversifolia*, a shrub located predominantly on the coastline of Southern California. These shrubs have leaves that are covered in glandular hairs. Census data and DNA systematic data were gathered from various populations of armored scales on *C. diversifolia* around California. This information will provide insight into whether scale population variance is correlated with morphological variation in the glandular hairs.

70

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Characterization of Cultivable Arsenic Resistant Bacteria from Black Mountain Open Space Park

ELENA BETTALE and GABRIELLA DORRELL and Terry Bird

Arsenic is a ubiquitous naturally occurring element. This metalloid is highly toxic and its dispersal in the environment represents an increasing threat to the organisms living in it. Arsenic-resistant bacteria have developed strategies to resist to the stress of this metal. Arsenic-rich soils were detected in San Diego County at the Black Mountain Open Space Park. This study focuses on the characterization of the cultivable bacteria presenting As resistance properties at this site. It is hypothesized that extreme exposure to an arsenic-rich environment has contributed to the evolution of species that possess favorable traits towards As resistance. Our findings show evolutionary diversity among the isolated species. Some species presented the ability to employ As as a source of energy. Screening for As resistance gene *arsC* was performed and phylogenetic comparison of the 16S rRNA tree with the *arsC* gene tree will allow to determine HGT occurrence within the microbial community.

71

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Behavior and Foraging Ecology of Semi-Captive Asian Elephants in Cambodia

CAMILLE MORALES, Megan English, Sydney Williams

Asian elephants (*Elephas maximus*) are an IUCN endangered species. Understanding Asian elephant foraging behavior is critical to mitigating human-elephant conflict, which is intensifying as elephant habitat is degraded and fragmented. There is a large gap in literature regarding their behavior and foraging ecology in Cambodia. This study analyzed the behavior and foraging ecology of semi-captive elephants at the Elephant Valley Project protected forest sanctuary in Mondulokiri, Cambodia. The Interval Sampling method was utilized for two-minute intervals for two hours every morning for a ten day time period in November. The most frequently observed activities of elephants were feeding and preparing food for ingestion. Sixty-six percent of the observed diet was bamboo, which supports pre-existing literature that Asian elephants are predominately grazing herbivores during late wet season. Habitat type and mahout proximity significantly affected elephant activity and elephant activity was statistically correlated to damage to vegetation. There were significant differences between the behaviors of the two focal elephants likely based on their age, personal history, and time spent in the Elephant Valley Project protected forest sanctuary. These results contribute to ongoing research regarding elephant behavior, recovery from captive to natural foraging environments, and implications for mitigating human-elephant conflict.

72

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Bacterial Encystment: Elucidating a Signal Transduction Pathway to Motility in *Rhodospirillum centenum*

JULIA ROCCATO and Terry Bird

Bacteria cover our Earth in abundance, from any environmental niche right to our human body. Of particular importance are bacteria that can form either vegetative cells or hardy, dormant cyst cells depending upon environmental conditions. This study aims to elucidate more of the signal transduction pathway leading to motility in the bacterial species *Rhodospirillum centenum* to better understand the complicated genetic basis of encystment and motility. The current model pathway in *R. centenum* follows a histidine kinase and response regulator pattern, with the phosphorylation of the CtrA protein ultimately promoting motility genes. By studying a related bacterium, *Caulobacter crescentus*, additional homologous proteins involved in this signal transduction pathway can be identified. This study characterizes the homologous protein SciP through a series of gene knock-out and phenotype evaluation experiments. It is likely that SciP regulates the motility pathway, with further studies focusing on its potential interactions with CtrA and position in the signal transduction pathway.

73

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Newly Developed Starch Granules that Sustainably Deliver Iodine and their Efficacy against *E. coli* and *S. aureus*

KATHERINE O'BRIEN, CATHRYN SANDERS, JAKE MICHAELS, and Terry Bird

Biofilm-related infections of wounds continue to be a problem in medicine. Evidence suggests that the protective matrix of bacterial biofilms contributes to delayed healing and resists antibiotic treatment. Iodine is a well established antiseptic, and growing evidence suggests that iodine prevents and kills biofilms. However, iodine can be toxic to mammalian cells at high concentrations. As a result, slow, sustained release of iodine is desirable. To achieve this, amylose has been chemically and physically modified to form an inclusion complex with triiodide, which slows the diffusion of iodine out of the granules. These granules can be inserted into hydrogels and used for clinical applications. Hydrogel supernatant effectively killed 100% of planktonic *E. coli* and *S. aureus* cells at a concentration of 0.08?M. Next, the ability of the hydrogel supernatant to both kill and prevent *E. coli* and *S. aureus* biofilms will be tested.

74

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Lysosome Function in Alzheimer's Disease in Fly Eyes

MIA GODOY, Maya Hall, Mackenzie Minehan, Annie Vu, Adam Haberman

Alzheimer's is one of the most common neurodegenerative diseases, characterized by the presence of amyloid- β , which are created from the amyloid precursor protein (APP). High levels of the naturally occurring amyloid- β clump together, forming a plaque that can disrupt cell function, allowing the disease to progress. We used the fruit fly (*Drosophila melanogaster*) to study the cellular aspects of neurodegenerative diseases, due to the fly's expression of specific genes and quick aging. A fruit fly of two weeks has characteristics of old age, providing neuronal aging and disease conditions needed to simulate Alzheimer's. We analyzed the effect of amyloid- β on lysosomes, one of the structures in the neurons that degrade unwanted protein. The presence of amyloid plaques has been shown to reduce lysosome function in fly eye neurons in our previous experiments. Instead of expressing amyloid beta, we will be expressing APP which simulates the natural disease conditions. We are expecting to see the same kind of degeneration caused by amyloid- β , in APP.

74

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Lysosome Function in Alzheimer's Disease in Fly Eyes

MIA GODOY, Maya Hall, Mackenzie Minehan, Annie Vu, Adam Haberman

Alzheimer's is one of the most common neurodegenerative diseases, characterized by the presence of amyloid- β , which are created from the amyloid precursor protein (APP). High levels of the naturally occurring amyloid- β clump together, forming a plaque that can disrupt cell function, allowing the disease to progress. We used the fruit fly (*Drosophila melanogaster*) to study the cellular aspects of neurodegenerative diseases, due to the fly's expression of specific genes and quick aging. A fruit fly of two weeks has characteristics of old age, providing neuronal aging and disease conditions needed to simulate Alzheimer's. We analyzed the effect of amyloid- β on lysosomes, one of the structures in the neurons that degrade unwanted protein. The presence of amyloid plaques has been shown to reduce lysosome function in fly eye neurons in our previous experiments. Instead of expressing amyloid beta, we will be expressing APP which simulates the natural disease conditions. We are expecting to see the same kind of degeneration caused by amyloid- β , in APP.

75

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Characterizing ATPases and Ion Transport in the Larval Gastric Caeca of the Aedes aegypti Mosquito

HANNAH OTTE and Marjorie Patrick

Larvae of the tropical mosquito *Aedes aegypti*, the yellow fever vector, inhabit freshwater and brackish water. A larval organ, the gastric caeca, has proposed involvement with osmoregulation. Previous studies showed a remodeling of ion transporter proteins, ATPases, in freshwater versus brackish water reared larvae. ATPases, which establish favorable electrochemical gradients, are indicative of cell type. We examined gastric caeca from larvae that underwent an acute salinity transfer, from brackish water to freshwater (instigating osmoregulatory stress) and vice versa (relaxing stress). Findings suggest that the gastric caeca display plasticity when transferred from brackish to freshwater as a more regionalized pattern of ATPases, and thus cell type, were visualized. Additionally, a light-excitable indicator was used to visualize sodium ions in the cells of the gastric caeca. Brackish water derived larvae had a patchy appearance of sodium-loaded cells throughout the gastric caeca. Freshwater larvae had cells with notable sodium amounts at the distal region of the gastric caeca.

76

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Colloidal diffusion and viscoelasticity in blended solutions of supercoiled, right and linear DNA

MEGAN LEE and Rae Robertson-Anderson

DNA, which has been widely studied as a model polymer system, naturally exists in different topological forms including linear, relaxed circular (ring) and supercoiled. While the reptation model can be used to understand molecular transport and interactions in systems of entangled linear polymers, it is far less successful in describing the dynamics of entangled supercoiled or ring polymers. The properties of entangled polymer blends of different topologies and polymer solutions blends as well as the overall solution concentration.

near the critical entanglement concentration are also still poorly understood. Here, we address these problems by creating blended solutions of (1) entangled linear and ring DNA of varying blend ratios and (2) supercoiled and ring DNA of varying overall concentrations from the semidilute to entangled regime. We use particle-tracking methods to measure the diffusion of colloids embedded in these solutions as well as the corresponding linear viscoelastic properties. We reveal previously unobserved and unpredicted dependences of transport and viscoelasticity on the ratio of linear to ring DNA in

77

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The effect of pregnancy on the elasticity of rat tendons

MEGAN LEE and Nicole Danos

Tendons and aponeuroses are elastic collagenous structures that translate muscle fiber contractions into large-scale movements of limbs. Under the right conditions, these elastic tissues can store elastic potential energy that can be used to move the body. This can have significant advantages for an organism because it means that movements can be produced with a smaller input of metabolic energy. However, for the conditions to be right, the stiffness of the elastic tissues need to be tuned to the capacity of muscles to produce force. Too stiff and it becomes difficult for the tendon to extend and store potential energy, increasing the risk for rupture. Too compliant and it becomes difficult for the tendon to return to shorten. We will use tensile tests to study the changes in stiffness of the Achilles tendons and gastrocnemius aponeuroses of pregnant rats in comparison to those of non-pregnant and post-partum rats. This investigation is an attempt to understand why female athletes, such as tennis player Serena Williams, are able to return to their sports after giving birth. One possible contributing factor is the effect of relaxin, a hormone released during pregnancy to allow the pubic symphysis to stretch during childbirth. The gastrocnemius, or calf muscle, was chosen due to the fact that it is an important muscle in rat locomotion and movement. This project will be paired with another that studies the changes in the animals' gait during different stages of its pregnancy. After synthesizing all of the data, this project may help to understand why female athletes are able to perform at the same level of competition, or even better, after giving birth.

78

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Particle-tracking Reveals Heterogeneous Subdiffusion in in vitro Cytoskeleton Composites

SYLAS ANDERSON, Christelle Matsuda and Rae M. Robertson-Anderson

The diffusion of microscopic particles through the cell, important to processes such as transcription, viral infection, transfection and gene delivery, is largely controlled by the complex cytoskeletal network that pervades the cytoplasm. The cytoskeleton is predominantly made up of thin semiflexible actin filaments and thicker, more rigid microtubules, as well as binding proteins that can crosslink each filament. By varying the relative concentrations of actin and microtubules, as well as the degree to which each filament is crosslinked, the cytoskeleton can display a host of different structural and dynamic properties that in turn impact the diffusion of particles through the network. Here we use single particle tracking methods to quantify the mean-squared displacements of microspheres diffusing in custom-designed in vitro composites of actin and microtubules. We show that particles exhibit subdiffusion, with scaling exponents and transport coefficients that decrease as the relative fraction of actin in composites increases. By evaluating the distributions of bead displacements, we also find that composites induce unique non-Gaussian diffusion characteristics and substantial heterogeneities in particle trajectories.

79

Thursday, April 11
Session II; 1:00 - 1:50 pm
UC Forums

Diagnostic Development for Internal Sheath Studies in Electronegative Iodine Plasma

MIGUEL MAGAÑA and Gregory Severn

Electronegative plasmas contain both negative and positive ions in addition to electrons, forming a quasi-neutral plasma. Electronegative plasmas play a significant role in the formation of a star's photosphere and nearly all plasmas used for surface processing ultra large scale integrated circuits (ULSI) are electronegative plasmas. Companies depend on the formation of a sheath at the processed surface to create directed (anisotropic) ion flux needed for etching tiny features into silicon computer chips. Two diagnostic tools, built in the summer of 2018, including a Langmuir probe, and an ion acoustic wave launcher, will be used to assess the degree of plasma electronegativity in iodine plasma. Their fabrication and experimental tests will be discussed with a view to understanding data anticipated for summer 2019 campaign.

80

Thursday, April 11
Session II; 1:00 - 1:50 pm
UC Forums

Electron-Positron Annihilation Freeze-Out in the Early Universe

LUKE THOMAS and Chad Kishimoto

Electron-positron annihilation is the final particle-antiparticle annihilation process in the history of the early universe. It largely occurs after the neutrinos fall out of thermal equilibrium (weak decoupling) and during the Big Bang Nucleosynthesis (BBN) epoch. This annihilation occurs predominantly in local thermal and chemical equilibrium, and its effects can be seen in BBN yields as well as the relativistic degrees of freedom. This work looks to self-consistently calculate annihilation rates to determine when this process falls out of equilibrium, and to estimate the magnitude of this out-of-equilibrium effect. Connecting precision cosmological measurements to tests of beyond standard model physics models requires full consideration of the standard cosmological model, including these oft-overlooked out-of-equilibrium effects.

81

Thursday, April 11
Session II; 1:00 - 1:50 pm
UC Forums

Exploring Mixed Sterile Neutrino Dark Matter Models

ISABELLA IANORA and Chad Kishimoto

Recent X-ray observations of galaxies and galaxy clusters suggest the existence of sterile neutrino dark matter with a mass of 7.1 keV. In this poster, we examine mixed dark matter models, comprised of both sterile neutrinos and cold dark matter, with sterile neutrino parameters consistent with the X-ray observations. We assess the compatibility of these models with observation by calculating cosmological observables resulting from sterile neutrino production mechanisms.

82

Thursday, April 11
Session II; 1:00 - 1:50 pm
UC Forums

Effects of Magnetic Pressure Support on Slim Accretion Disks

FRANK CORRAL and Theodore Dezen

We explored the dynamics and structure of slim accretion disks. Specifically, we studied the effect of magnetic fields on the radial and vertical structure of the flow. We incorporated magnetic pressure via a polytropic formulation as well as by measuring directly from recent three-dimensional shearing box simulations. Qualitatively, we found that both prescriptions led to increased disk vertical scale height, although we expect detailed quantitative differences to have an observable impact on emergent spectra.

83

Thursday, April 11
Session II; 1:00 - 1:50 pm
UC Forums

Effects of Dissipation Physics on Spectra and Structure of Accretion Disks with Non-zero Inner Torque

NOAH EGGER and Theodore Dezen

We present numerical calculations of spectra and vertical structure of accretion disks models appropriate for near-Eddington luminosity black hole x-ray binaries. We found that both stresses at the inner disk and significant dissipation near the photosphere are necessary to produce the observed steep power law state spectra.

84

Thursday, April 11
Session II; 1:00 - 1:50 pm
UC Forums

Measuring the Dispersion Relation of Capillary Fluctuations Using Differential Dynamic Microscopy

JING WANG and Ryan McGorty

With a recently-developed method for measuring capillary wave dynamics at the interface of fluids we examine non-equilibrium interfacial fluctuations. We use a colloidal-polymer mixture that separates into colloid-rich and colloid-poor fluid phases with an ultra-low surface tension and capillary velocities on the order of a micron per second. We use differential dynamic microscopy (DDM) to measure the two-dimensional dispersion relation of capillary waves at spatial frequencies spanning over an order of magnitude. Using temperature-responsive colloidal particles (pNIPAM) to tune the phase diagram we investigate the interfacial fluctuations between non-equilibrium phases.

85

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Effect of Organic Carbon on Particle Size Analysis in Marine Sediments

MICHAEL ARMSTRONG and Eric Cathcart

Particle Size Analyzers (PSAs) are a common method of measuring the grain size distribution in marine sediments. These systems are much faster and more precise than older size distribution methods such as using water density and particle sediment rates and sieving analyses. However, multiple studies have shown that organic carbon can cause error in the laser obscuration resulting in an apparent increase in the percentage of sand content within finer grained marine sediments. This study assesses untreated samples, Loss on Ignition and Hydrogen Peroxide (H₂O₂) pre-treatment techniques to remove organic carbon and compares the results of marine sediments (silty sand with 6% organic carbon) using a Cilas 1190 PSA. The efficiency of these techniques and the effect on the sediment grain size distribution results are also discussed. This study shows that quantitative grain size distribution studies may need to account for the concentrations of organic carbon as a possible interference. Additional research using higher concentrations of organic carbon and pre-treatment with stronger physical and chemical solutions needs to be completed in order to quantify the effect of organic carbon on PSA's.

86

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Microplastic Consumption by an Estuarine Fish in Mission Bay

KAYLA EICHENBERGER, Katie Blaha-Robinson, and Drew Talley

Plastics are highly versatile synthetic polymers that are cheap to produce and convenient for a variety of uses. This synthetic quality makes plastics resistant to degradation, allowing them to become a major pollutant in marine environments. Little is known about the long-term effects of these microplastics on marine organisms. This study aimed to identify and compare the types of plastics that are consumed by the California killifish (*Fundulus parvipinnis*), a common wetland resident fish in southern and Baja California, including Mission Bay. Plastic ingestion was assessed among individuals over a substantial size range (4-56+ mm standard length). Ingestion was also compared between fish in a natural and adjacent created marsh in the bay. I hypothesized that there would be a difference in consumption of plastics between individuals of different size. I also hypothesized that there would be a difference in the quantity and composition of microplastics found between the two marsh habitats. The guts of sixty-two fish were removed and placed in 10% potassium hydroxide solution to digest all organic material. The inorganic microplastics were then identified and quantified under a microscope. There was no significant correlation between plastic ingestion and fish size (ANOVA, $\alpha=0.05$, $p=0.42$). There was a difference in the average amount of plastics consumed per fish between sites ($R^2=1$, $p=0.05$). Identifying and quantifying the microplastics being consumed by these small but important residents of Mission Bay will help to provide insight in the role that plastic waste plays in the ecology of Mission Bay.

87

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Quantifying Sea Level Rise: Impacts on Land Use, Structures and Vegetation in San Diego

VADA THOMAS and Suzanne Walther

Sea level rise caused by climate change poses an increasing threat to humans and natural ecosystems along coastal regions. Rising sea levels lead to the inundation of low-lying regions, impacting human development, coastal ecosystems, and river dynamics in Southern California. Coastal flood damage, base level changes, and other effects of sea level rise have increasing social and economic impacts that must be considered for the future. This study aims to quantify how sea level rise will impact land use, development, human populations, and riparian watershed vegetation shift along the coast of San Diego county. To do so, I first used GIS to map three sea level rise scenarios, based on the IPCC emissions estimates of high, moderate, and low future emission levels. Next, I quantified land use, number of buildings, and population impacted by sea level rise. I also mapped the shift in riparian vegetation within the San Diego River watershed for each scenario. Future sea level rise, for every scenario, will impact low-lying coastal residential and commercial riverine waterfront development. For the high emission scenario, increased sedimentation and the migration of the river base level upstream will alter the distribution of vegetation of the San Diego river watershed.

88

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Variability in sediment texture (grain size) with water depth offshore of San Diego

JORGE SAAVEDRA and Sarah Gray

The aim of this study is to evaluate sediment texture (mean, median grain size, and % clay) off the coast of Southern California in the California Continental Borderland. This region consists of northwest trending basins and ridges which were created in association with the San Andreas fault system which extends offshore of Southern California. Understanding the relationship between sediment texture, water depth, and bottom water dissolved oxygen can offer insight into sedimentation processes and habitat accessibility. As part of a team of researchers, we collected sediments using a multicorer and Van Veen grab deployed from the Scripps Institution of Oceanography's newest research vessel, the Sally Ride, in June of 2018. Samples were collected from various locations offshore of San Diego and depths, between 200m-1000m, along the flanks of basins the California Continental Borderland. Dissolved oxygen concentrations were measured with a DO meter on board. The grain size distribution, mean, median and % clay was determined using a Laser particle Scanner (LPS). Data showed general trend of decreasing mean & median grain size and % clay with depth. Future research will link these parameters to other sediment characteristics such as metal concentrations as well as foraminifera abundance and diversity.

89

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Effect of Marine Snow Particle Distribution on Copepod Behavior

ELENA BECKHAUS and Jennifer Prairie

The biological pump is a process by which particles of high carbon content descend from the surface layers of the ocean to the deep ocean, which is known to be the largest carbon sink on Earth. A major component of the biological pump is marine snow (aggregates of phytoplankton and other organic matter). These marine snow aggregates can often form layers, which have been hypothesized to be hotspots for zooplankton foraging. When the copepods feed on the marine snow aggregates, they cause the aggregates to break up and remain in the surface ocean, which would prevent as much carbon from being exported to the deep. Although it is known that copepods feed on marine snow, no study has looked at how the presence of a marine snow layer could affect copepod foraging behavior. This study examined the effect of marine snow thin layers on copepod swimming properties. Three different treatments were used in the experiment: a tank with a thin marine snow layer, a tank with a homogenous mixture of marine snow particles, and a tank with no marine snow (for the control). Two cameras were set up to obtain 3D images of copepod behavior. Preliminary results have shown that the copepods are more active in the treatment with the homogenous marine snow distribution. This finding indicates that marine snow thin layers may not represent enhanced regions of foraging as previously thought.

90

Thursday, April 11
Session II; 1:00 - 1:50 pm
UC Forums

The effect of distribution on copepod ingestion of marine snow particles.

MAYA YOUNG and Jennifer Prairie

The biological pump is one of the most important pathways within Earth's carbon cycle, by which carbon is transported through biological processes to the deep ocean. Sinking marine snow aggregates are one of the primary contributors to this process, because as these particles sink out of surface waters they carry with them particulate organic carbon. Because marine snow aggregates are a known food source for copepods, it is important to study the way in which these organisms feed in order to gain a better understanding of how they may be affecting the ocean carbon cycle as a whole. We conducted experiments investigating differences in copepod ingestion of marine snow between different feeding environments: one tank was formed with a thin layer of marine snow aggregates, one tank was formed to have a homogenous distribution of marine snow throughout, and the third tank served as a control with no marine snow. Copepods were collected for the experiments off the coast of San Diego, and were then placed in these various feeding environments. Gut pigment analysis was used to estimate ingestion by the copepods for each feeding environment. Preliminary results indicate that a homogenous distribution of marine snow aggregates may result in increased copepod ingestion compared to a layered distribution. These results suggest that in regions where aggregates are distributed homogeneously, less carbon may be exported to the deep ocean through the biological pump, having important potential implications for marine carbon cycling on larger scales.

91

Thursday, April 11
Session II; 1:00 - 1:50 pm
UC Forums

Fundulus parvipinnis In Mission Bay: Understanding Patterns of Fecundity and Reproduction

ILANA RIVERA LARREA and Drew Talley

The California killifish (*Fundulus parvipinnis*) is a ubiquitous species to the Southern California marsh habitats, yet there is limited knowledge of their ecology, specifically their reproductive biology. Due to this limited knowledge, our current understanding into the reproductive habits of *F. parvipinnis* is derived from a few natural history notes and studies of congeners of the species found along the Atlantic coast. This study examined the reproductive patterns of *F. parvipinnis*, and their fecundity, measured in terms of gonadal weight and oocyte density. To assess fecundity, gonadal tissue of female *F. parvipinnis* individuals was extracted, weighed, and oocytes counted. Additionally, the diameter of a subset of oocytes from each individual was measured to determine their stage. Reproductive patterns of *F. parvipinnis* were assessed by measuring and weighing individuals collected in the field and then calculating changes in length/weight ratio through time as an indication of reproductive activity. In doing so, potential correlations between reproduction and lunar cycles were determined. Preliminary results show the average fish was 72 mm (TL) and 6.95 g. Of the females collected and examined, the average ovary wet weight was 0.2 g, with an average of 144 oocytes per ovary, and an average oocyte diameter of 1.85 mm. Furthermore, preliminary analysis suggests that *F. parvipinnis* individuals prepare for spawning during the cycle of the full moon. This was determined by an average decrease of 0.50 g in total weight after the occurrence of the full moon.

92

Thursday, April 11
Session II; 1:00 - 1:50 pm
UC Forums

Interactions Between Coral and Algae (Turf and Crustose Coralline) in the Phoenix Island Protected Area in the Kiribati Island Nation

ANDREW SUSKI and Eric Cathcart

The encroachment of algae, as a result of changing environmental factors such as eutrophication, reduced herbivory, or ocean acidification, on reef ecosystems causes the destruction of coral reefs throughout the oceans. The reef ecosystems in the undeveloped Phoenix Islands Protected Area (PIPA) remain some of the last reef ecosystems that are free from the effects of direct anthropogenic impacts, providing a perfect study site to assess the global impact that anthropogenic influenced changes of environmental factors have on isolated ecosystems. Based on the Resource Availability Hypothesis (RAH), it is hypothesized that the corals that fall under the size class of 0-5cm will best fend off encroaching turf and crustose coralline algae (CCA). Data was collected using a 10-meter transect line and scale bar to document size and interactions for each coral colony along the transect. Perimeter interaction was quantified by dividing coral images into eights and estimating percent interaction of turf algae, CCA, other coral, rubble, and other encrusting. Major and minor axis of the coral were averaged for determining size class. Any observations of more than 50% of the coral perimeter encroached on by algae was deemed to be a losing interaction for the corals. Corals ranging from 10-20cm (small to averaged sized coral) showed the greatest success rate in winning the interaction (71.2%). These results do not support the hypothesis. This is the first survey of this type ever conducted in PIPA, and in order to draw a more direct conclusion about how global climate change destroys isolated reefs, precise measurements of temperature, salinity, pH and nutrients should be taken in a study covering a longer duration. These future studies will be important in more thoroughly assessing the global impact of anthropogenic influenced changing environmental factors on isolated ecosystems

93

Thursday, April 11
Session II; 1:00 - 1:50 pm
UC Forums

Defensive Morphologies of the Barnacle *Chthamalus fissus*

BRENDAN QIU and Nathalie Reys

The predator-prey relationship is an important fuel for evolution. Over time, prey develop adaptations that help protect them from predators and predators develop adaptations and strategies that help them capture prey more efficiently, and this continuous cycle results in the eventual evolution of all species involved. This cycle is evident in the relationship between the predatory snail *Mexacanthina lugubris* and its barnacle prey *Chthamalus fissus*. We examined when *C. fissus* develop adaptive defensive morphologies (narrow operculums) during early juvenile development and the effects of early exposures of their main predator *M. lugubris* on barnacle survival. We performed an intertidal survey of barnacles and snails at Bird Rock, San Diego to determine morphology distributions in the intertidal and see if it has changes since a previous 2004 study. In lab, we cultivated newly settled barnacles for 8 weeks in 4 experimental groups and exposed these groups to snails at different stages in development to see when these defensive morphologies develop. The intertidal surveys showed that general barnacle size at Bird Rock has decreased since the previous 2004 study, with barnacles exhibiting smaller average operculum widths. This indicates a possible increase in defensive morphologies since 2004. The lab results show that barnacles exposed to snails at settlement showed the highest mortality rates compared to other groups that were exposed later. Thus, increasing snail abundances in San Diego in response to increasing sea surface warming due to climate change, may have negative consequences on barnacles, an important foundation species in intertidal habitats.

94

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Border Diplomacy: How Water Unites Cities

MICHAEL BENNETT and Suzanné Walther

The San Diego-Tijuana border region has undergone transformative political, economic, and social integration in the age of globalization. These changes have given rise to regional institutions, governmental partnerships, and other cross-border apparatuses that capitalize on the economic might and political significance of the border while acknowledging its unique challenges. The existence of transboundary issues surrounding water management and protection across this international watershed, particularly within the Tijuana River Estuary, has provided a similar cooperative arena for local and regional actors to establish and maintain mutualistic partnerships. The impetus for regional actors to tackle pragmatic issues that remain a lesser concern for far-off central governments raises key questions about the future of transboundary cooperation. As cities have risen in prominence in their shares of global population, economic power, and social clout, local actors may be uniquely poised to tackle transnational challenges with specialized practical approaches to diplomacy. The opinions and perspectives offered by actors at multiple levels of government suggest that such cooperation has represented an increasingly valuable tool for tackling environmental issues. Much deliberation has occurred in recent years on the viability of city diplomacy or paradiplomatic engagement that exists among municipal-level entities. Despite naysayers, the formal and informal institutional integration that has occurred among public and private entities in the San Diego-Tijuana border region lends both credence to and guidelines for the viability of such political partnerships.

95

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Necessity of CEQA: A Case Study of the Yellow Warbler

HUNTER ROHDE and Eric Cathcart

The yellow warbler (*Dendroica petechia*) is considered a species of special concern by the California Department of Fish and Wildlife (CDFW). They migrate to California in March. Their breeding season starts in April and ends in July, after producing one brood, they leave in October. They nest near streams in cottonwood and willow trees. They play an important role in the ecosystem by contributing to seed dispersal and pest control as most of their diet is insects. Populations of this species are threatened by habitat degradation, predation, and parasitism. The local population in San Diego has recently recovered after measures were taken to eliminate the parasitism of the cowbird species. In 2018, yellow warblers were observed nesting on a property in Chula Vista, California. In order for this property to undergo construction (which included the removal of willow trees), precautions were taken to mitigate impacts on the population. This study reviews the recommendations made by the CDFW and actions required by the California Environmental Quality Act (CEQA) and the National Environmental Protection Act (NEPA) for this specific property to determine if further action should be taken to protect this species of bird. To do so, we have reviewed the requirements of the species, the actions taken to protect the species, the changes the property underwent, and the impact on the species. This study looks at the importance of CEQA and the mitigation measurements that it requires.

96

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Growth and Mortality of Barnacle *Chthalamus fissus* in the Context of Climate Change

ELIZABETH BUSHNELL and Nathalie Reys

This research examines the impact of temperature increase due to anthropogenic climate change on California barnacle species, *Chthalamus fissus*. Given the prominence of the species in southern California, impacts to the species could translate to environmental impacts to intertidal ecosystems. We tested the hypothesis that different temperatures will have an effect on mortality and growth. To evaluate the effect of temperature on *Chthalamus fissus*, we cultivated barnacles in the lab for 8 weeks at average temperatures of 14°C, 22 °C and 28°C. Daily mortality and weekly growth of the barnacles was tracked. Results show increased mortality with elevated temperature. Results showed that at 8 weeks, barnacles kept at 22°C had a significantly larger basal diameter than those kept at 14°C. Our results also suggest that barnacles may have a short-term tolerance to extreme temperatures, as mortality in the 28°C treatment was comparable to the other treatments for the first 3 weeks, but those barnacles had all died by the end of week 6. It appears that barnacles are at increased risk of mortality as sea surface temperatures increase due to global warming.

97

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Heavy Metal Distribution in the Tijuana River Estuary

SIDNEY WILLIAMS and Suzanne Walther

Wetland habitats have a unique combination of characteristics including high nutrients and shallow, brackish water, that allows them to support a number of sensitive organisms. Many estuarine ecosystems are now suffering due to anthropogenic activities and major economic growth. Heavy metals have a number of impacts on estuarine ecosystems including toxicity when found in high enough concentrations. Due to their impact on local species, heavy metal concentrations can provide valuable insight as to the health of the ecosystem. This study aims to determine the abundance and spatial distribution of heavy metals in the Tijuana River Estuary system. We collected sediment samples in the Tijuana River Estuary in July 2017 using a transect method in the south, east, and western areas of the estuary. Additional transects were collected when possible. We collected and analyzed a total of 69 sediment samples using an X-Ray fluorescence (XRF) machine to determine the abundance of six metals known to influence the health of estuarine environments: nickel, arsenic, lead, mercury, copper, and zinc. The metal concentrations were then spatially analyzed in ArcGIS 10.4. Heavy metal particles tend to attach to fine sediment particles, so it was hypothesized that concentrations would be highest in the floodplain where the finest sediment particles settle. The results of the study supported our hypothesis that concentrations would be highest in the floodplain, and several metals were found at levels that exceed EPA regulatory standards.

98

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

What's For Dinner? A Look At Housing Segregation and Food Deserts in Chicago

SHERMEE RANDOLPH and Suzanne Walther

Housing segregation has been an ongoing issue for major cities in the United States. From the 1930s- 1970s, federal and state legislations were put in place to keep blacks and whites in different housing areas, as well as unintegrate neighborhoods where blacks and whites once lived together. These laws created urban slums or ghettos that are still present in big cities today. Many of these slums were, and still are, populated by African American. In these living conditions, it is very easy to discover many forms of environmental racism. One injustice that sticks out is the creation of food deserts. The lack of access to quality and fresh foods can cause various issues for the people that live in those neighborhoods. Using Chicago as a study area, this project looks at the relationship between housing segregation and food deserts through maps created in ArcMap. The objective is to see if there is a correlation between housing segregation and food deserts as well as the affect food deserts have on neighborhoods specifically in education and health. Lastly, this project will present possible solutions to food deserts.

99

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Cubic Slimgate

MAY TABSH, JINGYA XUN, PAYTON STANAWAY, FAYEZ ALQAHTANI, LAFI ALQAHTANI and Venkat Shastri

Slimgate is a portable and compact, single cabinet solution aimed at creating an inexpensive electronic barrier with a contactless payment reader for subway station customers. An initial prototype has been built, and will need to be modified to ensure the gate is portable, versatile, and reliable. Our design will focus on specific modifications to the existing cabinet, revised placement of subassemblies, and an overhaul on the barrier and sensor array to prevent fare evasion.

100

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Solar Turbines Camera Enclosure & Image Stitching

CAMERYN SEYMOUR, Le Hou, Danielle Gadbois, Tony Caseria and Subramanian Shastri

Solar Turbines is an industry leader in gas turbines for power generation. Their customers purchase both enclosed and “open” power generation packages. The enclosed versions of the package require an extra amount of daily surveillance by maintenance personnel in order to ensure the product is working correctly. To maintain the packages, a technician must enter the physical enclosure to perform a routine check-up of the turbine and its subsequent systems. This process is a safety hazard for the worker and is an inefficient use of the worker’s time. Our project aims to find a solution to the maintenance of these enclosures that is both time efficient and cost effective through the application of a camera system and the creation of a virtual environment. In order to eliminate the need for technicians to frequently enter the package, we are creating a camera system will be created to provide a full view of the interior of the package. This camera system will be capable of displaying a fully stitched image of the package as well as map this image onto a 3D model within a virtual environment. We are also developing a program to determine optimal locations for cameras and what views we will be working with.

101

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

FRED's Navigation, Communication, and Power System

JAZMYN GONZALEZ, SCOTT KOLNES, XIAOLONG FU, ZANE DECK, IYAD ALSULAIMAN and Gordon Hoople

Clear Blue Sea (CBS), a non-profit organization, has focused on removing the plastic from the Great Pacific Garbage Patch by designing and piloting a Floating Robot for Eliminating Debris (FRED). The goal for this project is to design and prototype two subsystems; a navigation and communication subsystem and a power subsystem. The navigation and communication subsystem will allow for tracking location, remote control of the vehicle, operational status and environmental conditions monitoring. The power subsystem will use solar power to operate the overall FRED system. Our objective is to integrate these subsystems with the other USD Clear Blue Sea team’s final prototype. This report discusses our objectives, requirements and functions of our subsystems. After extensive research on different -

components, we decided on utilizing high-quality and low-cost autopilot hardware. Rather than build from scratch our subteam switched gears and unanimously decided on using a flight controller and open drone software. This flight controller would then manage all the sensors and motors on the FRED unit itself, as well as allow for communication between the FRED system, a computer, and a handheld controller for manual inputs. For the power subsystem, it consists of 3 main parts: a solar panel, a battery and two motors. Solar panel converts solar energy into electric current, then power the thruster and the motor. Part of the generated electric power is stored into the battery for later use.

102

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Clear Blue Sea Floating Robot for Eliminating Debris

SYDNEY PLATT, CHRISTIANA SALVOSA, ERIN KENDRICK, ELISE RICCIO and Gordon Hoople

Clear Blue Sea has prototyped small-scale versions of their FRED (Floating Robot for Eliminating Debris) Trash Collection Subsystem and Solar Power Subsystem. However, they do not have a full, small-scale prototype of the entire FRED architecture that can be used for demonstration purposes with educational, industrial, and environmental organizations. The primary goal of this project is to design, build and test a small-scale prototype of the FRED architecture (6 feet long) with a focus on the debris collection subsystem for harvesting floating plastics. This design, prototyping, and testing project is aimed at implementing a small FRED model which satisfies and validates system requirements provided by Clear Blue Sea. This will provide the opportunity for Clear Blue Sea to implement a similar design on a full-scaled FRED prototype based on lessons learned from our project. FRED’s main purpose is to collect 70%-80% of the floating trash it encounters, while minimizing harm to ocean life. The goal for this semester was to create a working model remote controlled boat in tandem with a team working on the navigation process and control of the boat. This FRED is to pick up trash via a conveyor belt and be powered by a solar panel system and marine battery. This boat will be tested in Scripps Oceanography testing pool.

103

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Modeling the Storage of Spent Nuclear Fuel

HANS BRODERS, Austin Bakers and Imane Khalil

Current computer models of the dry casks cannot accurately scale to model all spent nuclear fuel rods housed in them. This leads to uncertainty of the integrity of the dry casks and a scalable model is needed to resolve this. Modeling a simplified fuel assembly we hope to be able to capture all the thermo-hydraulic properties of the assemblies housed within a dry cask. With the use of ANSYS Fluent, a CFD program, we hope to be able to improve the capabilities of predicting failures in these dry casks and prevent large scale failures that would lead to the release of nuclear radiation to the public.

104

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

ASME Human Powered Vehicle Challenge

WILLIAM CALDER, NATHAN SMITH, CODY ANDERSON, NATHAN SAUER and Bryan Cornwall

Developing sustainable transportation is one of the greatest challenges of this century. While developed nations suffer from pollution and over-crowded urban transit, developing nations struggle to provide their citizens with cost-effective and non-infrastructure intensive transportation methods. The ASME Human Powered Vehicle Competition provides teams from all over the world an opportunity to design, fabricate and test vehicles that help develop solutions to these issues. The University of San Diego Human Powered Vehicle Team strives to design, innovate, and fabricate a human powered vehicle to the specifications outlined in the ASME-HPVC Rules 2019 in order to balance performance, efficiency, and cost. The vehicle will have the ability to traverse the varied terrain in the endurance competition as well as support speed with high acceleration. The design is based around a Tadpole-style recumbent tricycle with two steered wheels in the front and a single wheel in the rear which will drive the vehicle. Each of the three wheels will have a disc brake system which will allow the vehicle to stop quickly and maneuver precisely through sharp turns and negative slopes. The drivetrain will be manually shifted for different speeds and will accommodate multiple rider sizes by including an adjustable bottom bracket. The safety of the vehicle will be increased with the addition of a rollover protection system with a roll bar and safety harness. The University of San Diego Human Powered Vehicle Team will provide a capable and reliable vehicle with the ability to compete at a high level.

105

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

SAE Baja

BLAKE DUNN, BLAKE DUNKLEBERGER, MOLLY MCGARVEY, CLAYTON MASSIMINO, MAX BEAU, MAYU STAUFFENEGER, DANIEL DIETZ, JEFF KEELER, and Daniel Codd

Each year, the Society of Automotive Engineers (SAE) holds a competition, called Mini Baja, for undergraduate engineering majors from around the world to design, fabricate, and compete with a four-wheel, single driver, all-terrain off-road vehicle. This will be the fourth year that the University of San Diego is represented by a group of senior engineering majors at competition. The competition consists of a variety of dynamic and static events including acceleration, hill climb, maneuverability, suspension, endurance race, and sales presentation. This year's main task in the design process consists of doing a failure analysis of the previous year's car and using it to create a list of corrective improvements upon its design. From failure analysis work done last semester, our team has found that two main areas of improvement are steering angles to remove bump steer and an overall reduction of weight within each subsystem. This information then becomes a guideline by which those in charge of their respective subsystems and their respective subgroups can move forward with in the design process. The members of our Baja SAE team are tasked into 8 interconnected subsystems, each concentrating on improvements that can be made upon last year's design: chassis, rear suspension, front suspension, steering, drivetrain, brakes, electrical, and paneling.

106

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

General Atomics Active Thermal Control System

HAYDEN SPENCER, MEGAN MONIER, KATHERINE KETLINSKI, MATTEO SALOM, CHRISTOPHER BRIDGEMAN, and Shastri Subramanian and James Gilb

General Atomics Aeronautical Systems, Inc. (GA-ASI) is aiming to develop an active thermal control system to replace their current passive thermal control system. Passive thermal control solely relies on the thermodynamics of conduction, convection and radiation to complete the heat transfer process, whereas an active thermal control system must monitor the current state of the system in order to make decisions to control the heat and cooling. This proposed active system will intelligently heat or cool internal electronic systems due to varying thermal requirements onboard an aircraft or inside its electronics pod. The goal of this project is to integrate the information acquired from a sensor network into a control system and drive the on-site heating plates and cooling fans/ducts so that the temperature of the electronics pod is regulated close to a desired temperature set by the user. All subsystems interact across a wireless communication network. For heating, the project focuses on the design of the heating plates, convective cooling system, temperature monitoring, and the communication. On the cooling side, we will develop doors that operate in the ducts already-in-place to control the air-flow into the pod for convective cooling (forced or unforced) of the electronic payload. If temperatures fall below the engineer's specifications then the heating system engages, the duct doors close, and the heaters for the LRU's (Line Replacement Units) are turned on. The heaters will be placed directly onto the LRU's and are insulated by an air gap from a heater cover that we designed. The temperature is monitored with the on-chip temperature sensors. When finished, our design will be used on any pod with any number of LRU's.

107

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Concentric Heat Exchanger- Fluent Model Kit

JACOB THOMAS Evan Berg, Ronald Luong, Joseph Miller, Tatiana Reeves, and Matthew McGarry

Issue: CFD software, particularly ANSYS/Fluent is difficult to use and understand for people learning fluid mechanics and heat transfer. However, ability to use this software can provide fundamental knowledge to students in these disciplines.

Solution: To create tutorials and simulations that will allow students without fluent experience to use fluent to learn CFD and heat transfer fundamentals

108

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

M.O.V.E. Uganda 2019

KYLE MALONEY, MARCUS VAIVAO, RASHED AL-WAHEAB, NASER ALJAIAN, and Bryan Cornwall

M.O.V.E. (Mobility, Opportunity, Versatility, Empowerment) Uganda 2019 is a continuation of the humanitarian engineering project that has had its foundation created by Simple Seat, Better Lives and M.O.V.E Uganda 2018.

M.O.V.E. Uganda 2019 aims to build and improve off previous years' work through the planning, design, analysis, and implementation of a walker/assistive pit latrine device. The objective of this project is to design a relatively low-cost walker that will assist the elderly and those with disabilities in mobility and pit latrine usage. These walkers are to be a product of the Ugandan economy as they are of local Ugandan materials and manufacturing methods. Based off last year's design, the new device will aim to improve in four main areas: transportation, mobility, comfort, and overall quality of the walker. Specifically, our device will incorporate collapsibility for easier transportation and storage, greater rotational ability with the incorporation of swivel wheels, better comfort with adjustability and seat quality, and the device will use stronger and more durable material as well as incorporate additional features such as a storage pouch. A significant area of change in this year's project is the shift in target market. Rather than providing a low-cost, assistive pit latrine walker designed for the low-class demographics in rural areas; M.O.V.E. Uganda 2019 will switch its target market to the middle to upper class demographic of urbanized areas. This switch of target markets will allow the team to upsell the updated design at a relatively low-cost. Revenue from these low costs will then go to subsidize previous years' work for further allocation of their devices in areas of need.

109

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Shape of The Universe

SYDNEY PLATT and MICHAELSWEEN and Gordon Hoople and Diane Hoffoss

One theory on the shape of the universe is that it has a dodecahedral shape. This theory is supported by astronomer Edwin Hubble who discovered that the universe is expanding leading us to believe that the universe may be negatively (hyperbolically) curved. The conclusion that the universe is a Poincare Dodecahedral Sphere comes from the fact that pentagons are capable of completely tilting a hyperbolic space, and a dodecahedron has spherical symmetry. To explore and communicate this fascinating concept through interactive art, we created a large-scale kinetic sculpture which will evoke the sensation of standing at the center of a dodecahedral universe. The sculpture is a 13 foot tall dodecahedron with mirrored internal faces. The interior is illuminated by LED lights to represent stars and galaxies. In the spring semester concepts and ideas of how to make the kinetics of this structure function were brainstormed and developed. In the beginning of the summer Computer Animated Drawings (CAD) of all the parts of this structure were created and Finite Element Analysis (FEA) was conducted on the structure for certain wind conditions and safety factors. Components were fabricated and assembled into the structure. Throughout the summer issues developed within the kinematic systems of the structure, using the engineering process the devices were redesigned and implemented into the sculpture.

110

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Electric GYRO-Plane Pre-Rotator

MICHAEL SWEEN, NICK CARDOZA, CHASEN MARIANO, MAZEN KIKI, AHMAD ALAWAJI and Bryan Cornwall

Pre-rotators have been sought after in the Auto-Gyro community since the birth of auto-rotation. Pre-rotators allow aircraft to take off in much shorter distances than traditional take off methods which commonly involve taxiing up and down the runway until sufficient rotation of the blades occurs. While designs are currently available on the market for pre-rotators they are plagued with issues ranging from lack of usability and insufficient functionality. Our electric pre-rotator utilizes a ball-lock transmission to effectively transmit power from an electric motor. Our design will meet our customer requirements including RPM and usability while provide an innovative solution to the problem which has plagued auto-rotation since its beginning. To reach a required rotor rotation of 220 revolutions per minute gear ratios for the gearbox have been calculated to allow for high and low gears. For usability we are using push buttons to operate the system so users of all ages and physical fitness levels can operate the system.

111

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Solar Turbines - Fuel Control System

ANDRE MALLIE, ARMAND BARAKA, NATCHAYA DEJCHAI, BRIAN LEE and Daniel Codd

Solar Turbines is experiencing oscillations in output power over time as a result of varying fuel flow supplied to their power generation turbines. This issue is reducing the reliability, and accuracy of their gas turbines causing customer dissatisfaction. The team created a model of the control system to simulate on Simulink to test the possibility of integrating a parallel control valve system. The simulated model will then be tested on a scaled benchtop model.

112

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Visualizing Load Paths through 3-D Printed Truss System

NATHAN HOONG and Diana Chen

Statics is an introductory Mechanical Engineering class that all types of engineers are required to take. One difficulty students often face is the inability to visualize how forces are transferred through truss systems. The goal of this project is to create a hands-on system that students can interact with to reinforce their understanding of tension and compression in an affordable manner. This project will build on previous 3-D modeling work to create an entire 3-D printed truss system for in-class demonstrations and may provide a framework for future student projects. The interactive system will demonstrate the effects of a load by using force-dependent, length-adjustable plastic components as bars and foam ear plugs as joints. This poster will discuss the educational benefits of the project for Statics students and will also provide Solidworks parts files for dissemination. This hands-on tool built to enhance comprehension of forces may lead to reduced lab fees in follow-on upper division courses that demonstrate tension and compression by using expensive metals and heavy machinery. This project provides an affordable and easily accessible solution for learning the effects of tension and compression in a truss system, and a live demonstration will be held at the Creative Collaborations Undergraduate Research Conference.

113

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Extracting Banana Fibers: A project in Support of Relief Work in the Dominican Republic

ALEC AGUILERA ZOEY MAU JACK ORR CARLEE SZAREK and Gordon Hoople

The community of El Cercado in the Dominican Republic has approached our team to design a community-run recycling center that will process their excess banana stem and plastics waste into useful and profitable construction material. In this project, we outline the design of a single machine within the recycling process that will extract the high strength fibers from a banana stem for use within a plastic composite material. We outline and justify the necessary requirements for this machine, including the need for a low powered, high efficiency, and simple to operate solution. This project explains the testing we conducted for determining the design that will maximize. Based on the testing, the primary system includes a rotating and motor-driven shaft with radial fins, used to impart a crushing force on the stem to remove the natural material and leave behind the usable fiber. The subsystems include a description and analysis of the motor specifications and power requirements. Additional subsystems include a preliminary frame design as well as safety features. Finally, the project covers full implementation of the fibers into the Dominican Republic's recycling center.

114

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

The Development of an Analysis Tool for the Comparison of the Microcirculation in Rat Spinotrapezius Muscle and Muscle Fascia

AMANDA KENNEDY, JAYDEN YEOMAN, and Frank Jacobitz

The microcirculation comprises the flow of blood through small vessels that supply nutrients to and remove metabolites from surrounding tissues and cells. It is difficult to analyze the microcirculation based on simulation results without a visualization of a variety of flow variables, including pressure, velocity, flow rate, Reynolds number, or Womersley number. In order to overcome this gap in understanding we must be able to map the simulation results onto the network structure in a way where it can be seen and understood visually. The network includes small arterioles, capillaries, and venules with vessel diameters ranging from 8 to 150 μ m. In this study, the network connectivity is obtained from microscopic images of blood vessels and the simulation results are mapped back on the network structure. From the microscopic images, a matrix is created that describes each blood vessel and its location. This matrix is then used to display the solution of flow properties onto the vessel structure, allowing a spatial analysis of the simulation results in addition, for example, to a statistical analysis. When analyzing the color maps of pressure in muscle fascia to skeletal muscle, both show a general trend of high pressure in arterioles, intermediate pressure in capillaries, and low pressure in venules. However, it can be seen from these pressure maps that the muscle fascia has a lower average pressure. The pressure histogram for the muscle fascia is also more skewed to the left while the skeletal muscle histogram demonstrates a Gaussian distribution.

115

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Mary Wollstonecraft's Entwinement of the Law and Literature: Maria, or The Wrongs of Woman and the Creation of a Legal Space for Women

LEILEE GHASSEMI and Susannah Stern

My research project engages with 18th century author Mary Wollstonecraft's work, specifically *Maria, or The Wrongs of Woman*, through a legal lens. Using an interdisciplinary approach, my project discusses the way in which Wollstonecraft draws together the law, which was unavailable to women, and the novel, which was at women's disposal, to create a space for women in legal discourse. My project connects her writings to Caroline Norton, a writer whose work influenced the legal system nearly forty years after Wollstonecraft's death, to analyze and understand how literature enabled women to engage with the law.

116

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Exploring the Role of Gastric Caeca in Osmoregulation of Saltwater Mosquito Larvae: Further Investigation into the Expression, Localization, and Activity of NKA and VHA ATPase in Gastric Caeca of *Aedes taeniorhynchus*

LARISSA EKWEVI and Marjorie Patrick

This study proposes a working model of the osmoregulatory process of saltwater mosquito larvae *Aedes taeniorhynchus* by examining NKA/VHA expression patterns and activity in gastric caeca (GC). The NKA/VHA immunolocalization in gastric caeca indicated that larval *A.taeniorhynchus* exhibits similar regionalization of cell types and localization of NK and VH pumps in both 30% and 150% water salinity. We saw that IT cells localize at the distal tip and the resorbing-secreting cells (SR cells) occupy the proximal region of the GC. The unchanging localization patterns of NKA/VHA in the GC suggested that the proportion of active NKA and VHA is changing in response to osmoregulatory stress. The rate of NKA and VHA activity in gastric caeca from larvae hatched and reared in 30 and 150% saltwater was quantified in an ATPase activity assay that showed changes in the proportion of NKA and VHA with varying salinity. The results of this prove that gastric caeca manage osmotic stress by altering the proportional activity of NKA and VHA.

117

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Observing aggregate formation of phytoplankton cultures at different growth phases using stereoscopic imaging

RILEY HENNING, Kathryn Ghiorso and Jennifer Prairie

"The sinking of marine snow aggregates is one of the primary mechanisms behind the transport of particulate organic carbon from surface waters to the deep ocean. Since aggregation of phytoplankton causes them to sink more quickly, allowing a higher rate of vertical carbon flux, it is important to understand how phytoplankton physiology may affect aggregate formation rate. In particular, previous work has shown that the concentration of transparent exopolymeric particles (TEP), which acts as the glue in aggregate formation, may differ depending on the growth phase of the phytoplankton. We conducted experiments to investigate how aggregation of cultures of the diatom *Thalassiosira weissflogii* varied at different growth phases. Phytoplankton cultures at four different growth phases were rolled in cylindrical tanks and imaged by two cameras illuminated by a laser sheet. This imaging setup allowed for direct 3D observation of the first 8 hours of aggregate formation. Here we will present results of these experiments showing the differences in aggregate formation between growth phases of phytoplankton by tracking particle concentration and size over time. In addition, by tracking individual particles in 3D, we are able to quantify particle collision and adhesion rates and demonstrate how they vary over time and for different particle sizes. Observing aggregate formation on the individual-scale for the first time will further our understanding of how different biological and physical factors affect the carbon cycle on much larger scales. "

118

Thursday, April 11

Session II; 1:00 - 1:50 pm

UC Forums

Determining colocalization of SIKE and WIT3 in mammalian cells

RENEE LAWRENCE and Jessica Bell

Wounds created in the oral cavity heal at a rapid rate and leave minimal to no scarring. During the healing process of these wounds, expression of a gene, wound inducible transcript 3.0 (WIT3), was activated. The mechanism of how WIT3 affects the healing process is not known, but may involve an interaction between WIT3 and cytoskeleton structures. WIT3 shares 51% sequence identity with suppressor of IKK (SIKE). The function of SIKE is also unknown, but this protein was first identified as part of the innate immune response to viral infection. In this response, SIKE was shown to be phosphorylated following a viral infection and form an association with cytoskeletal proteins. As WIT3 shares a high degree of sequence identity and potential interactions with the cytoskeleton, the primary goal of this work was to determine if WIT3 is associated with the same cytoskeletal proteins as SIKE and even directly with SIKE. To assess colocalization, immunofluorescence assays in four cell lines, epithelial ovarian cancer (DOV13), chronic myelogenous leukemia (HAP1), HAP1 cells with SIKE expression removed (SIKE-CR), and HAP1 cells with WIT3 expression removed (WIT-CR), were completed. Data suggest that cross reactivity between the SIKE and WIT3 antibodies may occur. To overcome this issue, introduction of fluorescently tagged SIKE or WIT3 into their respective knockout cell lines is underway to explicitly define SIKE versus WIT3 localization within the cell. These studies are laying the foundation for understanding if SIKE and WIT3 have distinct, overlapping, or complementary functions within the cell.



With Gratitude

Many thanks to faculty across all disciplines for their dedicated mentoring of undergraduate students in research, scholarship and creative works. We would especially like to acknowledge the 2019 recipients of the Glenn D. White Award, Dr. Lukasz Pruski (Department of Mathematics, College of Arts and Sciences), and the Outstanding Undergraduate Research Mentor Award, Dr. Jena Hales (Department of Psychological Sciences, College of Arts and Sciences) and Dr. Ryan McGorty (Department of Physics and Biophysics, College of Arts and Sciences), as well as all the mentors that oversaw the student projects and mentored them through the CCURC submission process.

Special thanks go to Marcy Alyn for the design of the brochure, flyers and signage, Bryan Teague for creating the CCURC abstract function in the mySDMobile app, Steffanie Hoie and Christopher Wray for creating the online abstract portal and mySanDiego page, Allen Wynar at Instructional Media Services for leading the poster design workshops and providing poster printing, Tonis Manriquez, Steven Silvas & volunteers for assistance with the set-up, and the staff at the Office of Undergraduate Research, Maritza Tapia and Jacqueline Puga for their enthusiasm and commitment to putting the entire event together.

Support for Creative Collaborations Undergraduate Research Conference comes from the Office of the Executive Vice President and Provost and from the Dean of the College of Arts and Sciences. The Office of Undergraduate Research was supported in part by a grant from the W.M. Keck Foundation. The research conducted by the students is supported by generous donors and foundations, including the Arnold and Mabel Beckman Foundation (Beckman Scholars Program), the National Science Foundation, and various industry partners.