CREATIVE COLLABORATIONS UNDERGRADUATE RESEARCH CONFERENCE

April 19 2018 • 12 – 2 p.m.

University of San Diego • Hahn University Center www.sandiego.edu/cc-urc

Office of Undergraduate Research

Student-faculty Research Scholarship Creative Works

WELCOME to the 28th 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 role of digitally enhanced Instagram images on the purchasing habits of USD students; the impact of whale watching boats on Humpback whale behavior in Alaska; a comparison of firearms culture, legislation, and violence between the US and Australia; the role of lysosomes in a Drosophila model of Alzheimer's disease and the effects of tax policy on the US economy. Other research being presented at the undergraduate research conference results in a "product." Examples include a wearable airbag to protect bicyclists from collisions, a low cost 3D printed prosthetic hand for amputees, and a hybrid photovoltaic and concentrated solar power systems method for use and storage of energy from sunlight.

Creative Collaborations is an important part of Research Week at USD (April 16-20, 2018), which showcases activities across the university and honors students and faculty members who challenge themselves to extend learning beyond the classroom. 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!

Gail F. Baker, PhD
Vice President and Provost

Elisa Maldonado Greene, PhD
Director

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 1-104)**
Interactive Exhibits & Poster Presentations: Hahn University Center Forums

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

1:10 to 2:00 p.m. **Session Two (Presentations 1-104)**
Interactive Exhibits & Poster Presentations: Hahn University Center Forums

ABTRACT BOOK

In keeping with USD's commitment to sustainability, the 2018 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 16-20, 2018

Creative Collaborations Undergraduate Research Conference is part of USD's 4th Annual Research Week. For more information about offerings, please visit www.sandiego.edu/osp/research-week/index.php.

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.

THE CAJITAS PROJECT

Exploring Identity through Material Expression

Cajitas ("sacred boxes") usually are small wooden boxes filled with significant personal and sacred belongings as well as family "artifacts" carried by Mexican migrants during travels, including movement across real and symbolic borders and borderlands during the mid to late 20th century. These boxes offer an orientation (a sense of place and belonging) as people in motion traverse new and unfamiliar spaces. Always in movement, the boxes contain anything from personal family items (e.g., family pictures, dishes, documents) to religious saints.

The Cajitas Project is a collaboration between Dr. Alberto Pulido (Ethnic Studies), Dr. Louis Komjathy (Religious Studies), and their students. In ETHN 240D: Introduction to Latino and Chicano Studies and THRS 394: Comparative Mysticism, students explore their personal ethno-cultural and spiritual identities, with particular attention to relationality and place, through the creation of their own *cajita*. These projects will be displayed in the University Center/Student Life Pavilion in conjunction with Creative Collaborations. Please join us for presentations and dialogic exchange. All are welcome. 12:15-2pm, Thursday, April 19, 2018.

12:00 - 2:00 p.m., Visual Arts Exhibits

Thursday, April 19
12:00 - 2:00 p.m.
SLP Exhibit Hall

To Bare and Borrow

EMILY MUELLER and John Halaka

To Bare and Burrow, explores notions of vulnerability, as well as the process of questioning what one chooses to reveal as well as conceal to the self and others. This group of images uses surreal spaces and unnatural draping to pull the viewer into this question. The symbol of drapery is present in every painting of this series. It suggests the intimacy of bed sheets and the comfort of being wrapped in blankets. The vastness and impossibility of covering the painted scenes in fabric implies the hand of an outside force, and the presence of God. The fabric is a solid, but malleable substance that represents the anxiety of holding such a material, reflecting the difficulty of processing and understanding the self.
The spaces are largely composed of this fabric. These uncovered areas take up much smaller portions of a painting's composition. In the details that are uncovered, the common place becomes unsettling when paired with the fabric. This tension between elements that are covered and those that are uncovered suggests an attempt to conceal or heal oneself. Drapery becomes a bandage-like substance that swaddles the scenes in mock comfort.

Thursday, April 19
12:00 - 2:00 p.m.
UC First Floor Foyer

Cajitas and Chicana/o/x Studies In The Borderlands

VALERIE JAIMES, VICENTA MARTINEZ GOVEA, BRIANNA WILSON, MAILE BURTECH, ISAAC GUERRA, MARCELINA JIMENEZ-SMITH, ANGELA SAJCHE, DELANEY TAX, CONNOR MACOMBER, MARIA PARRA, CARISSA ESQUEZ, LUIS PEREZ, JOHN PAUL CORREA, EMMANUEL WALKER and Alberto Pulido

Cajitas (sacred box) are usually small wooden boxes filled with significant personal and sacred belongings as well as family "artifacts" carried by Mexican migrants during travels, including movement across real and symbolic borders and borderlands during the mid to late 20th century. These boxes offer an orientation (a sense of place and belonging) as people in motion traverse new and unfamiliar spaces. Always in movement, the boxes contain anything from personal family items (e.g., family pictures, dishes, documents) to religious saints. For our course this semester every student is required to imagine and create a Cajita that spoke about their engagement and understanding of the U.S.-Mexico Borderlands. We will display and comment on our final projects.

Thursday, April 19
12:00 - 2:00 p.m.
Hoehn Print Study Room

Women Who Impress: Women Printmakers from USD's Collection

KATELYN ALLEN and Derrick Cartwright

Motivated by Linda Nochlin's 1971 article--?Why Have There Been No Great Women Artists?"--my research as a Keck Humanities Fellow has addressed the question of where are all of the great women printmakers? Expressed differently, I ask: why are there so many great women printmakers that we have never heard of? My intention for this project has been to highlight some of art history?s greatest printmakers whose work is housed already within USD?s growing collection of prints and drawings. For Creative Collaborations, I would like to put the work of these great women printmakers on display in the Hoehn Print Study Room. For those interested in learning more about USD's growing collection of work by women printmakers, I will offer a sort of "gallery talk" or tour of the works in the collection, during which I will share my research findings to visitors.

Session One: 12:00 - 12:50 p.m., Interactive Exhibits

8
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Torero Racing: Baja Electrical Team

CHANDLER ROGERS, YOUSIF ALBADER and Daniel Codd

For the third year in a row, the University of San Diego will compete in the SAE Mini Baja Collegiate Design Series. Engineering students design, engineer, fabricate, and test a single seat off-road vehicle. Every year across the country SAE hosts 3 competitions with this year's being located in Mechanicsville, Maryland; Pittsburg, Kansas; and Portland, Oregon. Our team will be participating in the Portland, Oregon event, from May 30th to June 2nd. For each venue 100 collegiate teams from around the world compete in various events and are judged and scored on various design specifications. Some of the competitive events include an endurance race, hill climb, acceleration test, and braking test. In 2016 and 2017, the University of San Diego placed 30th and 44th overall, respectively. In order to complete this project the team will use computer aided design software, finite element analysis, and manufacturing processes. Our team has organized into 3 subsystems; front suspension, rear suspension, and drivetrain. The team as a whole will work on the chassis design which means that each of the subsystems will be intertwined with that of the chassis. We plan to use the same chassis design from last year's team with minor changes in order to improve performance and reduce weight. The 3 subsystems will each analyze their respective systems from last year's car and look for ways to improve upon previous designs and reduce weight of the vehicle.

60
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

3D Printed Prosthetic Hand

SARAH GRAY, Gaby Mendoza, Khaled Alkhaled, Jack Hance, Rachel Morrison and Daniel Codd

Due to thousands of amputations happening in the United States every year, along with congenital patient populations, there is an increased need for a functional, accessible, and affordable prosthetic. The goal of this project is to create a low cost functional prosthetic hand to be attached at the mid forearm. This prosthetic hand will be 3D printed and use electrical components such as a battery, motors, and microcontrollers, EMG and force sensors to control its functionality. The design has been broken into five main subsystems: thumb, finger, housing, motors, and electronics. Each of these components will work separately yet cohesively to serve and complete specific functions for the hand to meet the desired goals. The goals for this hand will be to mimic a human hand as much as possible aesthetically and with movement all while completing a few basic functions such as picking up a 16 oz water bottle and lifting a bag..

62
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Supremacy of Auditory Versus Visual Input in Empathic Arousal

SEPIDEH AGAHI and Rebekah Wanic

Abstract Empathy is important in human social interactions, facilitating altruism and survival and its lack has been implicated in mental disorders such as psychopathy, autism, and personality disorders. Experiencing empathy is connected in part to the activity of aMCC-dACC-SMS, bilateral AI and mirror neurons, which can cause virtual pain sensations when exposed to an individual in pain. Neurocognitive and social-cognitive evidence supports the role of both auditory and visual stimuli in evocation of empathy, but no research has explored the relative effectiveness of each. The present study compared- auditory and visual presentation in the evocation of empathy, with the expectation that auditory information would evoke higher somatic empathy compared to visual. College students (N = 125) were exposed to a 40-second audio, video, or audio-video file presenting an elderly man suffering from a painful kidney stone. Participants indicated his perceived pain and level of danger and whether they experienced any physical sensations. The results were consistent with hypothesis for both pain and danger. Future research directions are discussed. Key Words: Empathy, Auditory Sensory System, Visual System Physical Sensation, Pain Perception, vicarious pain, Social Cognition of Empathy, and Neurocognition of somatic empathy

67
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Designing a 3-D Printed, Handheld, Flexible Polyhedron

CHRISTIANA SALVOSA, Gordon Hoople and Satyan Devadoss

Until very recently mathematicians believed all polyhedra were rigid. Consider the familiar polyhedron of a cube - even if the sides are all connected with flexible hinges it remains rigid. Remarkably, there exist a class of polyhedra that are constructed in a similar manner to this cube that do flex. In this work, we have explored moving from the theoretical mathematical space of flexible polyhedra to an engineered prototype of a hand-held, flexible polyhedron. At first inspection, moving from the theoretical flexible polyhedron to a physical prototype seemed a trivial task. In fact, we encountered multiple design challenges related to size, tolerancing, material selection, and flexibility. In the end, we have created a 3-D printed polyhedron that demonstrates this unique mathematical behavior. This poster discusses the mathematical relevance, engineering design process, and the discoveries we made at the intersections of engineering and math.

90
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Why Can't You Customize Your HotKeys?

CYRO KAMOGAWA, SEAN MULVEY, PAYTON DWIGHT, AVERY VANDENBERG and Saturnino Garcia

Keyboard shortcuts, commonly referred to as ?hotkeys?, are introduced relatively early on when using computers. Combinations like ?Ctrl + C? for copying and ?Ctrl + V? for pasting. However, most are only taught the simplest forms of hotkeys and never explore what is already readily available. A primary reason is because these hotkeys are sometimes complicated and require more effort than they are worth. Examples include: going back to a previous web page using ?Alt + Left Arrow?, ?Ctrl + L? allows you to immediately highlight the address bar, and ?Ctrl + Tab? will swap between your browser?s tabs. Go ahead try some! Google, Mozilla, Safari, and yes even Internet Explorer (Edge now!) have extensive documents on their hotkeys, but no one wants to memorize them. HotKey wants to simplify your hotkeys to be customizable and simplistic. The problem with customizing keyboard shortcuts is that a lot of them are already taken. HotKey?s solution is to swap your ?mode?. Typically you have the predefined hotkeys, but when you swap to ?HotKey Mode? you are given free reign over what your hotkeys do. The goal of HotKey is to make your keyboard as customizable as possible. One button to open your three most visited websites, one to open the page you just accidentally closed, and one to automatically change the screen zoom. One button, for whatever you need!

91
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Travel.ly

ALEXANDRA LEONIDOVA and Saturnino Garcia

Trave.ly is a traveling assistant application. This app helps with travel planning. Travel and tourism accounted for 7.61 trillion dollars to the global economy in 2016 alone. Among the global travelers in the travel and tourism market, 69% planned to try something new in 2016 (TripBarometer). Tourists are looking for exciting new adventures in places they know little about. There is no doubt that costs play an important role in determining where to book your next journey. However, there are a lack of fast and easy solutions to find out if a trip is affordable. Trave.ly provides the solution by helping travelers quickly estimate the cost of their next great escape. Using Trave.ly?s mobile app, travelers can easily determine whether a trip is within their price range with only a few taps of the screen. Trave.ly provides a user report that breaks down estimated cost per category (transportation, food, leisure, etc.), provides general information on the travel destination, and suggests travel activities. Advanced functionality also allows users to fine tune their trip details to help them reach a more accurate cost estimate. Thanks to Trave.ly, long gone are the days of wasting time scouring the web to find out if a trip is affordable.

92
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Flipped Class Software Platform

ERICK PEREZ, TAYLOR COURY, JACK MILLER, SETH NAKANISHI and Saturnino Garcia

A new teaching style that has recently grown in popularity is a flipped classroom where instruction is moved to outside where students can work through the lecture at their own pace, leaving classroom instruction time open to questions, collaborative work, and further applications of the course material. Using a web development framework, we will help ease this transition for both teachers and students by shifting the traditional classroom?s ?sage on stage? dynamic to the ?guide on the side?. We will assist in this change in dynamic by creating a web application that provides opportunity for learning through activity and educational technology, all with the end goal of influencing the student-teacher learning environment. Our developed software will be a platform for students, teachers, and potentially parents as well. Where software used in a flipped classroom setting is usually found separately on multiple platforms, we will provide a single location to serve as the basis for the blended learning environment we wish to cultivate. By developing tools for users such as: video creation, video hosting, video interaction, and learning management, we believe we can integrate technology into the learning process to ease the hassle of running a flipped classroom, therefore benefiting students and teachers in this new learning/teaching style.

102
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Irving Gill and the Old Scripps Building: How Progressivism Encouraged a ShiftTowards Modernism in Gill's Architectural Career

JANA HUNTER and Juliana Maxim

The exploration of Irving J. Gill's architectural "style" is achieved through an intensive case study of Gill's architectural background and a primary focus on his design of the Scripps Institute of Oceanography, 1910. Experts have not decided on what architectural style/movement Gill's prime work belongs to. Through my research-

I mapped Gill's stylistic evolution to better understand what led him to create most of his works and to determine what his canonical style actually is. The results being a model extrapolated from archival documents and blueprints, and digitized architectural drawings of the Scripps Institute of Oceanography.

Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

ASME Human Powered Vehicle Challenge

CONNOR MALIESKY, MARCO PANTOJA, JACKSON FELD, CALEB KRAMER, JEFFREY LAROCCO and Bryan Cornwall

With the onset of global warming and the need for alternative transportation methods that do not rely on fossil fuels, the American Society of Mechanical Engineers began the Human Powered Vehicle Challenge, which encourages students to seek innovation in human powered transportation. For our senior design project, our team built a vehicle capable of competing in the race. The goal of the competition is for engineering students to demonstrate their knowledge and refine their engineering skills through competing with other schools to have the best human powered vehicle and the most innovative design while remaining practical. Our design is centered around a recumbent style bicycle with a stylized fairing to reduce drag. The frame follows the popular "ground hugger" design with an optimized seat angle of 105o for maximum transition of rider movement to mechanical energy. A solid roll-bar and seat with harness protects the rider from serious injury in the event of a crash. Headlights, taillights, and turn signals provide the rider with the means to communicate with others of the road or path. The HPV is able to effectively navigate the obstacles commonly encountered by a rider on the average commute, handle transportation of small loads, and provide a comfortable ride for the user.

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

1
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Does Trump's Tax Triumph: an Analysis of the Effects of the Tax Cuts and Jobs Act

MITCHELL HANSON and Sarah Lyon

This presentation will be an analysis of the new tax plan recently passed in Washington: The Tax Cuts and Jobs Act. Called by many the Trump Tax Plan, these new taxation laws are the first complete tax reform in roughly 30 years. An overhaul of this size will have significant and varying effects on different groups of Americans; some affected more than others. My presentation will take a brief look at the history of tax reform in the United States and the differing political ideologies surrounding taxes in general. I then intend to specifically focus on the effects that this new plan will have on specific groups of citizens including students, homeowners, and the retired. I plan to look at the old tax laws and compare them to the new tax laws, analyzing the differences and concluding whether this new reform is as beneficial as the Republican controlled House and Senate claim it to be.

2
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Role of the medial entorhinal cortex in object sequence learning in rats

EDWARD FISHER, AIMEE STEEN, LINDA LEIJA and Jena Hales

The medial temporal lobes (MTL) are critical for the formation and retrieval of episodic memories, which have both spatial and temporal components. The hippocampus and medial entorhinal cortex, two structures within the MTL, have well characterized spatial processing abilities, with place cells and grid cells, and are both involved in spatial memory (O'Keefe and Dostrovsky, 1971; Hafting et al., 2005; Steffenach, et al. 2005; Hales et al. 2014). The hippocampus has also shown evidence of temporal processing, containing "time cells" (MacDonald, 2011), and is involved in temporal aspects of memory (Fortin, 2002). Unlike the well studied spatial contributions made by the MEC, the temporal functions of this structure are poorly understood. Recent work suggests involvement of the MEC in temporal organization of hippocampal firing patterns, indicating a role for the MEC in hippocampus-dependent temporal processing (Schlesinger et al., 2015). However, the precise role of the MEC in temporal aspects of memory is unclear. In order to examine this question, we developed a temporal object sequence learning task. Rats were presented with a sequence of objects. After a brief delay, rats were given a sequential order probe to test memory for which of two objects was presented earlier in the sequence, followed by an item memory probe to test object recognition memory. Preliminary results from this pilot task contribute to previous data examining temporal memory contributions of the medial entorhinal cortex.

3
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Strengthening (Not Weakening) Polymeric Materials via Mechanical Force

ANDY SAIZ and Peter Iovine

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 to aziridines under photochemical and thermal treatment. Spectroscopic data supporting the formation of aziridine units in the backbone of the polymer after photochemical or thermal treatment will be presented.

4
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Function of the lipid metabolic enzyme alkylglycerol monooxygenase (AGMO) in the nematode C. elegans.

ADDISON RODGERS and Curtis Loer

Alkylglycerol monooxygenase (AGMO) is the only enzyme able to cleave the ether bond of ether lipids, which are present in cell membranes and necessary for the structural integrity of those cells. Ether lipids in humans include plasmogens which are involved in protecting the eye from cataract formation and in the development of the brain and sperm. AGMO is part of a reaction that cleaves the ether bond of phospholipids, resulting in the production of fatty aldehydes which can be converted to fatty acids. The ability of AGMO to hydrolyze ether bonds and therefore breakdown ether lipids makes it an interesting enzyme for further study. We are studying AGMO function in the nematode C. elegans, including which amino acids in the protein are essential to the enzyme's function, and whether AGMO function is primarily catabolic (for breaking down ether lipid molecules) or anabolic (for building new lipids derived from those products). In C. elegans, agmo-1 mutants lacking AGMO protein function have a fragile cuticle and increased chemical sensitivity. Cuticle fragility in worms can be tested with a bleach solution; agmo-1 mutant worms rupture more quickly in bleach than normal, wildtype worms. So far, we have collected baseline data for the phenotype - wild-type or fragile cuticle (bleach-hypersensitive) - of worms with agmo-1 mutations, or mutations in other ether lipid synthesis pathway genes. Combining lipid synthesis mutations together and testing whether the bleach-sensitive phenotype is heightened, lowered, or remains the same will help indicate if AGMO's function is catabolic or anabolic.

5
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Characterizing Liquid-Liquid Phase Separation

CAROLINE RIEDSTRA and Ryan McGorty

The process of liquid-liquid phase separation (LLPS) has been explored in polymer physics and colloidal science, and recently, researchers have studied this process to better understand intracellular organization. LLPS is the process by which a liquid mixture will separate into two fluid phases. Currently, many research labs are working to understand how and why certain cellular organelles are liquid bodies that are the result of phase separation. Investigations of how the cell uses phase separation to organize and compartmentalize has demonstrated a wealth of biological implications. We experimentally study the process of de-mixing in a model system in order to define better ways of analyzing and characterizing the physical properties of the two fluid phases. Our experiments utilize the following optical methods: phase contrast microscopy for video analysis of droplets merging to determine capillary velocity; fluorescence recovery after photo-bleaching (FRAP) to determine the diffusion coefficient; particle tracking to determine viscosity; and confocal z-scans to determine the density difference between two phases. By assessing methods to study the physical features of these droplets, like surface tension, viscosity and density, optimal methods can be applied to study membrane-less organelles assembled in cells via LLPS.

6
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Location, Location, Location: Analyzing the Impact of Pitch Location on Run Prevention in Major League Baseball

NOAH HILTON and Andrew Narwold

In baseball, runs are considered the currency of the game. As a result, the foremost value of pitchers to their respective teams comes in the form of run prevention and keeping the opposing offense off the scoreboard as much as possible. While Major League Baseball has taken steps to better evaluate the run prevention skills of pitchers independent of their defensive teammates, new radar technology has made possible the research of specific skills related to a pitcher's repertoire of offerings. This research project examines the relationship between various pitch characteristics - velocity, movement, and location - and the primary run-prevention objective of Major League Baseball pitchers. Evidence from the research suggests that characteristics related to velocity and control provide the greatest independent impacts on run prevention at the major league level. The research then examines the relationship between these pitch characteristics and pitcher salaries in Major League Baseball to determine the efficiency of front office spending on big league arms, finding that baseball executives significantly undervalue meaningful pitch characteristics relative to their respective on-field impacts. In both analyses, it is determined that a new statistic that focuses specifically on pitch command aids not only run prevention efforts on the field by incentivizing productive pitcher behavior, but also assists in optimizing the financial commitments made by MLB organizations to big league pitchers off the field as well.

7
Thursday, April 19
Session One; 12:00 - 12:50 p.m. UC Forums

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

ABBY SCHRADER, MICHAEL KNEIFEL, and Mary Brinson

Instagram is filled with unrealistic, digitally enhanced images of women. These unrealistic images contribute to the online presence of the ?Thin Ideal? or the presentation of extremely thin women as the ultimate identifier of female beauty. Since college students consume social media at such a high rate, businesses have taken to Instagram to sell directly to this demographic. Historically, advertising techniques that use unrealistic models with unachievable body types tend to sell more products. The current study seeks to better understand whether the looks/body of social media influencers have an effect on people?s likelihood to purchase certain products. Our study will be conducted in two parts: using survey questions, and an online experimental design utilizing Qualtrics software. Students will first fill out our survey, then they will be randomly assigned to one of three conditions: advertisements featuring a disclaimer for digitally altered images, advertisements without a disclaimer, and advertisements that aren?t digitally altered featuring influencers with more average body types. A post test will measure the ad effectiveness of the images on attitudes and their intent to purchase. Undergraduate women at the University of San Diego will complete the online survey with the embedded experiment in April 2018. SPSS software will be used to run ANOVA?s in order to test our hypotheses. We expect to find that people exposed to unrealistic, digitally altered bodies are more likely to be influenced than those exposed to the same ads with a disclaimer.

9
Thursday, April 19
Session One; 12:00 - 12:50 p.m. UC Forums

The Effectiveness of Conservation Education Programs as a Part of Wildlife Conservation Education

ALLISON LYNCH and Michel Boudrias

The objective of this research proposal was to provide methods for evaluation and improvement of animal presentations within zoos or wildlife programs to enhance the conservation education experience. This study looked at previously published papers on wildlife conservation education research, particularly focusing on the methods of evaluations for these programs. These education programs included programs such as zoo summer camps or animal presentations at zoo exhibits. The methods for evaluating the effectiveness of these programs in educating the public about wildlife and conservation were compiled to propose an effective evaluation plan for these programs as well as to determine strategies for improvement. Past studies have conducted manual surveys completed by participants in the various conservation education programs. These surveys were distributed before the program and after the program to determine any differences in the participants' knowledge or motivation towards conservation. In general, the differences in the results of the surveys showed these conservation education programs were enhancing the participants' knowledge and passion for wildlife conservation. It is important to evaluate and improve these conservation education programs so that the general public can stay informed on conservation issues as well as improve their attitudes and behaviors towards wildlife conservation.

10
Thursday, April 19
Session One; 12:00 - 12:50 p.m. UC Forums

Catch to Plate - Verification and Traceability of Seafood Products

DAVIS PORTER and Eric Cathcart

Catch to Plate - Verification and Traceability of Seafood Products Fisheries use multiple methods to increase the volume of their catch. Some methods are more detrimental to the environment and have been shown to be less sustainable (e.g. bottom trawling and deep sea netting practices). Currently, multiple companies have implemented software to track the origin of catch and its movement through the consumer market (e.g. LegitFish) using a barcode system (QR code). However, information on the method of catch is currently not available to the consumer. This study researches possible methods in which companies may track their method of catch by QR codes which can be scanned by smart phones with a downloadable application, LegitFish. Knowing the method of catch in addition to the origin of the catch will allow the consumer to know if the product was caught in a sustainable manner and to make an educated decision towards the purchase. In the future, implementation of this type of tracking could be expanded to include all types of seafood and freshwater catch in addition to produce and dairy products.

11
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

The Rise of Anti-Semitic Art in Germanic Regions 1000-1300

ABIGAIL BECK and Thomas Barton

Violence and segregation of minority religious and racial groups is a part of our human history. The Jewish people have endured persecution since antiquity. In the eleventh century, the need to establish a pure Christian state coincided with the rise of militant Christianity during the First Crusade. With the twelfth century came murderous attacks on Jewish communities throughout Germanic regions and the popularization of anti-Semitic artwork. The treatment of the Jews was controversial and against Church policy. Although the papacy made attempts to protect the Jewish people, the vicious attacks continued. Christians singled out Jews as a way to purge impure elements of society and renew Christian unity by illustrating stereotypical and even grotesque Jewish features in Christian art. This project will trace the rise of violence and persecution inflicted on Jews, specifically in northern European regions, through the lens of artistic depictions of Jews during the high Middle Ages. As tensions between Christians and Jews worsened, Jews became identified with all that was profane in Christendom and increasingly demonized in Christian art and architecture.

12
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Breathe Easy Fans: Ceiling-mountable Fan & Air Filtration System

WILL KNOPKA, NICK LESTAR, AARON MILLER, CHRIS SHEEHAN and Venkat Shastri

The design our project combines the functions of an air filtration unit and a ceiling fan in order to improve indoor air quality. The most difficult design challenge to surmount was the difference in air flow rates required for filtration and for circulation for cooling. Air filters do not need to move a lot of air, but in order to achieve the cooling effects of a ceiling fan, the total flow rate of our design must be substantially higher. The challenge is to simultaneously cool the room and filter air in one unit while eliminating excessive noise and maintaining a low profile. Our current design uses a single motor to power two different fans. The first fan incorporates external fan blades, and is powered using a gearing system to allow the mounted fan blades to run at a slower rate than the shaft of the motor. The second fan is an internal radial fan for air filtration that runs at the same rpm as the motor. It draws air in through a circular filter on the bottom of the unit and expels the air radially outward. This entire system has a custom ceiling mount and housing that allows for easy access to the filter for replacement. The main housing around the internal radial fan sits below the external fan blades. This product is the culmination of our Senior Design Project for the Renaissance Initiative (entrepreneurship program). We aim to have a working prototype by the date of Creative Collaborations.

13
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

The Permutoassociahedra

ASHLEY DUNN, AUSTIN SCHIFF, KRISTIN DESPLINTER and Satyan Devadoss

The permutoassociahedron was introduced by M. Kapranov in 1993 and has been further developed since. This simple n-dimensional polytope is a merging of the n-dimensional permutahedron and the n-dimensional associahedron. Our research studied permutohedra, associahedra and their influences on the labeling of the permutoassociahedra. We delve into the formation of the three polytopes from the foundational n-simplex, the labeling systems of each, and how they interact with each other. With emphasis on permutoassociahedra, we analyze a previously established construction and then explore a new construction that results in a simpler method. Due to the fact that the graph permutoassociahedron has components of the associahedron and the permutohedron graphs, it seems as if it can be labeled using some combination of the elements from these two graphs; however, we go into detail as to why our new method of labeling may not be as simple as originally portrayed.

14
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Kiosk Power Design Study

ADRIANA MANGIONE, JASMIN MEZA, LEAH SATO, AKLILU TULU and Subramanian Shastri

Cubic Transportation Systems is implementing a new above ground bus transportation system in New York City that will run from the West side of the city to the East side. This system will consist of Kiosk ticketing machines where customers will be able to buy or add money to their MetroCard. The kiosk will be located at different cross sections in New York City and be powered by a solar panel and battery. Our Senior design team will determine how to power the kiosks using solar power and storage. To do so we will create a program that calculates the total harvested solar energy to power these kiosks at different location and create a data logger system that verifies and validates our program. The program will take into account the following parameters: location, time of day, and angle of a solar panel. The data logger system will store information about power by reading the voltage and current from a sensor that will be connected to the solar panel. This information will be used to verify that our model predicting the amount of power that can be expected at a location is reliable. It will also feed into a database connected to our program to give it more accurate and current data.

15
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Ocean Discovery Institute Watershed Monitor

ISABEL JURADO MALLO, VIKTORIYA ALEKSEYEVA, SHAUN THOMSON, MICHAEL YASSEAR and Gordon Hoople

The Ocean Discovery Institute (ODI) requires a way to understand how watersheds impact aquatic conditions downstream. The ODI Living Lab is situated in a canyon upstream of the Chollas Creek, which is fed by a watershed. This project provides a real time video feed of the Chollas Creek, viewable inside the Living Lab. The system includes four subsystems including the video camera, power supply, data transfer, and video projection. The system will operate without a connection to grid power.

16
Thursday, April 19
Session One; 12:00 - 12:50
p.m. UC Forums

Selective-Plane Illumination Microscopy to Characterize Diffusion of DNA in Cytoskeletal Networks

DEVYNN WULSTEIN, CHRISTELLE MATSUDA and Ryan McGorty

How polymers such as DNA move through crowded cytoskeletal environments has yet to be fully understood. New techniques to quantitatively characterize how the dynamics may differ from simple diffusion and to link those anomalous dynamics of DNA to properties of the crowding cytoskeletal network are required. Here we demonstrate a technique that measures the ensemble and single molecule dynamics over a large range of time and length scales. We use selective-plane illumination microscopy (SPIM) to observe the dynamics of fluorescently labeled DNA molecules in varying networks of actin and microtubules. Due to the Gaussian nature of the excitation light-sheet, we use single molecule tracking in the region with high optical sectioning and capture ensemble dynamics in the regions with low optical sectioning. We use differential dynamic microscopy (DDM) to analyze ensemble dynamics. Using SPIM and DDM, we efficiently obtain single-molecule and ensemble dynamics from the same time-series of images. Additionally, we can image and measure the dynamics of the three-dimensional network. Our use of single-molecule tracking and DDM on the same image acquired with SPIM could be extended to characterizing in vivo dynamics or other complex fluids with non-ergodic behavior.

17
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Wielding the Pen: British Women's Writing of the Great War and Suffragist Success

KATHRYN COLLINS and Michael Gonzalez

The history of women's suffrage activity in the United Kingdom spanned over fifty years of concerted effort before the passing of the Representation of the People Act of 1918 by Parliament. Many historians have studied the decades of suffragist activity leading up to the enfranchisement of women, but the efforts of these women during the Great War years have been either overlooked or described as dormant from the outbreak of the war through early 1918. My research will paint a more detailed picture of the suffragist movements during these early war years by examining the written work of these women rather than the oft-studied public demonstration and protest. Women's writing was pivotal to the incremental success of the suffragist movement and balanced the publicly unaccepted militancy of some suffragette factions. A thorough study of women's writing from the Great War period in the United Kingdom identifies the written word as a weapon for change and as the catalyst for lasting suffragist success.

18
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Veteran Survey

ALEXIS NACHT, DANIEL KURZWEIL, HAILEY SACHS, CASEY LOPES-SCERER and Veronica Galvan

At the University of San Diego we have a large military student population that consists of over 750 students. Unfortunately, we have little information on our military student population, including basic demographic information. With the growing population of military students at our university we want to learn more about how to enhance their college experience. Military students differ from non-military students in a variety of ways and this often makes it more difficult for them to graduate. We will be surveying military students in comparison to non military students and be studying them in three specific areas that may pose challenges: their transition period, academic experience, and social involvement. Once gathered, the survey information will provide crucial information pertaining to the well-being of our military student population which can be used to offer more specific programs to these students and make USD's campus better suited for the military student community.

19
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

The Effects of Using Social Media on Psychology 101 Students at USD

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

Smartphone applications and websites like Twitter, Instagram, Snapchat, and Facebook have the ability to connect us to our surrounding world, but can also impair our interactions with others. In our current technologically-driven society, an overdependence on our electronic devices and their associated social media applications can negatively affect our attention and focus (Ward et al., 2017). One recent study has shown that 75% of teenagers use the internet daily, and 41% do it for three or more hours per day (Ferreira et al., 2017). Additionally, Ferreira et al. also found that 19% of adolescents have an internet dependence. Knowing that social media use can have such large effects on young students, it is important to learn more about the social media habits of members of the USD community. We are currently surveying USD Psychology 101 students to learn how often they use various social media applications, and how their social media use may affect academic performance and social interactions. With the information gathered, we can learn more about how to use social media as a resource for students, while also learning about the negative impacts it may have on academic and social experiences.

20
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Visualizing the Principle of Conservation of Momentum in a Multilevel System of Rigid Spheres

ISABELLE GEHRS and OMAR KHAN and STEFANO MONZON and Lukasz Pruski

This interdisciplinary project presents a visualization of a system of many rigid spheres (balls) that simulates elastic collisions between systems and their resulting motion. We model each system as a collection of rigid spheres confined by a surrounding spherical enclosure. This physics-based model is implemented in an interactive computer program which displays the system's motion using computer graphics in real time. It calculates the resulting momentum of each post-collision body as a function of previous relative momenta and positions in accordance with classical mechanics. The main goal of this project is to provide a pedagogical tool for facilitating students' understanding of the principle of conservation of momentum and its implications in a system's collective motion. Further goals include comparing statistical results, such as energy distribution and energy transfer rates, to other models.

21
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Far From Home

ANDREA PIACENTINI and Daniel Lopez-Perez

Human beings are migratory creatures, since the beginning. As a collective we have traversed millions and millions of miles, and continue to do so. We have now separated ourselves into two systems of migration: one that moves by choice and one that doesn't. In our current era we are still experiencing the migration of entire countries. Reasons such as climate and war are the basis to this movement. "By 2050, because of the consequences of climate change, the amount of climate migrants could reach the number of 200 millions refugees." Our solution to this as a collective has been the creation of refugee camps. Nowadays these are conceived as temporary settlements, usually managed by governments, the United Nations, international organizations or NGOs. "Far From Home," responds to the questions raised by the Project Earth 2 competition: Is it possible to consider refugee camps as the cities of tomorrow? As changing structures that can grow, adapt and develop? Link to competition brief- https://www.projectearth2.org/citiesoftomorrow

22
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Learning Through Action: Designing a Bus Shelter in Logan Heights

ANGELA LEAL, BRIAN WHITE, BRYAN CARDENAS, GABRIEL FALLIS, IVONNE SALAS, JASMIN ROSS, MARCELINA JIMENEZ-SMITH, SARAH GUENO, ALI MCLAGAN and Alberto Pulido

Ethnic Studies 343: Chicano/Latino Studies: Chicano San Diego in the Borderlands has spent the 2018 Spring semester imaging, discussing and creating a covered bus shelter for the community of Logan Heights next to historic Chicano Park in San Diego. Incorporating Participatory Action Research, our class worked with the community to design a bus shelter that would serve as an educational guide telling the history of the park and the Logan Heights community. Students were broken into groups, and each group focused on designing a distinct panel of six. Along with designing the shelter, students reached out to San Diego politicians and lawmakers to learn about the process of requesting and acquiring a bus stop shelter through the Mass Transit Authority of San Diego. The next step will be for ETHN 343 students will be to take their ideas and design to the 48th annual Chicano Park Day and acquire feedback from community members. As students of ETHN 343, we see our project as a way to utilize our educational skills and resources to support and empower the local communities of San Diego and in turn learn from them.

23
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Development of Analysis of Wound Healing Assays

Andres Quintero and Jessica Bell

Cell migration assays are an important technique in determining the effect of altering the environment of the cell or the cell itself has on the movement of the cell. In the laboratory, cells are grown in a confluent layer. A ?wound? or ?scratch? is introduced across this layer of cells by drawing a pipet across the field of cells to create an open space. The movement of cells into this open area is monitored for ~24 h by microscopy, most often brightfield images taken every 2-10 minutes. To quantify the movement of cells as a function of time and the overall closure of the open area, the researcher must define the open area on each image. This constitutes a major difficulty with these assays as several software programs are available for this analysis but their reliability and efficiency vary. In this study, cell migration assays were assessed by three different software packages: MiToBo (an ImageJ plugin), Sketch and Calc (an iPad app), and ibidi?s Automated Cellular Analysis System (ACAS). Migration assays for Hap1 cells, WT or having a single protein knockout, were completed in triplicate. Data, images taken every 10 min for a 24 h time period (149 images) were analyzed by each of the three programs. MiToBo was a very fast image analysis program, but was not able to consistently distinguish between the cells and the open area. This led to over- or under-estimation of the open area. The Sketch and Calc approach was an extremely accurate image analysis program but required the user to trace the edges of the open area on each image, requiring several hours to completely analyze each data set. The ACAS was also a very fast automated program like MiToBo, but was much more consistent in distinguishing the cells from the open area. In directly comparing the Sketch and Calc with the ACAS analysis, the WT cells had a 25% closure for the ACAS and a 26% closure for the sketch in calc and for the knocked-out cell line it was reported to have a 15% closure by the ACAS system

24
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Cryptic Species in the Scale Insect Genus, Chionaspis?

ANNA WHITFIELD and Geoffrey Morse

Scale insects are some of the most interesting herbivorous insects studied. They belong to the same suborder (Hemiptera: Sternorrhyncha) as aphids, whiteflies, and plant lice. They are often referred to as "armored scale insects" because of the waxy -

scale they secrete as defense. Small size and extreme sexual dimorphism are some identifying characteristics. Males mature into winged adults while females become sessile. A consequence of having sessile females means most to all of scale insect species identification is based on females. Due to their small size, nature of inhabitance, and limited identification resources, there is a high possibility that there are cryptic species yet to be discovered (Morse & Normark, 2006; Gwiazdowski et al. 2011). We collected Chionaspis specimens from three species of pine trees (Pinus jeffreyi, P. coulteri, and P. torreyana) from three different locations in San Diego County - Palomar Mountains, Cleveland National Forest, and Torrey Pines. We then analyzed three variants of DNA (CO1, 28s, and EF-1a) to determine genetic variance across the Chionaspis specimens collected. If we find conserved sequences across specimens collected within the same geographic location but on different hosts, then this suggests speciation-by-drift. In contrast, if we find conserved sequences between specimens collected from the same host but in different locations, then the speciation has occurred due to host-specialization. Understanding mechanisms of diversification in herbivorous insects is comparable to understanding species diversification as a whole and being able to recognize cryptic species has general implications for the discovery of new species (Gwiazdowski 2011).

25
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

The Spatial and Temporal Expression of Polymeric Immunoglobulin Receptor (pIgR) in Zebrafish Larvae

KATHRYN FAIDLEY and Valerie Hohman

The mucosal immune system (a branch of the adaptive immune system) mediates infections in the body?s mucosal surfaces, where the organism?s internal structures come into contact with the external environment (i.e. the gastrointestinal tract). Polymeric immunoglobulin receptor (pIgR) is essential for the proper functioning of the mucosal immune system. pIgR transports secretory immunoglobulins across intestinal epithelial cells into the lumen, the site of the pathogens. Along with this function, certain aspects of pIgR?s sequence and structure have been evolutionarily conserved in many classes of vertebrates. Zebrafish (Danio rerio) often serve as key model organisms in studies of vertebrates, as they are small, easy to raise, and virtually translucent as embryos/larvae. It is known that the zebrafish adaptive immune system does not become fully functional until approximately four weeks post-fertilization. However, indicators of adaptive immune system activation (including the expression of the recombination activating genes) demonstrate that the adaptive immune system may begin to function as early as four days post-fertilization. The spatial and temporal expression pattern of pIgR in zebrafish larvae is not yet known. It is expected that pIgR will begin to be expressed at approximately four days post-fertilization in areas surrounding the mucosal surfaces. Protocols, including in-situ hybridizations and reverse-transcriptase polymerase chain reaction (RT-PCR), will be utilized in order to assess the expression pattern of pIgR in zebrafish larvae. Characterizing this expression pattern will provide profound implications for the evolution of the adaptive immune system as well as of pIgR in particular.

26
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

A Computational Study of the Origins of Life: Exploring the Co-Oligomerization of Pyrrole and Formaldehyde

HELEN LOLI and Jeremy Kua

The non-oxidative stepwise co-oligomerization of formaldehyde and pyrrole to form porphyrin and its derivatives using density functional theory has been explored, using both water and acetic acid as catalysts in reaction. So far, it has been determined that water is a better catalyst, as the kinetic barriers associated with most of the water-catalyzed reactions are significantly lower than that of the acetic acid-catalyzed reactions. The addition of formaldehyde to pyrrole's nitrogen appears to be kinetically favored, though the addition of formaldehyde to the ortho-carbon is more thermodynamically favored. The most kinetically favored reaction is the addition of pyrrole with a formaldehyde substituent to aza-fulvene, which is an important precursor to linked, linear pyrroles that can eventually lead to porphyrin ring formation.

27
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Media Effects on the Identity Development of Latina/o Lesbian, Gay, Bisexual, and Transgender Individuals: A Retrospective Study

ELISENDA GUERRA-DELGADO and Bradley J. Bond

Previous research has demonstrated that the emotional well-being of lesbian, gay, bisexual, and transgender (LGBT) youth can be positively influenced by exposure to LGBT individuals in media. However, a majority of this research uses White samples; there is limited research demonstrating how media exposure influences the emotional well-being and identity development of racial minority LGBT youth. Despite similarities that LGBT individuals share in their identity development, there is a significant difference between White LGBT youth and racial minority LGBT youth due to cultural and environmental influences. This retrospective study sheds light on how media influenced the identity development of Latina/o LGBT individuals throughout adolescence by examining the intersection of race and sexuality. Using focus groups and interviews, the data collected provides insight into how media exposure plays a role in Latina/o LGBT individuals identity development, along with the influence of culture, religion, and race.

28
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Active Monitoring of Chemical Fume Hood Sash Position for Energy Conservation

LAURA BECERRA, Juan Ferrua, Maxwell Drake, Ariel Anders, Daniel Preston and Evelyn Wang

Chemical fume hoods in laboratories consume the power equivalent of 3 - 4 American households. The amount of energy used by a hood is directly proportional to how far the hood sash is open, and closing the sash completely can result in up to 75% energy savings. Past efforts have attempted to achieve these savings by visually reminding users to close the sash when the hood is not in use. In the present work, we implement an easily-installable alarm system to audibly alert users to close the sash when it is not in use. The device is comprised of a microcomputer fitted with a webcam to track the position of the sash using augmented reality tags and simultaneously detect motion to determine whether the hood is in use. We installed this device in several MIT laboratories with fume hoods for one week without the alarm activated (control), followed by a second week with the audible feedback when a hood was left open and not being used (test). We then compared the test data to the control to calculate the amount of energy saved and the corresponding cost savings in energy bills from the implementation of the alarm. The addition of the alarm reduced wasted energy by 96-98%, resulting in an average cost savings of $427 per fume hood annually. This work has produced an easily-installable fume hood monitor with active feedback to incorporate into any laboratory in efforts to save energy and reduce monetary costs.

29
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

A Proposal to Enhance Learning Achievement

BROOKE BATTEN and Michel Boudrias

This poster will focus on a proposal for the Ocean Discovery Institute(ODI), an organization that teaches marine science to underserved urban schools in San Diego. Essentially, this proposal will outline potential changes to curriculum and teaching styles that will positively impact learning achievement for students. To accomplish this, findings from journal articles on how to improve academic performance in schoolchildren will be collected and analyzed. All findings that would be applicable to ODI will be used in the proposal. This study found that the use of augmented reality(AR) systems and increased amounts of hands-on learning experiences, mainly in the form of field trips or experiments, are likely to increase learning achievement of marine science concepts. A customized AR system and a digital game will be designed for classroom use. These additions will allow for students to immerse themselves in the material and increase their learning achievement. It is also recommended that classes participate in more field trips and experiments.

30
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Tilt Tube

TROY SINHA, ALFRAIB IBARRA, GABRIEL PRECIADO and Imane Khalil

The tube was designed using Solidworks according to the following specifications; high visibility of the fluids inside the tube, high permittance for the instability to form with the least amount of disturbance, ease of manufacturing, ease of maintenance, rigidity while being relatively crack resistant, and easily transportable. First and foremost was constructing the tube while remaining within given time, budget, and material constraints. This meant choosing a geometry that was easy to build a support structure around. Round and rectangular cylindrical shapes were considered, but due to the possibility for unwanted flow perturbation, the relatively small number of waves that would be visible (reference picture of cylindrical tube here), and the necessity of a custom fabricated stand/support for such a tube, a round cylindrical tube was ruled out as a possibility. A thin rectangular cylindrical tube was chosen for the stable, 2D-esque flow it permits, the ease of fabrication, and the adaptability to various readily available stands. The requirements of high visibility in a rigid yet crack-resistant form required a material that is clear for easy observation of the instability, rigid, relatively sturdy in the event of a light impact, and resistant to corrosion so it may be continually reused. Acrylic sheet was chosen for its adherence to all the above criteria. Additionally, it is relatively easy to repair compared with other suitable materials such as glass. The Tube's outer dimensions are 50.8mm (2") x 152.4mm (6") x 1,778mm (70"), with inner dimensions of 31.75mm (1.25") x 127mm (5") x 1,739.9mm (68.5"). The base of the tube was given extra thickness to allow the drilling of holes for mounting purposes without compromising the integrity of the rest of the tube, allowing cracks to form, and to prevent bowing under consistent static loading. Additionally, due to the mounting solution chosen (Triton Multi-stand) it was necessary to account for the clearance needed so that all of the tube's inner section was visible upon use. To reduce the amount of time needed to construct the finished product and reduce consumption of the fixed budget, a Triton Multi-stand was incorporated into the design. With this mounting solution the tube is able to tilt up to over 60 degrees before touching the ground, limited only by the tube's length. The incorporation of this stand also made transportation of the assembly much easier.

31
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Brunelleschi 1377-1446: How He Changed and Influenced the Shape of Church Architecture in Renaissance Italy

ALISSA BARRAZA and Molly McClain

This research looks at the work of Filippo Brunelleschi - Florence architect and engineer during the Renaissance and his influence on Church architecture. While Brunelleschi is best known for his architectural design and construction of the Cathedral Dome in Florence, most of his other works are largely overlooked. The purpose of this research is to show how Brunelleschi moved architecture from the Gothic to the Renaissance style and in particular Church architecture. Primary sources, including Vasari, Mannetti, and Alberti include published letters, completed books, and current events during the Renaissance era crediting Brunelleschi with significant change and contribution to the movement. A literature review of works by Jacob Burkhardt, Ross King, and Frank Prager are examined as secondary sources on Brunelleschi's churches during the Renaissance. This focus on Church architecture highlights Brunelleschi's use of linear perspective and architectural design to change the age of Gothic church architecture in Italy and eventually throughout Europe and his influence on other artists including Michelangelo and Leonardo Da Vinci.

32
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Beasts and Barbarity: Framing Latin American History with Jaguars and Tigers

CHRISTOPHER HARROP and Kim Eherenman

The tiger has been employed historically in a variety of foundational political and literary texts in Latin America, primarily carrying symbolic associations with cruelness and ferocity. In the 1500s, Bartolome de las Casas described Spanish colonizers as tigers for their cruel treatment of indigenous communities. Writing later in the mid-1800s post-colonial Argentina, Domingo Sarmiento described his conservative political rival as the 'Tiger of the Plains.' Jose Marti, a Cuban revolutionary, similarly decried the growing threat of the United States to independent Latin American states using the imagery of a tiger silently stalking its prey. In these and other textual examples throughout Latin American history, the tiger yields a valuable lens for understanding Latin American political and cultural history. The symbolism of the tiger further informs and deepens understandings of colonialism and the civilization v. barbarity debate, critical discourses that continue to weigh heavily on modern Latin American identity. Tigers symbolically represent power, cruelty, violence, and barbarity. In this project, I argue that given the longstanding history of oppression in Latin America, the tiger is an apt symbol that can be used to name and understand violence and power abuses in their many historical manifestations in the region.

33
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Development of a Simulation Model for the Microcirculation in Capillary Bundles of Rat Skeletal Muscle

AMANDA KENNEDY, JAYDEN YEOMAN, and Frank Jacobitz

The microcirculation encompasses the flow through the smallest arterioles, capillaries, and venules with vessel diameters ranging from 8 to 150 micrometers. It has been hypothesized that, by the time the most common symptoms of hypertension and diabetes are recognized and accurate diagnosis can be made, permanent damage has occurred in the microcirculation (Schmid-Schönbein, 1999). This work aims to develop a computational simulation model of a capillary bundle based on microscope images of rat spinotrapezius muscle (Skalak and Schmid-Schönbein, 1986). 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 was created that describes each blood vessel and its location. This matrix was then used to display the solution of flow properties onto the vessel structure, allowing a spatial analysis of the simulation results in addition to a statistical analysis. This analysis includes properties of the microcirculation such as the distribution of pressure, speed of the flow in different vessels, red blood cell concentration, shear stresses, aggregate blood viscosity, Reynold's number, and Womersely number.

34
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Evaluation of the nuclease resistance of DNA four-way junctions.

GASTON MOORHEAD, RAYMOND HUANG, YONATAN KEBEDE, ANDREW SMITH, LOUIS ESTEVEZ, MARIA TROISI and Anthony Bell

Oligodeoxynucleotides (ODN) offer great promise as therapeutics due to their high binding specificity, low toxicity and ease of synthesis. Hence, it is not surprising that ODNs are being developed as antigene and antisense reagents that can control gene expression by targeting proteins. More recently, researchers have used a similar approach to target proteins in the extracellular matrix. In these studies, nucleic acids are directed against the damage-associated molecular pattern (DAMP) molecule, High Mobility Group B1 (HMGB1). -

We hypothesize that ODNs based on DNA four-way junctions (4WJs) can be used to target HMGB1. To enhance the ex vivo stability of 4WJs, the helical termini of a DNA junction are modified to generate i-J1. The objective of this study is to investigate the nuclease resistance of i-J1, a control 4WJ (J1) and the intramolecular 4WJ, J4, against three nucleases. The three nucleases are: DNase I, Exonuclease III (Exo III) and bacteriophage T5 Exonuclease (T5 Exo). DNase I cleaves dsDNA and ssDNA in a largely non-specific manner to generate mono- and oligodeoxyribonucleotides. Exo III acts as a 3'5' exonuclease, 3'-repair diesterase, 3'-phosphomoesterase and ribonuclease. T5 Exo hydrolyzes dsDNA and ssDNA in a 5'3' direction to release mono-, di-, tri-nucleotides and oligonucleotides. The nuclease protection data shows that i-J1 and J4 have significantly higher nuclease than J1 against DNase I and Exo III. We suspect the increase in nuclease resistance is linked to changes in the minor groove dimensions of i-J1 and J4.

35
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Determining Forces in Macroscopic Fiber Networks Using Conductive Fabric

JASON CLAPP and Ryan McGorty

Fiber networks are present in various systems from textiles and paper to the cytoskeleton and tissues. Simulations of fiber networks have unveiled interesting emergent phenomena. However, it has proven difficult to experimentally probe how forces are distributed across individual fibers in such networks. Here we are able to determine the force distribution through multiple geometries of macroscopic networks in both two and three dimensions in a simple manner. We construct networks out of macroscopic strips of conductive fabric. We measure the change in resistivity of each element of conductive fabric as a network is perturbed to determine the force on each element simultaneously. We investigate the magnitudes of the forces within the network and how those forces are spatially distributed through the network. Our model system makes determining the stress throughout a large system quite simple, and can be applied to large and three-dimensional systems

36
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Economic Manipulation of the Mexican Media

KELLY KENNEDY and Emily Edmonds-Poli

Media plays an important role in the continued process of democratization and opening in Mexico. By corroborating facts and providing analysis, the media is vital to the capacity for, and the validity of, civic participation. Though the Mexican press seems vibrant due to an abundance of news outlets across the three major medias ? radio, television, and print ? journalists continue to face physical violence at the hands of drug trafficking organizations (DTOs) and, in some cases, members of the local or municipal police. Though less viscerally shocking than physical violence, economic threats and incentives also threaten freedom of the press. Among the lowest paid professionals in Mexico, journalists have historically endured economic manipulation through the institutionalization of ?press-release journalism,? through which political parties and government officials, notably the Institutional Revolutionary Party (PRI), incentivized the rehashing of official statements and government information without due diligence. This research project seeks to determine if Mexican journalists continue to be economically manipulated by their government, specifically in terms of government advertising, hirings and firings, and incentives such a bribes. This paper will also connect the apparent degree of modern press freedom to historical press manipulation, and fortify the deep connection between freedom of press, freedom of information, and democracy.

37
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

The Effects of Power and Empathy on Attitudes Toward Healthcare

ALEXIS POSADAS and Rebekah Wanic

Previous research has evaluated the influence of power and perceptions of power on many outcomes. For example, numerous studies have demonstrated that power manipulations are capable of influencing perspective taking (Galinsky et al., 2006) as well as creating an illusion of personal control in decision making (Fast et al., 2009). Specifically, participants who were exposed to a manipulation of high power were more likely to take positions of self-interest (Galinsky et al., 2003) and less likely to adopt another individual's perspective as well as less likely to recognize that other individuals do not possess the knowledge they do (Galinsky et al., 2006). Similarly, researchers have shown that empathy manipulations are capable of influencing behavioral outcomes thus altering decision making (Finlay & Stephan, 2000). For example, increasing empathy through manipulations has led to increased understanding toward disadvantaged groups (Finlay & Stephan, 2000). As yet, little research has explored either of these variables or the possible connection between the two in the context healthcare beliefs and attitudes. Thus, the aim of the present study is to experimentally manipulation power and empathy to determine whether either or both might impact participants' self-reported beliefs about government provision of healthcare services. Results and future directions will be discussed.

38
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

"Your Engagement Has Consequences"

JORDAN READYHOUGH and Daniel Lopez-Perez

Although architectural space is defined by walls historically, there have been a number of theories and manifestos that challenge the traditional role of the wall through its activation and dissolution: Le Corbusier's concept of open plan, Kiesler's theory of elastic architecture, Superstudio's "Continuous Monument," Diller Scofidio + Renfro's "Blur Building," and Olafur Eliasson's "Your Rainbow Panorama," among others. The scope of these theories range from an emphasis on surface and the activation of the interior, all the way to the rejection of walls altogether. Underlying all these projects and theories lies the concept of the relationship between the body, environment and its perception. These manifestos challenge our normative perceptions and relations between body, floor, wall, ceiling and environment; bodies respond to space as much as space responds to bodies: "Your engagement has consequences" (1). The body's engagement with space is perceived through a simultaneity of registers ranging from the physiological and sensory to the collective memory. "Your Engagement has Consequences," aims to explore the space between the physiological and the sensory as a way to reimagine the body's relationship to its environment. Bib. (1) Eliasson, Olafur. "An Evening with Olafur Eliasson." Lecture, Visions and Voices at the University of Southern California, Los Angeles, CA, February 27, 2018.

39
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Octopaminergic Sleep Regulation in Drosophila

AMANDA NGUYEN, ROXANNE MOGHADAM, and Divya Sitaraman

Octopamine (OA), the invertebrate homolog of norepinephrine, has been implicated in multiple behaviors in Drosophila such as feeding, sleep, and aggression. The precise circuit mechanisms by which octopamine regulates these behaviors remains largely unexplored. Using a high resolution neurogenetic screening we have identified a subset of octopamine neurons (VPM 4,5) that suppresses sleep and increases wakefulness. Neuroanatomical analysis reveals that these neurons -

Octopamine (OA), the invertebrate homolog of norepinephrine, has been implicated i project to the mushroom body (MB), an associative neural network analogous to the mammalian cortex. Using genetic, anatomical, and behavioral approaches we show that the OA-VPM neurons release octopamine that interacts with subsets of dopamine neurons in the MB in regulating sleep. Furthermore, calcium imaging studies show that flies that are sleep deprived display reduced activity within OA-VPM neurons as compared to sleep-replete controls. Taken together, these results reveal octopamine is important in sleep regulation through these neuronal connections. In addition to presenting this data, we will also discuss potential receptor mediated mechanisms underlying these connections.

40
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

A Guide for Goliath:An Evaluation of Historically Successful Counterinsurgent Operations and Their Applicability to Modern United States Military Doctrine

DANIEL GELOSO and Kathryn Statler

The United States has struggled to mount successful counterinsurgency operations, most recently in the 2004 invasion of Iraq. Often, military strategists have turned to historically successful counterinsurgent operations such as those operations undertaken by the British and French in the Second Boer War, Malaya Emergency and French War in Algeria. In these operations the British and French saw a degree of success in subduing insurgent forces through various tactics and strategy which aimed to win over local populations, isolate and then eliminate insurgent forces. While enticing to apply these paradigms regardless of the context in which they saw success, often the tactics and strategy that brought success in one conflict will bring about failure in other similar conflicts. There is certainly something from the tactics and strategy used in historically successful conflicts that can be applied to modern United States military doctrine. However, the United States must be cautious in applying these tactics and strategy without adapting them to the particulars of a new conflict as has been done in the past. Furthermore, the integration of these tactics and strategy into US military doctrine will force the US military to fundamentally reexamine how it is organized and counterinsurgency operations are mounted.

41
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Lysosomal function in a Drosophila model of Alzheimer's Disease

CAITLIN MACGREGOR and Adam Haberman

Alzheimer's Disease (AD) is a neurodegenerative disease characterized by amyloid plaques, which are composed of insoluble Aβ42. Plaques accumulate despite the fact that neurons have systems to degrade them. In the endolysosomal system, proteins are trafficked to lysosomes where they are degraded by enzymes, such as Cathepsins. In models of AD, this system appears to be malfunctioning. Accumulations of Aβ42 reduce the functionality of the endolysosomal system to some degree. We and others have chosen Drosophila photoreceptors to model AD, yet our study system has consequences. Light can induce photoreceptors to endocytose the receptor protein Rhodopsin. If photoreceptors contain lysosome-impairing mutations, Rhodopsin aggregates and causes degeneration. Furthermore, we have shown that light increases the amount of degeneration seen in Aβ42-expressing photoreceptors. If we predict that Aβ42 dramatically impairs lysosomal function, we must account for the effect that light-dependent Rhodopsin endocytosis may have on degeneration. To test this, we developed an assay that tracks Cathepsin through the endolysosomal system. Cathepsin becomes functional when its pro-region is cleaved in a lysosome, and thus we can see a molecular weight difference between pro and mature Cathepsin. Using this assay, we can compare lysosomal function of Aβ42 mutants to that of wildtype flies and determine how severely endolysosomal function is impaired. If the endocytosis of Rhodopsin exacerbates the lysosomal defects caused by Aβ42, we will see a greater level of degeneration in light-reared flies. Through experimentation with other AD models, we can determine if this characteristic of Drosophila photoreceptors applies to all AD models.

42
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Analysis of CHP-NHE Protein-Protein Interaction

ISAAC BELL and Joseph Provost

The Sodium Hydrogen Exchanger (NHE1) is a membrane transporter that exchanges an intracellular proton for an extracellular sodium ion in order to maintain cellular pH. NHE1 is studied for its critical role interacting with and activating migratory proteins along the leading edge of a mobile cell. Regulation of NHE1 is complex due to a large intracellular domain with many protein interactions and phosphorylation sites. Two NHE1 binding proteins, whose roles in regulating NHE, are not fully clear, are the calcineurin B homologous protein isoforms 1 and 2 (CHP1 and CHP2). Because CHP2 is primarily expressed in gut and tumor cells, the interaction between the CHP isoforms and NHE1 is a potential anticancer target. We found using circular dichroism (CD) thermal melt experiments, that CHP2 has a five-fold higher binding affinity than CHP1 at the same 40-amino acid long CHP binding domain (CBD) in the 300-amino acid long intracellular tail of NHE1. In order to further quantitate this difference in binding efficiency between the two isoforms of CHP a bait and pray plate binding assay was conducted to optimize assay conditions to measure binding affinity and interactions between the calcineurin B homologous proteins and the sodium hydrogen exchanger using CHP-fluorescent fusion protein and GST-NHE CBD fusion protein.

43
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Confronting Gamergate: An Analysis of News Coverage in the Video Games

JORGE VARELA and Antonieta Mercado

News coverage in the video game industry suffers through low standards and journalists with inconsistent attitudes towards conflict. Since video game journalism is a relatively nascent activity that thrives on the Internet, it is difficult to find reputable, let alone scholarly sources of information for news coverage. This paper analysis the way mainstream gaming journalism covers the news. The analysis begins though observing how the biggest outlets currently in the video game industry cover the Gamergate scandal of 2014. The hypothesis is that the coverage is based mostly on reactionary comments and emotion, rather than scholarly perspectives. In addition, there is the factor of Internet noise that can misconstrue and confuse people as to what is true or not. Trying to make sense out of both Gamergate and how gaming news is covered by doing some comparisons with The New York Times and other website that are fully dedicated to covering games.

44
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Spiritual, but Not Religious

BRIANA JURRIES and Joel Gruber

In the intersection between feminist critical theory and religious studies, this presentation excavates the changing attitudes of spirituality among Western American women in the 21st century. Particular to the phenomenon of white women practicing Eastern forms of spiritualism, this presentation asks why women are leaving their monotheistic religions of origin, what the appeal of Eastern spirituality provides, and the implications thereof on feminism as a whole in the context of the modern-day women's movement in the West. This presentation hopes to move toward a discussion of inclusion beyond a "one-size-fits-all" chronicle of feminism, and validate the narratives of women who are routinely disregarded in popular culture for their spiritual convictions.

45
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Salt Extractable Organic Matter Carbon in Alaskan Permafrost Region Soils

CALLIE SHARP and Julie Jastrow

Permafrost, soil frozen for two or more consecutive years, is common in the northern circumpolar region. The soils in the permafrost region are estimated to hold over two times more carbon than the amount contained in the atmosphere. This region is highly susceptible to the effects of climate change, specifically to the thawing of permafrost due to global warming. When permafrost thaws and other soils in this cold region are subjected to warming, microbial activity increases, decomposing soil organic matter into the greenhouse gases carbon dioxide and methane. The release of these gases into the atmosphere can potentially begin a positive feedback loop that could speed up the rate of climate change. The goals of this project were to estimate the amount of bioavailable organic matter in the permafrost regions of Alaska, USA, to use salt extractable organic matter (SEOM) as a proxy for the most readily decomposable organic matter, and to look for trends within this data related to various subdivisions, such as land cover and horizon type. SEOM analysis was performed through K2SO4 extraction, UV spectroscopy, and a Shimadzu total organic carbon analyzer. The study found that while there is a higher proportion of bioavailable carbon in mineral soils than organic soils, organic soil SEOM appears to be more labile than that of mineral soils. Additionally, SEOM total organic carbon is greater in forest soils than wetland soils, and this difference is primarily driven by the organic soils in each area.

46
Thursday, April 19 S
ession One; 12:00 - 12:50 p.m.
UC Forums

Making CEQA Sustainable

JAMES BARRETT and Eric Cathcart

This project is a proposal for electronic services to act as a standardized threshold for the preparation of Environmental Impact Reports required by the California Environmental Quality Act. The law requires development projects to undergo a review conducted by local government to assess the impacts that the project will have on the environment. If impacts are significant, the project is mitigated or required to move somewhere else. The lack of a standardized threshold for the preparation of EIRs produces problems with the efficiency of environmental review in private projects. The various current methods of preparation require dispensable resources like paper and create carbon emissions from the transportation of documents between intergovernmental agencies. Requiring the electronic arrangement of EIRs effectively reduces the variance in EIR conception methods, increasing communication between the various entities required in the environmental review process. This effectively reduces time and human error associated with document preparation, the demand of paper, and the need for its transportation. The implementation of this proposal calls for further investigations into the environmental impacts associated with electronic services like computers. While there is no doubt that electronic services benefit the environmental review process, future studies are needed to form a conclusion about the environmental benefits of electronic services in comparisons to the costs that current methods create.

47
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

A Biophysical Approach in Understanding the Thermodynamics Behind the Substrate Channeling Between Malate Dehydrogenase and Citrate Synthase

DANIEL GHEBREIGZIABHER and joseph Provost

Sequential enzymes in a metabolic pathway interact with one another and form highly organized complexes, with which the term metabolon was introduced to describe these enzymatic structures. The nature of the protein-protein complexes underline the basis of how enzymatic processes carry forth certain reactions in cellular respiration. The metabolomics theory describes the importance of protein-protein interactions to drive substrate channeling - the direct exchange of product/reactant in adjacent metabolic enzymes. In order to better understand the thermodynamics behind metabolic metabolomes, this study focuses on the protein-protein interaction between malate dehydrogenase (MDH) and citrate synthase (CS), which are integral intermediate metabolic enzymes. Using size exclusion chromatography and sedimentation, the interaction between CS and MDH is shown to be isoform specific, but no further work has been conducted to obtain affinity values or the biophysical nature of the interaction. First, optimal expression was determined in order to successfully purify and express the enzymes: glyoxysomal malate dehydrogenase (gMDH), human cytosolic malate dehydrogenase (MDH1), human mitochondrial malate dehydrogenase (MDH2), and human mitochondrial citrate synthase (CS). Next, the nature of the CS-MDH interaction was examined through protein thermal melt shift assays where the energies of affinity and binding were studied to better understand the thermodynamics of the interaction. The results show that CS has a more thermodynamically favorable interaction with mitochondrial MDH than cytosolic, based on the magnitude of the shift in thermal denaturation.
NSF REU 146045

48
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Comparing U.S. and French Approaches to Counterterrorism in the Sahel

ALEXA AUDINO and Randy Willoughby

Although terrorism is typically associated, in the U.S., with the Middle East, there is also a significant presence of terrorist groups in Africa. Both the United States and France are involved in counterterrorism in the Sahel region, where the two states often work together. However, the strategies of the U.S. and France in this region also frequently diverge. This project analyzes the differences in the strategies taken by France and the United States in counterterrorism interventions in the Sahel, specifically studying the ways in which these two countries are fighting Boko Haram, Al Qaeda in the Islamic Maghreb, and Al-Shabab. This analysis takes into account actions taken by each country's military, diplomats, and non-governmental organizations. Additionally, media coverage from Le Monde, a French newspaper, and The New York Times, representing American media, is used to study the cultural perceptions of each state's actions.

49
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Examining the Experiences of First-Year Honors Engineering Students in Service-Learning

AVA BELLIZZI, Elizabeth Reddy and Susan Lord

Although research projects and skill-based courses are central to engineering and computer science curricula, service-learning has also been highlighted as a pedagogy that has proven beneficial to students' learning within these disciplines. This qualitative investigation examines the experiences of two cohorts of students in an Honors Introduction to Engineering course during Fall 2016 and Fall 2017. As part of a mandatory service-learning project, students worked in teams to deliver a presentation and prepare a hands-on activity to expose underprivileged adolescents to Science, Technology, Engineering, and Math (STEM). Participants in this study were surveyed to assess the efficacy of service-learning. In particular, students? abilities to develop their skills in effective communication, practice strategic teamwork, and develop a clear self-concept as engineers or-

computer scientists were examined following their service-learning experiences. Learning how to communicate with a non-technical audience was noted as an important takeaway by both cohorts of student-participants. The second cohort of students highlighted teamwork as a major obstacle that they had to work through to successfully execute their projects. Finally, students voiced a feeling of duty to improve access to higher education for underprivileged adolescents in the community, seeing themselves as peers with an obligation to improve the educational prospects of these local adolescents, rather than as future professionals in a technical environment.

50
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

A Rejection of Panpsychism in Epiphenomenalist Theory

AMBER SHELDON and Jack Crumley

This paper will explore epiphenomenalist accounts of consciousness given by David Chalmers. Chalmers contends in his book, The Conscious Mind, that consciousness is realized through "information states." According to Chalmers, an information state is an abstract state defined by a causal pathway of functional and physical states of being. He then outlines the two aspects of information: physical and phenomenal. Ultimately, the chain of physical information is realized as consciousness. However, this theory of consciousness results in panpsychism. For Chalmers, all objects in the world are subject to causal influence from physical states. Thus, when a rock undergoes expansion or shrinking from temperature, it is technically experiencing an information state and therefore a conscious one. In this paper, I will argue that consciousness is not reducible to information. I will begin by explaining epiphenomenalism and supervenience as they are presented by Chalmers. I will then outline his explanation of how he links the physical and the functional, to the informational, to the conscious. I will question: How does Chalmers get from information to consciousness? Is his linking of the two arbitrary? Next, in an attempt to adapt epiphenomenalism to a non-panpsychist theory, I will explain how other views, such as those given by David M. Rosenthal and Frank Jackson, show that information does not equal consciousness. Rosenthal's higher-order thought theory illustrates how information could be phenomenally processed, but not conscious.

51
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

The Effects of Neuroticism and Gender on Heavy Drinking

CAILEY BENARD and BRITTANY HUNT LE'STRANGE and Michael Ichiyama

In the present study we explored the effects of gender and neuroticism on heavy drinking. Participants were 640 undergraduate students attending a university in Southern California who completed an online survey that included measures of heavy drinking and neuroticism group levels (high vs. low). A 2x2 (gender x neuroticism group) univariate analysis of variance was computed with a composite measure of heavy drinking serving as the dependent variable. Significant main effects for gender and neuroticism group were found along with a significant interaction effect. It was found that males engage in more heavy drinking than females, and participants with low neuroticism scores engaged in less heavy drinking than those with high neuroticism scores. In addition, males high in neuroticism engaged in less heavy drinking than the females in our sample and the males low in neuroticism. These findings may contribute to the literature involving personality variables as potential predictive factors for heavy drinking among college students.

52
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Perceptions of Mental Health Risks of Non Dominant Partners Varying in Gender and Sexual Orientation

MAUREEN COBILE, DESIREE JOCSON and Rebekah Wanic

Partners often have various levels of power in their romantic relationship. In this study, we refer to relationship partners varying in power as the dominant and the less dominant partners in a relationship. Based on past research, the less dominant partner, typically a woman in a heterosexual relationship, is more likely to experience physical and mental health risks in comparison to dominant partners. In addition, women who identify with the LGBTQ community are also at higher risk of experiencing mental health issues. Because little research has evaluated power dynamics in non-heterosexual relationships, the purpose of this study is to evaluate if surveyors can perceive that less dominant partners (varying in gender and sexual orientation) are at higher risk of experiencing mental health issues. The surveyors will be randomly given one of the following scenarios in which the partners vary in power: dominant male/less dominant female, dominant female/less dominant female, dominant female/less dominant male. A questionnaire is currently being distributed online and is accessible to students. Results and conclusions will be formed by mid to end of March.

53
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Outlaw and Order: Norse Approaches to Justice and Society

EMILY BOLENDER and Thomas Barton

Within Western cultural memory, the Norse, or Vikings as they are more popularly known, represent a terrifying and savage other. While the raids conducted by Vikings across Europe strengthen this image, the Vikings represent a single facet of Norse culture. While the romanticized violence of the Viking Age is a popular vision, the reality is that the Norse were no more violent than any other contemporary societies. Indeed consulting legal codices such as the Icelandic Gragas, and the Norwegian Gulathing, illustrate the centrality of law and order to Norse society. Additionally, the medieval sagas depict a world in which upholding social order meant strict reciprocal applications of justice that bound all members of society. Consideration of Norse legal texts, practices, and literature reveals a society strictly bound by law, and a people who relied on strict application of justice to maintain order.

54
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Assessing the Thermal Denaturation of Aminoacyl-tRNA Synthase in Presence of Analog Amino Acids and tRNA

DANIEL GHEBREIGZIABHER and Anthony Bell

Current techniques that evaluate amino acid activation and tRNA-charging require laborious protocols and the use of hazardous radioactive isotopes. The use of a PCR-based technique offers a safe rapid analysis that can be compatible with a 96-well plate. This technique could be developed as a screening tool for the unnatural or analog amino acids (AAs) as protein translation substrates. Analog AAs are non-proteinogenic residues that are not encoded for in the human genome. Bacteria and fungi use large multi-subunit complexes, nonribosomal peptide synthetases, to synthesize peptides composed of analog AAs residues3,4,5. Analogs such as N-methyl and D-amino acids increase membrane permeability, protease resistance, and increase overall chemical complexity1,6. The objective of this proposal is to develop a safe and rapid method to measure the initial stages of protein translation. We will establish a PCR-based thermal denaturation assay to indirectly measure amino acid activation and aminoacylation (i.e. tRNA-charging). The long-term goal is to evaluate the resulting library of analogs with the protein synthesis using recombinant elements (PURE) system to translate analog peptides.

55
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Characterization of the Polymeric Immunoglobulin Receptor in Leucoraja erinacea

JAMES RICKETTS and Valerie Hohman

The immune system is essential in protecting organisms against infectious diseases. The mucosal immune system protects mucosal membranes, such as those lining the respiratory and intestinal tracts, which are typical entryways for pathogens (such as viruses & bacteria). An important component of the mucosal immune system are antibodies, which are produced as a defense mechanism in response to pathogens. The antibodies are transported across mucosal membranes by the polymeric immunoglobulin receptor (pIgR). Both antibodies and pIgR are highly conserved throughout vertebrate evolution, and have been identified in mammals, reptiles, birds, amphibians, and bony fish. Antibodies have been characterized in cartilaginous fish in intestinal secretions, however, the pIgR has not. Hence, we hypothesize that pIgR is presence in cartilaginous fish, to transport these antibodies for protection against pathogens. We have identified a partial cDNA sequence that has similarities to pIgR in other species. My project is to characterize the sequence and expression pattern for this gene in Leucoraja erinacea, the little skate, a cartilaginous fish. I am using a PCR technique called 5' Rapid Amplification of cDNA Ends to obtain the full-length sequence. Through semi-quantitative PCR, I am characterizing expression patterns of this gene in the various tissues of the little skate to see if the expression of our gene is consistent with pIgR function. The polymeric immunoglobulin receptor in the little skate, a cartilaginous fish, is of interest, because skates are representative of the most primitive vertebrate species with antibodies, hence providing insight on the origins of the immune system.

56
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Racial Politics and the Google News Algorithm: Personalized Delivery Feeding into a Person's Racial-Political Biases

KEVIN DO, Raven Maragh, Andrew High, Brian Ekdale, Huyen Le, M. Zubair Shafiq and Tim Havens

In order to carry out key processes such as gene transcription and cell replication, DNA must diffuse through a highly crowded cellular environment. Previous studies aimed at understanding intracellular DNA transport have mainly focused on the effect of small mobile crowders. However, the cytoskeleton, composed of filamentous proteins such as semiflexible actin and rigid microtubules, has been identified as a key factor suppressing viral transfection and gene delivery. Here, we investigate the effect that cytoskeletal proteins have on the transport properties of linear and circular DNA. Specifically, we use fluorescence microscopy and custom single-molecule tracking algorithms to measure center-of-mass transport and time-varying conformational changes of single DNA molecules diffusing in in vitro composite networks of actin and microtubules. We determine the role that DNA topology (linear vs circular), as well as cytoskeletal filament rigidity (actin vs microtubules), has on DNA transport and conformational states. We specifically quantify DNA diffusion coefficients, degrees of anomalous diffusion, and conformational sizes and shapes for protein networks with varying concentrations and polymerizations states of actin and microtubules.

57
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Assessing Potential Impacts of Whale Watching on Humpback Whale Behavior in Juneau, AK

DANA FLERCHINGER and Heidi Pearson and Nathalie Reyns

Whale watching serves as an important industry in Juneau, Alaska during the summer when humpback whales (Megaptera novaeangliae) arrive to prey on abundant food resources. This coincides with the arrival of cruise ships packed with tourists, ¼ of whom embark on whale watching excursions that generate millions of dollars for Juneau's economy. However, because the sustainability of whale watching depends on the abundance and health of the whales, assessment of the impacts is essential to creating a mutually beneficial industry for both whales and humans. Energy is a significant factor in the determination of the fitness of an organism, and vessel presence may provoke behavioral changes among cetaceans resulting in overall greater energy expenditure. The objective of this study was to demonstrate the short-term effects of whale watching vessel presence or absence on humpback whale respiration rate and dive time, which can serve as proxies for energy expenditure in cetaceans. Shore-based observations were used to record the behavior of whales with respect to whale watching vessels during the summer of 2017 in Juneau. Results

indicate that boat presence did not significantly impact respiration rates and dive times for humpback whales in Juneau. However, further data analysis of humpback whale behaviors and continued research is necessary to adequately determine if and how vessel presence influences whale behavior in Juneau in both the short and long-term. These assessments will aid in the development of conservation policy and help to promote the best practices for the whale watching industry.

58
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Everyday Imperialism: Marines in Nicaragua, 1927-1934

EMILY MAY, Julia Medina and Michael Gonzalez

When discussing both current and historic events, oftentimes the military and its members are characterized as a monolithic actor, without paying attention to the diverse backgrounds of the individuals who make up the armed forces. Previous historians who have written about the Marines' conflict with Augusto C. Sandino have overlooked a large part of the history by ignoring the details of their lives in Nicaragua. This paper will take a renewed look at the perspectives of Marines and their mission during the conflict with Sandino in Nicaragua from 1927 to 1934 through primary sources such as diaries, newspapers, and oral histories. The sources discuss what Marines thought of the people of Nicaragua, the environment, and attitudes about the war. Their writings provide a case example of how the U.S. military men experienced these forced interactions through their assignments within the military. The Marines in Nicaragua tried to learn some basic Spanish phrases and take note of the environment around them as both their new home. As a part of that, they also inscribed the "othering" of the Nicaraguan people, using derogatory language to describe the community and their way of life. The Sandino confrontation offers an opportunity to witness cultural interactions through the eyes of Marines, and to learn historical lessons on how imperialist forces experience the cultures they attempt to "civilize." Not only were the physical actions of the Marines imperialist in nature, but their perception of Nicaraguan culture and environment also belies imperialist attitudes.

59
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Smart Bicycle Airbag

BROOKE ZALUD and Bryan Cornwall

Our project focus came about from the belief that cyclists are ill protected in the event of a crash, as shown by recent studies that focus on the number of bicyclist injuries and the location of these injuries. A helmet adequately protects the head region of a bicyclist, but the neck, spine, and torso of the cyclist has little to no protection. Our solution to this problem was to design a wearable airbag in the form of a backpack that can deploy and protect a cyclist during a crash. Through various iterations, we designed an airbag to be deployed through an IMU sensor containing both an accelerometer and gyroscope. By measuring what jarring and falling movements a crash consists of, we were able to write a code that can determined the positive event of a crash, information that is deciphered by a microcomputer, which then triggers a battery powered solenoid. This pulling solenoid valve then releases an orthogonal manually loaded spring in a trigger housing system, at which time a metal pin successfully pierces a CO2 canister. The gas that escapes is then of sufficient pressure and volume to inflate airbag pockets sewn into the lining of the backpack. The process of sensors identifying a crash to the finished inflation of the airbag takes no more that half a second and leave the user's upper body more protected and cushioned to absorb crash forces.

61
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Macrophage Function in the DIPG Tumor Microenvironment

HEATHER KOVAR and Jena Hales

Diffuse Intrinsic Pontine Glioma (DIPG) is a universally fatal pediatric brain tumor arising in the pons. It is diagnosed in approximately 350 children a year in the United States, usually between the ages of six and seven. Surgical resection is not an option due to its location, chemotherapy has shown no significant benefit and radiation therapy is used as a means of palliative care resulting in a median survival outcome of nine to eleven months. One treatment starting to show promise in treating other brain tumors is immunotherapy due to its ability to specifically target tumor cells while leaving healthy cells intact. We know that the composition of the tumor immune microenvironment greatly influences the efficacy of said immunotherapies. Therefore, the goal of this project was to characterize the DIPG tumor immune microenvironment. We isolated RNA from DIPG patient tumor samples, various other brain tumors, and healthy brain tissue to quantify immune related gene expression. Subsequently, macrophages were co-cultured in DIPG and adult glioblastoma cell lines and analyzed using flow cytometry technology. This research has resulted in important preliminary findings that the DIPG microenvironment has relatively little macrophage infiltration, lower levels of immunosuppressive factors, and an inability to polarize macrophages to a pro-tumor like state. These findings are imperative to future development of effective immunotherapies to treat DIPG.

63
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

The Effect of Temperature and Water Level on Dispersal in Crawling Water Beetle Family Haliplidae

GABRIELA ORTIZ, LAUREN MUSIAL and Kate Boersma

The occurrence and severity of extreme climatic events is expected to increase in the future. Extreme climatic events, such as droughts, can have devastating effects on freshwater ecosystems. Aquatic insects have adapted strategies to tolerate or survive climatic disturbances, such as dispersing to a more suitable habitat. Temperature and water level are two environmental factors known to trigger dispersal in aquatic insects. However, little is known on how those two factors can interact together in triggering dispersal. In this work, the combined effects of temperature and water level on the initiation of dispersal by crawling and/or flight in aquatic beetles of the family Haliplidae were evaluated through a fully factorial experiment. Three temperatures and three water levels were combined to create 9 treatment conditions. We recorded beetle behavior in response to the conditions and found that at low temperature, more beetles dispersed at low water level than at high water level. However, at medium and high temperatures, dispersal did not vary across water levels. Our findings suggest that increased temperature is the principal stimulus for dispersal and that water level is important in the context of lower temperatures.

64
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Immigration, American Exceptionalism, and the American Dream

CASSANDRA ORTEGA and Thomas Reifer

This study aims to investigate if and how the younger generation, is holding a different outlook toward the American Dream, American exceptionalism, and American nationalism in comparison to the generations of the early 20th century. This study particularly emphasizes on the importance of early 20th century second-generation immigrants who formed the modern idea of the American Dream, which compares and contrasts with the immigration wave in the late 20th century that has created the most ethnically and racially diverse generation present today. This same generation is one that seems to hold more egalitarian views toward social policies than previous generations. Furthermore, given the impacts of immigration, and the dissipating promise of the American Dream, an increasingly number of young people seem to be forming a political

revolution. The study will be conducted through a comparative world historical approach, examining existing research on successive immigrant generations, and their changing views on the American Dream and American exceptionalism, including their perception of immigration, diversity, inequality, and related social policies. The results anticipate that the younger generation is gravitating toward advocating for a more egalitarian and altruistic society, which may spark a change in the future of American politics.

65
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Microaggressions in Relation to Latinidad and Latinx Identities

ELIZABETH HURLEY and Kevin Guerrieri

The goal of this research project is to analyze how microaggressions manifest themselves among Latinx residents in the United States and how they interact with different notions of Latinidad. Microaggressions are the brief and commonplace daily verbal, behavioral, and environmental indignities, whether intentional or unintentional, that communicate hostile, derogatory, or negative racial, gender, sexual-orientation, and religious slights and insults to the target person or group (Sue). They are a mounting issue in society because they perpetuate inequality in a variety of environments. Racial microaggressions as pertain to the Latinx community in the United States have been studied, and this investigation will draw from a variety of other works in order to provide a more comprehensive interpretation of the racial microaggressions experienced by the Latinx community in the U.S. This research will also analyze the complexity of Latinidad in relation to microaggressions. The notion of Latinidad encompasses different concepts of what it means to be a Latinx person as well as a wide range of values and attributes present in Latinx communities. Finally, this project also seeks to explore different mechanisms and tactics for resistance against microaggressions in different settings of daily life and beyond.

66
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Exploring the structural basis of the Cross-Talk between GlcNAcylation and Phosphorylation Using Physical Models.

SHARON SHANIA, MICHAEL SCHWABE, NINA MARIE GARCIA, HALIE SONNENSCHEIN and Ellis Bell

The focus of this project was to explore Structure Function relationships in the enzyme UDP-GlcNAc O transferase protein and design and build a physical model that illustrates key functional features of the protein. In particular our focus is on the Cross-Talk between O-GlcNAcylation and Phosphorylation that plays a critical role in overall regulation. Using the pdb file 4gyy.pdb from the paper “Crystal structure of human O-GlcNAc Transferase with UDP-5SGlcNAc and a peptide substrate” The structure illustrates the binding sites for both UDP-GlcNAc and the peptide YPGGSTPVSSANMM with the requisite PV prior to the GlcNAcylatable S. Recent work by Leney et al (Proc Natl Acad Sci U S A. 2017 Aug 29;114(35):E7255-E7261) has shown that the preceding T can be phosphorylated and that the sequence TPVS is common in proteins thought to undergo GlcNAc- Phosphorylation cross talk. We have also used computational models to create and built models of the peptide phosphorylated at the N-3 Threonine. These models clearly illustrate that the phosphate group clashes with the U in UDP-GlcNAC. Since the kinetic mechanism of OGT is ordered Bi-Bi with UDPGlcNAc as the obligate first substrate, the phosphorylated peptide can no longer bind in the peptide substrate pocket explaining why excludes GlcNAcylation. The models described here can be used to illustrate three different aspects contained in the ASBMB 8 Core Concepts of Macromolecular Structure and Function: #3. Structure and function are related, #4. Macromolecular interactions, and #6. The biological activity of macromolecules is often regulated. In addition construction and use of the models illustrates the use of core concept #8, A variety of experimental and computational approaches can be used to observe and quantitatively measure the structure, dynamics and function of biological macromolecule.

68
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Race and Religion as Moderators of Perceived Friendliness

GRANT GILBRETH, HANNAH GILLILAND, and Rebekah Wanic

An individual's identity involves membership in various groups, such as gender or race. Previous research on stereotyping has shown that while groups are often attributed with both positive and negative characteristics, certain groups are overall viewed more negatively. For example, past research regarding race has found overwhelming support for pro-White attitudes and more negative attitudes associated with minority groups. Religion is a group which may form part of the basis for one's identity and research has shown generally positive attitudes associated with religion and-those affiliated with various religions, with negative Muslim-associated biases standing as the primary and consistent exception. Finally, because individuals strive to maintain a positive self-view, research has shown that they tend to rate their in-group more positively. The current study seeks to explore the relationship between race and religious affiliation on person perception. Specifically, members of a primarily White, Catholic, private university were shown images of either a White or Middle Eastern individual and half in each condition were also provided with a manipulation of religious affiliation as either Catholic or Muslim (consistent with race). It was expected that the White Catholic participants would rate the White Catholic man most positively and the Middle Eastern Muslim man the least positively, however the data were inconsistent with this prediction. Specifically, the Middle Eastern individual was rated more positively than the White individual, and the non-religious Middle Eastern individual was rated higher than both the White conditions. Potential reasons for this surprising result are discussed along with limitations and future directions.

69
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Effect of Partial Hippocampal Lesions in Rats on the Traveling Salesman Problem

JESSICA PAUL, Gequasha Collins, Kiran Long-Iyer, Elizabeth Petty and Rachel Blaser

The Traveling Salesman Problem (TSP) is an optimization problem in which the subject attempts to find the shortest possible route that passes through a set of fixed locations exactly once. The TSP is used in cognitive and behavioral research to study problem solving and spatial navigation. While the TSP has been studied in some depth from this perspective, the biological mechanisms underlying the behavior have not yet been explored. The hippocampus is a structure in the brain that is known to be used for tasks that require spatial memory. Because the TSP requires spatial problem solving, we designed the current study to determine whether rats use their hippocampus when producing solutions to the TSP, and if so, what role the hippocampus serves. The rats were pretrained on the TSP, which involved learning to retrieve bait from targets in a variety of spatial configurations. Matched for performance, rats were then divided into two groups, receiving either a partial hippocampal lesion or 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.

70
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Biophysical characterization of Suppressor of IKKepsilon structure, stability, and metal binding properties

FLOWREEN SHIKWANA and J. Ellis Bell and Jessica K Bell

Suppressor of IKKepsilon (SIKE) is phosphorylated in the signaling cascade that initiates the anti-viral innate immune response mediated by Toll-like receptor 3. Although shown to be associated with cytoskeletal proteins, the function of SIKE in association with the cytoskeleton or as part of the innate immune response is not yet known. To gain insight into SIKE?s function, structural and biophysical characterization were undertaken. Fluorescence-based thermal shift assays (FTSA) indicated that the SIKE structure displayed hydrophobic residues prior to thermal denaturation. With increasing temperature, additional hydrophobic character was displayed giving rise to unique FTS curves showing -

transitions, initial binding of fluor, unfolding, and quenching of fluorescence, presumably by protein aggregation. From modeling software, a divalent cation binding site was predicted. Using FTSA, the addition of zinc and calcium appear to alter the thermal stability of SIKE. Using ANS as a reporter group or direct tryptophan fluorescence of SIKE, the binding affinity of SIKE to various divalent cations, zinc, magnesium, manganese and calcium, was assessed. Fluorescence quenching experiments with neutral and charged quenchers were used to probe the local environment of the lone Trp residue of SIKE. The quenching coefficient for the Trp in SIKE determined from acrylamide studies was significantly lower than that of free Trp in solution indicating that the residue is fairly protected. Together, these studies provide biophysical parameters with which to interrogate and refine our predicted SIKE structure that is being employed in interpreting how SIKE interacts with cytoskeletal proteins to mediate host defense mechanisms.

71
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Fight or Flight? The role of ChpT phosphotransferase in R. centenum motility and encystment.

ISABELLA FULOP and Terry Bird

Rhodospirillum centenum, an alpha-proteobacterium that transitions between multiple cellular states allowing this species to colonize a variety of environments. The hypothesized phosphorelay pathway DivK --|Cyd2 <--> ChpT --> CtrA is known to be genetically conserved in alpha-proteobacteria including such well-known species as Caulobacter cresentus and Sphingomonas melonis. In R. centenum, this phosphorelay is hypothesized to form a signal transduction system that affects differentiation into the swarm, swim, or cyst cell states. CtrA is a transcriptional activator that has been shown to enhance swarming and swimming motility while hindering encystment when cells are deprived of nutrients. We hypothesize that CtrA activity is directly regulated by the phosphotransferase protein ChpT. Our analysis of a chpT mutant strain suggests that the ChpT protein activates CtrA through phosphorylation so that cells 'choose' to become motile, rather than encyst, in response to starvation.

72
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Metaphors of Apocalypse in Parable of the Sower snd The Book of Eli

DOMINIQUE SHANK and Carlton Floyd

In A Sense of Apocalypse, Marcin Mazurek argues that our cultural understandings of apocalypse can be largely subsumed within two metaphors. This study investigates the validity of Mazurek's argument through an examination of Octavia Butler's Parable of the Sower and Hughes Brother's The Book of Eli through the scope of metaphor theory. Parable of the Sower prophetically envisions California as xenophobia, systemic corruption, declining ecosystems, and corporate takeovers threaten to destroy it. The novel's lead character, young Lauren Olamina, survives the destruction of her state by forming a diverse enclave of people bound together by a belief that out of destruction a utopian space might be created; thus, Butler constructs their future, though unknowable, as actionable. The Book of Eli adheres to an eschatological, predetermined, Abrahamic interpretation of the apocalypse. Eli is posited as a "quasi-messianic figure" operating within a framework established by the Book of Revelation. Given the parameters of an established mythology, The Book of Eli fails to present any actionable means of addressing the imminent apocalypse; instead, it assumes a fatalistic stance within the apocalypse it constructs. The disparity between these two metaphoric understandings, apocalypse as actionable or revelatory, in addition to the prevalence of the latter form in an extended examination of other 20th and 21st century apocalyptic representations, reveal a social tendency to experience the apocalypse as beyond human agency rather than as a potential state in which human intervention matters.

73
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
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 the 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 ingestions 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.

74
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Firearms Culture, Legislation, and Violence in the United States of America and the Commonwealth of Australia

IAN CARSTENS and Michael Gonzalez

In the modern world, firearm violence has long been a major issue and source of contention. Since their invention, firearms have revolutionized the way in which people can inflict harm on others. While arguments are made for firearms as sources of protection, they are in essence tools for violence and destruction. The United States of America and the Commonwealth of Australia are two developed first-world countries that can be used for a comparative study of how differing cultural opinions and legislative policies can affect the prevalence of firearm violence. While both nations have origins of being British colonies that occupied lands inhabited by indigenous peoples, two drastically different cultural mindsets on firearms have arisen. Several interesting facts are relevant to be studied: 1) Though in the United States firearms are viewed as a right, in Australia they are viewed as a privilege; 2) Firearm regulations in Australia have developed to be more restrictive than those in the United States; 3) Rates of firearm violence in Australia are lower than those in the United States. Analysis and comparison of the available research shows that it is likely a combination of the cultural and following legislative differences that have led to the varying rates of violence. Unfortunately, additional research shows it is unlikely that mere legislative changes in the U.S. would not yield the same results as seen in Australia.

75
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Ultrasonic Wave Propagation in 3D Printed Plastics

EDWARD ALEXANDER and Gordon Hoople

3D printing has emerged as a promising new manufacturing technique with applications ranging from dental implants to precision aircraft components. 3D printed parts, unlike those made in a traditional manufacturing processes, exhibit anisotropic characteristics due to the layering process inherent to 3D printing. This non-uniformity presents challenges for engineers designing and working with parts fabricated by 3D printing, especially in applications involving ultrasonics. In this research poster, we present our preliminary findings of how ultrasonic wave transmission is impacted by the non-uniformity of 3D printed parts. We compare behavior for three different printers (Form 2, Ultimaker, and uPrint) that each use different materials and printing parameters. We printed multiple specimens from each 3D printer and measured the ultrasonic transmission both aligned with and orthogonal to the print axis. We find that the Form2 exhibits the most homogenous behavior of all of the 3D printed materials, but that for each part there are observable non-uniformities due to the orientation of the printed layers

76
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Parameters that define Suppressor of IKK epsilon (SIKE): cytoskeletal protein interactions revealed through determination of binding affinities and SIKE?s dimer interface

HALIE SONNENSCHEIN, John Bell and Jessica Bell

Upon pathogen challenge multiple receptors both inside and on the surface of the cell, recognize pathogen associated molecular patterns (PAMPs) and initiate the production of proinflammatory, antiviral, and apoptotic responses. Pathways converge at key hubs that serve to amplify and regulate the signals, and are often responsible for determining the downstream response. TANK Binding Kinase 1 (TBK1) serves as a catalytic hub in the antiviral TLR3 mediated innate immune pathway. Suppressor of IKK epsilon (SIKE) is a recently identified high affinity alternative substrate of TBK1. It was initially found to inhibit TBK1 activation of type 1 interferon production. Upon subsequent study, it was found that SIKE was phosphorylated at six serine residues by TBK1. This phosphorylation of SIKE corresponds to the activation of the antiviral response, and releases SIKE from the SIKE:TBK1 interaction. The primary function of SIKE remains unknown. Examination of SIKE?s interaction network has established direct interactions with cytoskeletal proteins including tubulin and ?-actinin. Migration assays have shown that chronic myelogenous leukemia (CML) cells in which SIKE has been knocked out migrate at a slower rate. Together, these studies suggest that SIKE plays a role in cytoskeletal rearrangements associated with innate immune responses such as migration and phagocytosis. The goal of this study is to define the interaction surface of SIKE as well as the binding affinities associated with these interactions. A quartz crystal microbalance with dissipation (QCM-D) assay was developed to obtain binding affinities for the SIKE:cytoskeletal protein complexes. A gold sensor was utilized and functionalized with protein G and ?-His antibody to which 6xHis-SIKE was immobilized. Increasing concentrations of binding partner were flowed over the chip to develop a binding curve. Prior to examining SIKE:cytoskeletal protein interactions, SIKE?s oligomeric state was defined by crosslinking s

77
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Probing the Reactivity of Amine-end Functionalized Starches

JAMES YOUNG and Peter Iovine

The development of end-functionalized polysaccharides increases the utility of these naturally occurring and abundant polymeric materials by facilitating high yielding conjugation reactions with complementary polymers, small molecules, and biological targets. Herein we present the synthesis and characterization of a series of amine end-functionalized starches prepared by reductive amination. We demonstrate the utility of these macromolecular reagents in high-yielding conjugation reactions with a variety of electrophiles with an emphasis on activated esters.

78
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Airports Going Green

IRIS PENA-FRANCO, The San Diego County Regional Airport Authority: Environmental Affairs, and Eric Cathcart

Airports around the world serve an average of about 40 million passengers yearly with exponentially growing passenger traffic. With the increase in demand for customer services provided by Airports, such as restaurants and retail vendors, the determination of environmental impact of these services and mitigation of that impact is important for financial and environmental sustainability practices.

Locally Airports such as the San Diego International Airport, under the management of the San Diego County Regional Airport Authority, utilize the launching of programs such as "The Green Concessions Program" to improve environmental leadership. "The Green Concessions Program" focuses on water, energy, pollution, and waste diversion throughout the LEED certified Green Build terminal retail, food, and beverage establishments. With an approximate 20% of concessions certified in the Summer of 2017, data providing details of what green practices were already being utilized versus ones implemented by "The Green Concessions" program are discussed along with other challenges encountered. These studies will encourage other Airports throughout the world incentives to partake in sustainability through similar practices or programs, leading to more efficient and greener services, with a decreased impact on the environment.

79
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Six Stroke Engine

GRANT LABRIOLA, DEREK ARTHURS, CONNOR REUSS, ALEX WILSON, ALVARO ESPEJO, and Matthew McGarry and Daniel Codd

Four-stroke gasoline engines are extremely inefficient at utilizing all of the thermal energy released during combustion. Traditionally, excess thermal energy within the cylinder of the engine is simply transferred to the outside environment in order to prevent overheating. It is estimated that 62% of the energy contained in fuel is lost in the form of heat ('Where the Energy Goes?', 1). Our senior design team will address this shortcoming by modifying an existing four-stroke gasoline engine into a prototype that demonstrates a means of recovering and using otherwise wasted heat. After analyzing many approaches, we have elected to modify the engine to run the Crower cycle, a six-stroke cycle which injects water into the cylinder after the combustion products are exhausted. The excess heat produced will convert the water into steam, and the expansion of this steam provides the engine with an additional power stroke. A direct injector and additional exhaust valve are necessary to introduce and evacuate the water and steam. Our prototype is broken down into four major subsystems: water injection, camshaft, timing gear and base engine. The custom camshaft is needed in order to actuate the valves at the appropriate times for the modified cycle, and the timing gear must be modified to turn the cam at a speed that allows it to control three revolutions of the crankshaft over the usual two.

80
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Oxidation of Borylated Phosphines

Joshua Wilson, Enrique Marcilla and Timothy B. Clark

Phosphine-directed C-H borylation has been a recent subject of research for the formation of elaborate phosphines. Phosphines are ubiquitously used as ligands in metal-catalyzed reactions due to the ability to tune the steric (size) and electronic properties of a catalyst. Borylated phosphines are useful as intermediates to incorporate other functional groups into the phosphine backbone. The borylation reaction replaces a C-H bond with a C-B bond using a metal catalyst. The new boronate ester can be reacted with an oxidizing agent, replacing the boronate ester with an alcohol which adds to the utility of the resulting phosphine. Our results showed that an oxidation using H2O2 and NaOH led to over oxidation of the phosphine, oxidizing both the C-B bond and the phosphorus atom. Using MCPBA (meta-chloroperbenzoic acid) as the oxidizing reagent we have improved the selectivity for the desired oxidation product.

81
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Does Metabolic Intensity of Tissues Explain the Basal Metabolic Rate of Eared Grebes?

JONINA CAPINO, STEPHANIE LOW, KATHERINE VILLEGAS and Hugh Ellis

Eared Grebes (Podiceps nigricollis) are diving waterfowl that have 4-6 migratory legs in their annual cycle (Jehl 1997). They spend around 9-10 months of the year flightless during long sedentary periods, which are punctuated with long-distance migrations. At each staging site, Eared Grebes undergo a change in body composition involving both atrophy and hypertrophy of specific tissues and organs. Daan et al. (1990) and others have argued that basal metabolic rate (BMR) can be altered by changes in a bird?s body composition. Surprisingly, Grebe BMR remains constant throughout these changes (Ellis and Jehl, 2003 and unpublished). We suspect that metabolic tissue intensity, rather than their size, affects their BMR as suggested but not demonstrated by Piersma (2002). We are looking particularly at birds either in the middle of their sedentary period or those who are preparing for flight. We are using metabolic pathway enzymes to represent metabolic intensity and we particularly focus on the enzyme activities of citrate synthase (CS) and pyruvate kinase (PK). CS is a rate-limiting enzyme in the Krebs cycle (Vezina and Williams 2005). PK, which catalyzes the final reaction step in the glycolytic pathway to yield pyruvate, can be used as an indicator of glycolytic activity within cellular tissues (Bishop et al., 1996; Berg et al., 2002). These enzyme activities were measured spectrophotometrically and then quantitatively analyzed. CS and PK seem to be upregulated in pectoral tissues, CS is upregulated in the heart, and PK is upregulated in gastrocnemius prior to departure for migration. Further research will be conducted to understand the trends of CS and PK, as well as observe other critical metabolic enzymes.

82
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Spatial Distribution of Toxic Release Sites and Relationship to Population

JASON GREENSTEIN and Zhi-Yong Yin

The spatial locations of toxic releases from industrial and commercial facility and waste sites in southern California were compared to the demographic characters of the neighborhoods as defined by census data to see if there was a disproportionate number of toxic sites in disadvantaged and minority communities. The ArcGIS software was used to map and integrate the EPA toxic release data (2010-2015) and solid waste sites from CalRecycle.ca.gov with the demographic data (estimated 2015 data by census tracts), which was then imported into the statistical software program R to determine the relationship between the two. The results of this analysis showed a significant association between Hispanic populations and the location of toxic and waste sites (OR = 2.99). The results also showed a significant positive relationship between Hispanic populations and the density of toxic sites (r = 0.447). The chosen socioeconomic variables (e.g., median income, housing value, and percent of population below poverty line) also had significant, although weaker, relationships with the locations of toxic sites. From the results of this analysis, we concluded that there was environmental inequity between different racial and socioeconomic groups in southern California in allocation of the hazardous sites. However, the relative contributions of the demographic and socioeconomic factors in forming the observed distribution pattern of the hazardous sites still need to be determined.

83
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Development and characterization of novel biocomposites using supercritical carbon dioxide

GREG BARR, WILLIAM TREVENA and Truc Ngo

The goal of this project is to develop drug-impregnated biocomposites using supercritical carbon dioxide (scCO2) processing. Poly(methyl methacrylate) (or PMMA) samples will be prepared by a 3D-printing method, called stereolithography, and processed in supercritical carbon dioxide with an anti-inflammatory drug (flurbiprofen). Mechanical properties and surface morphology of materials will be characterized and compared before and after processing. Process parameters such as 3D-printing orientation, scCO2 pressure and temperature, will also be varied and levels of drug loading in the biocomposites will be measured to establish potential correlations. The developed materials have potential applications in controlled drug release systems, implants, bone scaffolds and other related biomedical uses.

84
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

The Synthesis of Novel Metal Complexes Formed from Dipyrromethene Ligands

KELSEY CARRERAS-SIMONS, NICHOLAS DICHRISTOFANO and Mitchell Malachowski

Organic moieties called dipyrromethenes have become increasingly popular as donors to metal ions. We have synthesized a series of new organic molecules where we have combined the dipyrromethene portion to various organic moieties. These organic molecules have been complexed to metal ions such as copper and cobalt and the metal complexes have been characterized. These complexes will be characterized by a combination of elemental analysis, mass spectrometry and X-ray crystallography. The ability of the complexes to form supramolecular arrays will be determined and additional complexes will be synthesized based on these results.

85
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

CEO and Chairman of the Board: The Corporate Governance Controversy

JULIE COURTNEY and Annalisa Barrett

About half of the companies that make up the S&P 500 Index, an index comprised of 500 publicly traded United States companies with market capitalizations of at least $6.1 billion, have one individual as the CEO & Chairman rather than splitting each role amongst two individuals. This sparks a conflict of interest within corporate governance in U.S. companies. In a combined role of CEO and Chairman of the Board, a company has no issue determining who is in charge of the goals and outcomes of the organization. This leadership structure has potential for setting clear company objectives and maintaining efficiency coming from one voice; however, it leaves many loopholes to be taken advantage of if the individual were to act in his or her own best interest. This paper serves to provide further research and explanation into what would be the overall best resolution, both ethically and strategically for U.S. companies, comparing the pros and cons of the two leadership structures and ultimately concluding that a combined CEO/Chairman of the Board structure should not remain an acceptable corporate governance practice in the United States. The ethical risks outweigh the potential success of combined leadership, often resulting in scandal, fraud, and failure. For each decision to be in the best interest of the shareholders, the decision power should be split into two different hands—one CEO and one Chairman of the Board.

86
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Solar Turbines Enclosure Door Project

HANA ALMUNAYES, SERGIO SAMANIEGO, OLUFOLARIN SALIU, EAMON SCHANEY and Gordon Hoople

The issue we are exploring revolves around turbine enclosures for the company Solar Turbines. When turbines are placed in enclosures, they have to be serviced by individuals to ensure the turbines continue to run properly. The problem that is occurring is that the enclosure doors are large, heavy, and creating a safety hazard. When the door is shut, pressure builds up inside the enclosure and can cause the door to violently swing open when someone goes to open it. Additionally, the current system used to hold the door open is problematic and can come undone causing the door to slam shut in high winds. The solution we are looking at is a two-pronged approach with two subsystems. We are looking to implement a door kickstand that can catch the door before it flies open, resisting forces on the order of 130 pounds of force. The second part of our design is a door angle adjuster that must be able to resist 120 MPH winds. We believe that this two-pronged approach will be able to solve the two main issues at hand while providing safety and cost effectiveness to Solar Turbines.

87
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Free Energy Mapping of Glycolonitrile Co-Oligomerization

KYRA THRUSH and Jeremy Kua

Glycine, the simplest amino acid, is a product of the Strecker synthesis of hydrogen cyanide (HCN) and formaldehyde (H2CO) in the presence of aqueous ammonia. But a plethora of other related molecules, not utilized by extant biology, are also produced from these simple chemical reactants. By establishing a system of in silico design approximating the conditions of prebiotic earth and calculating free energies and reaction barriers, we determine potential pathways to the different molecules found in this complex mixture. We hypothesized that, consistent with experimental measurements, glycine is one thermodynamic sink within our "free energy map", explaining its presence in benchtop experimental solutions. However, it is in kinetic competition with other thermodynamic sinks. Our results are semi-consistent with our hypothesis. Our calculations show that although glycine is a thermodynamic sink, its formation requires significant inputs of energy to overcome barriers necessary for its synthesis over other thermodynamic sinks. This experiment is significant because it assesses the relative accessibility of glycine in solution to determine the feasibility of its formation, incorporating data that is not readily probed in benchtop chemistry.

88
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Measuring Political Power: Explorations of Public Good Power Indices

KATHRYN FORSYTHE, MELANIE KLIEGEL, DAVIS GILES, TAYLOR BONGIOVANNI and Bryan Cornwall

What do the UN Security Council, the Electoral College and a company's board of directors have in common? They are weighted voting systems, in which voters may have different numbers of votes, and a quota must be met in order to make a decision. However, actual power is not directly proportional to the number of votes held. The common good power index measures power by counting the number of times that a voter appears in "minimum winning coalitions": groups of voters that have quota, but would lose quota if any member exited the coalition. This measure of power is motivated by the observations that: a) coalitions larger than minimum winning coalitions rarely form and b) all members of a minimum winning coalition are equally necessary. We will explore some aspects of the common good power index.

89
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Diffusion and Conformational Dynamics of single DNA Molecules Crowded by Cytoskeletal Proteins

KATHRYN REGAN, Rachel Dotterweich, Shea Ricketts and Rae M. Robertson-Anderson

The high concentrations of proteins crowding cells greatly influence intracellular DNA dynamics. These crowders, ranging from small mobile proteins to large cytoskeletal filaments such as semiflexible actin and rigid microtubules, can hinder diffusion and induce conformational changes in DNA. While previous studies have mainly focused on the effect of small mobile crowders on DNA transport, we focus instead on the role of the cytoskeleton. Specifically, we use fluorescence microscopy and custom single-molecule tracking algorithms to measure center-of-mass transport and time-varying conformational changes of single DNA molecules diffusing in in vitro networks of actin and microtubules. To determine the roles that cytoskeletal filament rigidity and size have on DNA dynamics, we vary the relative concentrations and polymerization states of actin and microtubules crowding DNA and quantify resulting DNA diffusion coefficients, degrees of anomalous diffusion, and changes to conformational size and shape.

93
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Electric Vehicle Power Allocation Logic System (EVPALS)

SEAN CURTIS FERNANDEZ and James Gilb, Venkat Shastri

Every day, electric vehicle owners plug in and charge their cars using electric vehicle charging stations based on their charging needs. Currently, EV charging stations can only charge one vehicle at a time. As a result, there are charging inefficiencies that surface due to customers who leave their car parked yet no longer need charging. The Electric Vehicle Power Allocation Logic System developed by students from the University of San Diego aims to use a field-programmable gate array (FPGA) and microcontrollers to obtain several advantages: increased charging efficiency, multiple car capability, and controlled current/power output. Increased efficiency can be achieved by programming the FPGA with an algorithm that takes in user input and allocates power depending upon the user's charging needs. The design allows for up to four electric vehicles to charge simultaneously by connecting them to four individual microcontrollers that negotiate power. Current and voltage are dictated by the communication between the electric vehicle and the charging station. A charging station equipped with EV PALS will benefit from improved charging efficiency and increased customer satisfaction.

94
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

ColdShoulder Coolers

SYLVESTER SCHANER, JACK SHEFFIELD, JOSHUA CANTY, PATRICK FARNEY, PETER RACQIER and Venkat Shastri

Everyone that recreates on a regular basis needs some form of device to store food and beverages for extended periods of time without them going bad. The Cold Shoulders backpack cooler solves these issues. The most common way to keep the essentials fresh is to keep them cold. The most basic solution to keeping items cold is ice. The issue with ice is that it eventually melts. Once it melts, the user has to buy more ice. Additionally, ice takes up valuable space that could be used for more food and drinks. Our backpack is a self-cooling, non grid-powered cooler. Our design consists of a medium-size backpack with a modular battery source, cooling system, and insulated compartments to keep food and beverages cold for

extended periods of time. Our biggest goals are to create a cooler that can run off a battery that can be repeatedly charged, hold at least 30 cans, and be easily portable for the average user. Our backpack cooler will eliminate the need for ice as well as the need for an extremely heavy and expensive cooler to keep food and drinks cold for an extended period of time. The Cold Shoulders backpack cooler will revolutionize the cooler industry. Additionally, the ColdShoulders has massive potential for application in underdeveloped regions of the world that do not have access to conventional power and refrigeration. The ColdShoulders backpack will give people in these areas the ability to keep food, beverage, medicine, and all other supplies refrigerated.

95

Thursday, April 19

Session One; 12:00 - 12:50 p.m.

UC Forums

Adversity Creates Agency for Argentine Women: The Impact of the 2001 Financial Crisis on Female Identity

DEVIN COREA and Kenneth Serbin

The Argentine 2001 financial crisis is a moment which presented social, political, and economic chaos. Out of this turmoil public protests and popular movements arose. It is within this context that Argentine women emerge as key players in social, political, and economic ongoings. An analysis of the roles that women played throughout the crisis reveal that there existed a feminization of protest, female leadership, and an overall movement of women from the private sphere to the public sphere. This progress in action allowed women to develop a distinct form of feminine activism and agency. Thus, the instability and disruption of cultural normalities, as a result of the 2001 financial crisis, provided a context in which Argentine women experienced newfound autonomy, leadership, identity, and agency.

96

Thursday, April 19

Session One; 12:00 - 12:50 p.m.

UC Forums

The Ideal Individual and the Ideal Citizen: The Conflict Between Individualism and Authoritarianism in the Writings of Jean-Jacques Rousseau

KATHRYN RICHARDS and Timothy McCarty

The political writings of French philosopher Jean-Jacques Rousseau contain sets of conflicting claims and paradoxically structured ideas, thus resulting in his work being the basis for arguments made by political thinkers on opposite sides of the ideological spectrum. One contradicting pair of ideas repeatedly reveal themselves in Rousseau's writing: his conception of the ideal individual as someone radically disconnected from the corruption of society and his conception of the ideal political state as a community dependent upon individual subordination to an authoritarian entity. I hypothesize these two conflicting ideas are reconcilable and present a method for interpreting how one can exist as a radically individualist citizen within the type of political state Rousseau constructs in "The Social Contract." I trace the development of these concepts through four of Rousseau's most influential political works: "The Social Contract," "Émile," "Discourse on the Origin of Inequality," and "Discourse on the Sciences and the Arts." I then present several methods for interpreting and reconciling this conflict, drawing from research conducted by previous theorists on interpreting this specific conflict. I finally posit my own solution to the problem, arguing that the distinction between the political individual and the personal self allows for Rousseau to advocate for the existence of a radical individual within the type of authoritarian society he creates in his own writing. Rousseau's political ideas are not the ramblings of an ideologically conflicted man but rather a blueprint for how to exist in a society that seems to discourage radical individuality.

97

Thursday, April 19

Session One; 12:00 - 12:50 p.m.

UC Forums

Measuring Political Power: Explorations of Public Good Power Indices

SOREN DEHAAN and Jane Friedman

What do the UN Security Council, the Electoral College and a company's board of directors have in common? They are weighted voting systems, in which voters may have different numbers of votes, and a quota must be met in order to make a decision. However, actual power is not directly proportional to the number of votes held. The common good power index measures power by counting the number of times that a voter appears in ``minimum winning coalitions'': groups of voters that have quota, but would lose quota if any member exited the coalition. This measure of power is motivated by the observations that: a) coalitions larger than minimum winning coalitions rarely form and b) all members of a minimum winning coalition are equally necessary. We will explore some aspects of the common good power index.

98

Thursday, April 19

Session One; 12:00 - 12:50 p.m.

UC Forums

Determining the role of disheveled and b-catenin homologs in the development of sex-specific neuronal cells in C. elegans

JALEN PAULOS and Curtis Loer

The development and homeostasis of all animals is regulated in part by the Wnt signal transduction pathway. This pathway is named for Wnt, a secreted signaling protein, which binds its receptor protein, Frizzled, on the surface of a cell. Activation of the pathway by Wnt binding activates the protein disheveled, which increases the amount of the transcription factor b-catenin present in the cell to control gene expression. When something goes awry in a Wnt pathway in humans it may result in compromised development, cancer, and even death. In most animals, the pathway works in a variety of different ways. There are multiple versions of the pathway, with several genes encoding each pathway protein - such as multiple Wnt, Frizzled, and b-catenin genes. We are using the nematode C. elegans to elucidate more about how Wnt pathway components function in nervous system development. We used RNA interference (RNAi) to block the function of several disheveled and b-catenin homologs and examined their effects on the development of specific neurons in the nematode. Blocking dsh-1 function did significantly inhibit the proper development of these neurons (p=0.027). Determining how the Wnt signaling pathway regulates the development of these neurons can paint a fuller picture of how the pathway works and may help reveal methods that can be used to manipulate Wnt signaling. In the future, when more knowledge about the inner workings of the Wnt pathway is collected, gene therapies may be a key resource used to battle disease and control development.

99

Thursday, April 19

Session One; 12:00 - 12:50 p.m.

UC Forums

Physiological Effects of Exercise on Yellowtail White Muscle

JULIE GIANNINI and Sue Lowery

California yellowtail (Seriola dorsalis) is a species of ray-finned fish that demonstrate a significant increase in muscle mass in response to sustained exercise at optimal swimming speed. In this study, three groups of yellowtail have been analyzed for a

undergoing hypertrophy or hyperplasia. Hypertrophy is arbitrarily classified as fibers 7000+ um2 and hyperplasia is marked by presence of new fibers (0-1000 um2). The results show that immediately following the exercise period, the 4-week exercise group had the highest average fiber area (3335.8 ± 143.3 um2) and the control group had the smallest (2416.3 ± 83.9 um2). However, at the end of the 6 months, the average fiber area of the 4-week exercise, 3-week exercise, and control were more similar in size
(4249.4 ± 149.2 um2, 4046.1 ± 134.6 um2, 4121.4 ±161.7 um2). When comparing the patterning of the fibers, all three groups demonstrated a general trend of hypertrophy over the 6-month period. In contrast, the control group had the greatest amount of hyperplasia, but there was not a noticeable trend in the amount of fibers that accumulated over the 6-month period. MyoD was upregulated at the start of the racing procedure compared to samples that were collected one month post-exercise.

102
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Irving Gill and the Old Scripps Building: How Progressivism Encouraged a Shift Towards Modernism in Gill's Architectural Career

JANA HUNTER and Juliana Maxim

"The exploration of Irving J. Gill's architectural "style" is achieved through an intensive case study of Gill's architectural background and a primary focus on his design of the Scripps Institute of Oceanography, 1910. Experts have not decided on what architectural style/movement Gill's prime work belongs to. Through my research, I
mapped Gill's stylistic evolution to better understand what led him to create most of his works and to determine what his canonical style actually is. The results being a model extrapolated from archival documents and blueprints, and digitized architectural drawings of the Scripps Institute of Oceanography."

101
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Exploring Metaphorical Meaning

KYLIN COPTHORNE and Ashley Feinsinger

Analytic philosophy of language has been largely devoted to the study of literal meaning,
or what is said. However, we know that often times we are able to convey something over and above this literal meaning, giving us an implied meaning. For example, we can take the sentence "the cops are around the corner" and interpret this literally. The conventions of the language lead us to understand the meaning: that the cops really are around the corner. On the other hand, we are also able to say, "the cops are around the corner" to mean something over and above this literal meaning. Imagine that you are in a very dangerous situation and you say 'the cops are around the corner" in order to alert your friend that you are safe. Or, imagine that you are at a college party and things are getting a little out of hand. When someone says "the cops are around the corner" they send a warning to all of the less than sober partygoers.
When examining these meanings, the literal and implied, we encounter a problem: what
do we do with metaphors? For example, take "Juliet is the sun". If meant to be taken literally, it would be absurd! We do not mean to say that Juliet is a giant ball of gas floating around in the universe, but what do we mean to say and how does a metaphor like this one even work?Within my presentation, I will review three of the standard views on metaphor: the comparison view, interaction view, and the pragmatic view. Unfortunately, it seems that all of these standard views fall short and do not provide an adequate theory to determine what metaphorical meaning is. With this in mind, I will introduce the possibility that maybe there isn't any distinct metaphorical meaning, and if there is, we may not be able to explain exactly what it is.

103
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Active microrheology of entangled blends of DNA and Actin link polymer flexibility to induced molecular deformations and stress propagation

ROBERT FITZPATRICK, BEKELE J. GURMESSA and Rae M. RobertsonAnderson

Entangled polymers display unique viscoelastic properties that can be precisely tuned by polymer length and flexibility. Polymer composites, comprised of two or more distinct polymers, have added versatility and tunability, providing a platform for designing multifunctional materials. To determine the role that polymer flexibility plays in composite properties, we create entangled networks of actin filaments and DNA with varying actin:DNA ratios. While the contour lengths of actin and DNA in our designed composites are comparable, their persistence lengths differ by over three orders of magnitude. To measure the mechanical properties of composites, we optically drive microspheres through the composites and measure the induced force during and after the strain. We use confocal microscopy to image distinctly labeled actin and DNA polymers within each composite and characterize spatial heterogeneities and macromolecular fluctuations. We show that the composites show increased stiffening and longer yield times than networks of only actin or DNA. We also show that the force relaxation of all composites follow a power law relationship with time with a scaling exponent of ~0.66, while systems of only actin or DNA display relaxation profiles that are distinctly different from those of composites. Our results not only inform studies on polymer mechanics provide a well characterized highly tunable biomaterial platform that has a range of engineering applications.

104
Thursday, April 19
Session One; 12:00 - 12:50 p.m.
UC Forums

Hybrid Solar Converter with Integrated Thermal Storage

NATHAN KRAMER, CHRIS SPLITTER, JACOB PLATZ, ALEX BONSON, LUIS GARCIA, HAYDEN SPENCER, and Daniel Codd

There are two primary methods for capturing and using sunlight today: direct conversion of sunlight to electricity using photovoltaic (PV) solar panels or focusing sunlight onto a fluid that is used to drive a steam turbine in concentrated solar power (CSP) systems. Storing hot fluid in CSP systems is a less expensive way to generate electricity when the sun is not shining compared to storing electrical energy from PV in batteries. However, PV uses just part of the solar spectrum at high efficiency, while CSP systems use the entire solar spectrum but at low efficiency. Combining the best elements of these two technologies could provide a means to get the most out of the full solar spectrum, generating both electricity and storable heat (for later use) within the same system. Developing hybrid solar energy systems that perform both functions at the same time could provide electricity at a cost comparable to traditional sources, whether the sun is shining or not.

Session Two: 1:10 - 2:00 p.m., Interactive Exhibits

14
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Thermo Fisher Label Remover Application

KENDALL SLAUGHT, THUNDER BRAUN, HUAN NGUYEN, VINNY TORRE and Gordon Hoople

Thermo Fisher has workers who are tasked to manually remove labels on antibody vials from 3rd party vendors. This is a problem because the labels are difficult to completely remove and it takes a lot of time to do so. We are working to develop a machine that will improve this process by removing the manual labor from this task and speeding up the process. Our machine consists of an adhesive roller system which utilizes a motorized roller and support rollers, all functioning to spin a roll of adhesive tape. When the the antibody vial is pushed towards the rollers, the adhesive tape will catch on the label and will strip the label off the antibody vial. Once the vial is clean, Thermo Fisher would then apply their own label.

33
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Clorinda Matto de Turner: Una Guerrera Social por la Narrativa Ficción

SHANNAN CONLON and Kimberly Eherenman

Los recursos literarios como las emociones proscritas y la narrativa ficción funcionan para desafiar a las normas de la sociedad y desafiar de la censura del gobierno y de la iglesia. Estos recursos dan autonomía a Clorinda Matto de Turner en sus trabajos, y expresan su voz en una manera explicita. La embajadora de cambio social, Matto de Turner amenazaba la sistema injusta con su periodismo y con sus novelas. Aunque tuvo que salir en exilio, ella fue liberada por la expresión de sus creencias. La emoción fue uno de sus armas más importantes. Desafiaba el legado de colonialismo por escribir de los indígenas, y propuso un mensaje político muy fuerte.Voy a leer "Indole" y "Aves sin nido," para ver como las emociones proscritas afectan el mensaje de estos, y como Matto de Turner describe los indígenas. También, quiero explorar su concepto del ?feminismo? y las idea de los papeles de mujeres y hombres. Clorinda Matto de Turner es una autora tan influencia en la historia de Latinoamérica, el movimiento para dar derechos a los indígenas, y el feminismo temprano, y por esto es importante para mi estudiarla y entenderla más.

40
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Braced! Architecture on the Fringe of Collapse

PEARL CHOU and Daniel Lopez-Perez

We live in a world, from countries like Mexico to India, full of cities densely populated by buildings that are structurally unstable. Taiwan, among the list of countries, has one of the most dense population of buildings at risk officially identified by the government. Starting by compiling a large list of most at risk buildings in Taipei city, I observed a lack of intervention in downtime recovery from natural disasters due to economic and materialistic-restrains. While buildings that were falling apart were immediately taken down after natural disasters, those that are still standing are stuck in a limbo of renewal process. With natural disasters like earthquakes, tsunamis, typhoons, and many more, these at risk buildings are at the fringes of collapse; there is an urgent need to address this problem. Braced! investigates the issue of structural instability through a design intervention that re-imagines the structure and space of buildings by bracing rather than demolishing.

54
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Shot Timer

RYAN HAYES, BRENNA THOMAS, MARK MOLLICA, CLAY RIVETTI, JULIA CASSELLA and Venkat Shastri

Shooting has an increasing need to collect advanced shooting metrics that current devices on the market do not provide. From the military to gun enthusiasts, people are always looking for a way to improve their shot. Our shot metric device will provide analytics to the shooter to help them better their shot with actual data versus just the eye of an ?expert.? This will also allow multiple shooters to acquire data simultaneously unlike the other acoustic based shot timers currently on the market. This device will let our user improve their shooting performance more efficiently than any other device available at the moment. Our design is a sleek, wireless, low profile device which can be directly mounted on the weapon providing analytics to a separate handheld device. The data would be presented through an intuitive and clean user interface providing the shooter with a very clear way to obtain the information. This concept can change the way competitors, the military, and hobbyist shooters train and practice their shot.

87
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Changing Lives and Curing Blindness With a Digital Microscope

TROY PASCOE CONNOR SPENCER GAUTAM DARYANANI RYAN GABRIEL JACOB GILLAN and Venkat Shastri

In 1994, Doctor Geoff Tabin of the United States and Doctor Sanduk Ruit of Nepal came together to establish the Himalayan Cataract Project (HCP). The goal of the HCP is to cure the ever-growing problem of unnecessary blindness in developing nations around the world. More specifically, Drs. Tabin and Ruit are targeting cataracts-the condition responsible for nearly half of the world's blind population. Fortunately, cataracts are extremely treatable and have outstanding success rates. This does not mean, however, that these surgeries are easy to come by for someone living in poverty and without access to long distance transportation. To solve the issue of cost, the HCP manufactures its own replacement eye-lenses; bringing the rate per surgery to just $25. To solve the issue of accessibility, the HCP travels directly to the patients, allowing surgeons to access more patients who otherwise would be unable to receive treatment. The issue with this-and the reason our project exists-is that reaching these destinations is extremely cumbersome when transporting heavy, fragile microscopes. Therefore, our team is working to create a lighter, more durable microscope that can be easily transported wherever a surgery may take the HCP. By providing a digital alternative, our microscope will be smaller, easier to set up, and will allow incorporation of neighboring surgeons for teaching.

94
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Mujerista Theology and Understanding its Source

AURORA ESPINOZA and Orlando Espin

This research answers the key question on how did the Latino/a Theologian Ada Maria Isasi-Diaz develop her theology? Focusing on only three of her basic writings I analyzed from what source(s) she developed her theology by investigating carefully the topics and context in her texts and her life experiences. With further background information that I received from my mentor, who was a colleague and friend of the late professor Isasi-Diaz, I was able to describe and explain how she developed her theology and her major contributions to the field. This was a directed literature review maintaining my emphasis on her three books and some of her recorded conference talks. This research is different than other scholars who have answered the question of how she developed her theology, because few have undertaken the task to provide an analysis of her life experiences that led to her doing theology through a particular method. The impact of this research is to increase the awareness of the experiences theologians have which transform their way of developing theology, and this research offers what essentially needs to be understood to properly and thoroughly interpret the theology of Isasi-Diaz.

101
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Hive Soundz

RADIYLON MINA, KHEPERAH RAY, RYAN ROBBIBARO, JASMYN SOSA-HOUSTON and James Gilb

With a number of portable Bluetooth speakers on the market, it is important to uniquely differentiate ourselves from other devices and competitors. Hive Soundz will be the first portable speaker that gives its users the ability to play one unified audio signal via Bluetooth or Wifi over a wireless or physical connection between multiple Hive Soundz Speakers. The speaker extends 6" in diameter and 2" in height giving it a portable form factor. In addition to being portable Hive Soundz speakers boast a consumer-friendly durability of being drop proof up to 2 meters as well as water resistant. Our primary focus for creating a multi-connectable, portable, and durable speaker is to provide a device that works well for all generations and can be used in multiple environments. Our flexibly designed speakers are creating more ways for individuals to connect and listen to music. At Hive Soundz we understand how important sound is to culture. Listening to music is a social experience for many communities and it is within these community experiences that we shape our perception of self. Hive Soundz speakers make it easier to listen alone, as well as collectively, to the sounds that we find meaningful. It is our hope that by improving the technology by which our users can listen to their audio and introducing more opportunities for them to socialize and connect to others through music, our speakers will offer multiple ways to listen and develop a thriving hive mind of music lovers worldwide.

102
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Cheers

WILL CARHART, MEELAD DAWOOD, MAEVE MCCLATCHEY, JORDAN ABUSHAHLA, MAIA THOMAS and Saturnino Garcia

Cheers will be an iOS application to locate nearby bars and happy hours based on the user?s location. In research and from personal experience, we have found that many young adults become frustrated when wait times are long for bars and restaurants. We have observed that many find themselves walking long distances only to end up at a bar that has a long line, usually having to go somewhere else. Cheers will create a platform to solve this issue by suggesting other options on places to go, based on crowds and proximity. Furthermore, the application will display the happy hour deals going on to help maximize your experience. Young adults do not like to wait and want to save money while also having a good time; this application creates the opportunity to experience all three. This application will utilize real-time location tracking to locate nearby bars and restaurants. In addition, the application will offer a plethora of information about each nearby location, including, but not limited to, user ratings, pictures, happy hour and hours of operation information, and menu details. At its completion this application will offer an easy-to-use solution to finding local bars with happy hours for a wide range of users.

Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

2018 USD SAE Mini Baja

CARSON EDWARDS, Kenneth Pipe, Troy Sinha and Daniel Codd

For the third year in a row, the University of San Diego will compete in the SAE Mini Baja Collegiate Design Series. Engineering students design, engineer, fabricate, and test a single seat off-road vehicle. Every year across the country SAE hosts 3 competitions with this year?s being located in Mechanicsville, Maryland; Pittsburg, Kansas; and Portland, Oregon. Our team will be participating in the Portland, Oregon event, from May 30th to June 2nd. For each venue 100 collegiate teams from around the world compete in various events and are judged and scored on various design specifications. Some of the competitive events include an endurance race, hill climb, acceleration test, and braking test. In 2016 and 2017, the University of San Diego placed 30th and 44th overall, respectively. In order to complete this project the team will use computer aided design software, finite element analysis, and manufacturing processes. Our team has organized into 4 subsystems; front suspension, rear suspension, drivetrain, and electrical. The team as a whole will work on the chassis design which means that each of the subsystems will be intertwined with that of the chassis. We plan to use the same chassis design from last year?s team with minor changes in order to improve performance and reduce weight. The 4 subsystems will each analyze their respective systems from last year's car and look for ways to improve upon previous designs and reduce weight of the vehicle.

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

1
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Afloat! The Architectures of the Freeze-Thaw

MADELINE PETERS and Daniel Lopez-Perez

The history of architecture shows that it has the capacity to occupy the water, and even to float. From the Japanese Metabolists of the mid-twentieth century, to contemporary projects exploring the future of building in the sinking Netherlands, a rich discourse exists surrounding the relationship between architecture and water. This project investigates the concept of floating architecture, with an emphasis on Lake Calhoun in Minneapolis as the site. It is anchored on the idea that the water is a public space just as much as the parks that surround it. Minneapolis is a city of lakes with a deeply-rooted history and culture surrounding the water. Here, I focus specifically on the pavilion and how it could be designed and constructed on the water rather than on the shore. Despite the intensive use of lakes in Minneapolis, no floating architecture exists there. Therefore, this thesis proposes an intervention that would bring the pavilion onto the water. I look at how a floating pavilion can be programmed to serve the water-centered recreational culture of large lakes. The critical point of analysis for this new design on this particular site is the annual freeze-thaw zone between seasons. Then, I examine the environmental and technical implications that accompany a structure built on the water. I will use my proposed intervention to analyze these factors and determine how they can best be applied to my design in a way that is both technically sound and environmentally focused during all four seasons.

2
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Dopaminergic Modulation of Sleep is Independent of Feeding in Drosophila

MARGARET DRISCOLL, VICTORIA COLEMAN and Divya Sitaraman

Neuromodulators such as serotonin and dopamine (DA) have previously been implicated in behaviors such as sleep and feeding across vertebrates and invertebrates. The majority of the dopaminergic neurons in the fly brain project to an associative learning network called the mushroom body (MB), modulating the synaptic strength of connections within. The MB has been implicated in many motivated behaviors, including decision-making and sleep. Approximately 2,000 kenyon cells (KCs) make up the lobes of the MB and synapse onto MB output neurons (MBONs). Transgenic activation of clusters of DA neurons has been found to result in significant sleep deficits in Drosophila melanogaster. In order to ascertain whether the observed sleep deficits resulting from DA neuron activation resulted from dopaminergic regulation of a drive to forage for food, a comprehensive screen of all MB DANs and MBONs was conducted. To this end, Split GAL4 driver lines, specifying the targeted dopamine neuron clusters previously tested for sleep phenotypes, were crossed with UAS-dTRPA1 lines. Progeny, now expressing dTRPA1 channels in these targeted dopamine neuron clusters, were collected and tested with half of the male progeny on blue food at 21°C and the other half at 29°C, in which the selected neuron cluster was activated. Feeding levels resulting from activation of all MB DA neuron clusters were compared spectrophotometrically and found to be unaffected by this activation, despite their sleep phenotypes. These data indicate that sleep modulating dopaminergic neurons may comprise a circuit modulating homeostatic control of sleep independent from circuits controlling feeding. These results may help to explain the way in which DA influences sleep suppression and behavioral arousal, but further investigation is required to understand their circuitry and mechanism.

3
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Utilizing homology of Wound Inducible Transcript 3.0 (WIT3) as a stepping stone to investigate the function of Suppressor of IKKepsilon (SIKE)

MARIAM DAWOOD and J. Ellis Bell, Jessica K Bell

Wound inducible transcript 3.0 (WIT3.0) is a novel cytoskeleton protein that regulates fibroblast migration and initiates rapid wound closure. WIT3 shares ~50% sequence identity with an innate immune protein of unknown function, Suppressor of IKKepsilon (SIKE), that also associates with cytoskeletal proteins. We hypothesize that SIKE and WIT3 will have similar biochemical and biophysical characteristics that contribute to a shared function. To assess these similarities, we undertook characterization of WIT3 structure utilizing circular dichroism, fluorescence-based thermal shift assays, ligand binding studies using an ANS reporter, and crosslinking with BS3. Using PHYRE2, a WIT3 model was predicted that consisted of an alpha helical coil with 30% disordered regions. The secondary structure of WIT3 was assessed via circular dichroism. Wavelength spectra is consistent with an alpha helical protein and thermal melt data showed a linear unfolding pattern with Tm of 37°C, suggesting a minimally stable protein. As part of the PHYRE2 model, 3DLigandSite proposed a zinc binding site. To assess an interaction between WIT3 and divalent cations, WIT3-ANS titration and fluorescence-based thermal shift assays were completed +/- Mg, Mn, Ca, Ni and Zn. An interaction between WIT3 and Zn was confirmed where, in the presence of zinc, WIT3?s affinity for ANS was 2 fold higher than in the absence of zinc. The initial comparison suggests that WIT3 and SIKE share similar helical structure and similar FTS melt curve topography indicating exposed hydrophobic residues prior to denaturation, but different structural stability and a potential divalent cation binding site on WIT3. Together, these data suggest that WIT3 and SIKE share several biochemical characteristics that may allow these two proteins to have complimentary function.

4
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Generalist Versus Specialist Speciation Patterns in Chaparral Community Armored Scale Insects

KRISTINA PECK and Geoffrey Morse

Armored scale insects (Diaspididae) are ubiquitous parasites of trees and shrubs. They have the potential to exhibit either a generalist or specialized host association pattern. When generalists, armored scale insects live in varied environments using different resources and showcasing a wide diet breadth. As specialists, they only survive in a specific habitat with a limited diet breadth. Whether or not they are generalists or specialists could limit or host-associated speciation. The determination of their lifestyle could have far-reaching implications in pesticide use as the armored scale insects are economically destructive. Additionally, looking at the insect lifestyle could shed light on speciation. The following research aims to determine if specialization drives speciation in armored scale insects. Specimens were collected off oaks (Quercus spp.) and manzanitas (Arctostaphylos spp.) samples based on geographical location in order to determine if the insects are generalists or specialists on different host plants. Non-destructive DNA extractions of the sampled armored scale insects were performed and PCR replicates of the CO1 segment of the mitochondrial DNA were sequenced. These DNA segments can indicate speciation patterns in correlation to geographic isolation or host-mediated speciation. If these insects demonstrate host-mediated speciation, there is expected to be a strong correlation between genotype and host plant; if not, a neutral model of isolation-by-distance is expected.

5
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

The Role of Timing in Fear Conditioning in Zebrafish

RACHEL CHARBONNET and Rachel Blaser

A common model of testing learning behaviors in animals is through fear conditioning, in which a neutral, Conditioned Stimulus is paired with a negative, Unconditioned Stimulus so that a fear response is shared for both. It is already known that zebrafish can be classically conditioned and that their fear response can be measured by rapid swim movements. What we do not know, however, is whether the behavior is learned in the same way as other model organisms or even humans. We are hoping to discover whether zebrafish exhibit the same time dependence as seen in model organisms. There are four distinct sessions that can be administered, varying in time between light flash (the Conditioned stimulus) and shock administered (the Unconditioned stimulus). The four sessions consist of the Delay Conditioning group, Trace Conditioning group, Unpaired group, or No Shock group, with the former two groups as experimental groups and the latter two as control groups in which little or no learning should occur. We expect that the zebrafish will be most strongly conditioned by the Delay Conditioning sessions and most weakly conditioned by the Unpaired sessions; no conditioning should occur in the No Shock group. If these proposed patterns are observed, we suggest that learning in zebrafish may have a common neurological mechanism to a variety of other vertebrates like rats and humans.

6
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Shareholder Proposals for “socially responsible issues

JOHNATHAN FARMER and Steven Sumner

As the owners of corporations, shareholders have the opportunity to impact financial performance by bringing forward proposals that they believe are in the best interest of the company. With the recent increase in diversity initiatives many nuanced factors have been linked to a firm’s ability to grow, increase share price, increase morale, and improve public image. As such our research will examine shareholder proposals focused on diversity, particularly LGBTQ initiatives, and how these initiatives affect firm performance. Independent variables analyzed will include: industry, location, lobbying ability, political and social climate at a particular point in time, manner in which the proposal is presented, behavior affected by proposal (i.e... improved pay, unionization, more green initiatives, etc…), to determine what scenario a proposal is most likely to be accepted. Public data from: The Congressional Budget Office, Bureau of Labor & Statistics, Federal Reserve Economic Data, Proxy Monitor etc.. will be used to analyze, identify, organize, and test models and methods useful in gaining insights into causes and effects.

7
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Migrant Narratives of the Border in Reyna Grande's "The Distance Between Us: A Memoir"

MARY BERSET and Gail Perez, Marcelle Maese-Cohen

In "Gendered Transitions: Mexican Experiences of Immigration" (1994), Pierrette Hondagneu-Sotelo demonstrates the positive impact that education and social organization has on the undocumented community in Oakview, California. I use this study as a framework for reading Reyna Grande's The Distance Between Us: A Memoir (2013), and show the powerful influence that education can have on the migrant in the United States, offering a means of personal development and success. In her memoir, Reyna discovers her voice through education and the study of creative writing, which eventually allow her independence and success in the United States. Reyna struggles to find her place in the United States as a female and a newly arrived migrant child, feeling as though she is an outsider in an unfamiliar American society. She demonstrates the transformative power of education within the life of the migrant, as it offers an avenue for positive self-growth and fulfillment that is otherwise difficult to find. Writing allows her a means of self-expression that strengthens her confidence and motivation in the face of obstacles.

8
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Site Characterization and Geophysical estimate of Waste Rock and Tailings, Black Mountain Open Space Preserve, San Diego, California

MATTHEW ROCHELLE and Eric Cathcart

Abandoned mines are common throughout California with recent estimates exceeding 50,000. During the 1920?s the Black Mountain Open Space Preserve, San Diego, California was home to a short-lived mining operation for Arsenic which was processed for use in pesticides. On-site mine activities were limited to one specific canyon near the northeast perimeter of the Preserve. These activities resulted in the generation of several hundred tons of waste rock and processed - ore material. Much of this material accumulated in the canyon and is a potential human and ecologic exposure concern. Current regulations dealing with abandoned mine sites require an estimate of the volume and concentrations of waste rock and ore material in order to complete an appropriate Site Characterization. Volume estimates of mine waste rock were determined by surveying the inside of each of the 4 mines using lasers and standard survey techniques. This data will be compared to an in situ seismic survey of the canyon to obtain an estimate of the volume of waste rock and processed ore materials remaining in the canyon. These data will be used to formulate remediation and engineering techniques, if required, to reduce the potential exposure of the Arsenic bearing material. In the future, these techniques may be applied to Site Characterization of additional abandoned mine sites throughout California.

9
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Wicked Women in Opera: A Study of Bad Women

MADDISON NELSON and Marianne Pfau

Women in media -- written or performed -- often play into some form of gender role, be it to abide by or upset gender roles. When females do not play into these roles and instead act more like men, they are cast as wicked, evil, or tragic characters. The research presented here is a literary and musical analysis of three female characters in opera: the Queen of the Night from The Magic Flute composed by Mozart, Lady Macbeth from Verdi's Macbeth, and Tosca from Puccini's Tosca. I have brought these women together because they all seem to refute their assigned gender role in some way, which ends in their death. The literary analysis of the opera's librettos will discern, in one dimension, how these women are portrayed. The harmonic analysis I will be doing of these women's arias will add another dimension of understanding to their characters. The aim of this research is to decide what these three characters have to say about the female gender in general, what happens when one chooses to not follow their gender roles, and also to put to question whether these characters deserve any empathy from the audience.

10
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Nutrient Concentrations in Relation to Hydrographic Conditions on Tidal Time Scales in Mission Bay, San Diego, CA

GARRETT EVENSEN and Ron Kaufmann

Mission Bay in San Diego, CA is a highly modified hypersaline estuary in a Mediterranean climate. In summer, the front of the bay resembles oceanic conditions, while the back of the bay is usually warmer and more saline. Tides are the primary means by which water is exchanged between the ocean and bay. Tidal flux decreases from the front to the back of the bay, and water in the back bay has a comparatively long residence time. Nitrate, phosphate, and silicate are important nutrients for phytoplankton, fueling growth, metabolism, and reproduction. Variability in nutrient concentrations on an annual basis has been studied previously; however, short-term fluctuations have not. The goal of this project was to examine variation in nutrient concentrations over time and across the bay, in relation to

hydrographic conditions and biological demand from primary producers (phytoplankton). Concentrations of nutrients and chlorophyll a, along with hydrographic parameters (temperature, salinity), were measured during July, August, and September 2016. Samples were taken every two hours over a 24-hour cycle at three sites across the bay. Temperature and salinity increased from the front to the back of the bay and decreased from June to September. Correlations between concentrations of chlorophyll a and nutrients were not consistently positive or negative. In many cases, nitrate, phosphate, and silicate concentrations correlated negatively with tidal height, particularly in the central part of Mission Bay. This result suggests a relationship between tidal flow and nutrient concentrations, though the exact connection has not yet been determined.

11
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Just Deserts: Food Accessibility in Low-Income Denver, CO Neighborhoods

KAITLIN GIRTIN and Suzanne Walthers

This study looks at the distribution of healthy, fresh foods in Denver, Colorado. It examines the correlation of food sources (food stores, farmers markets, and urban gardens) and low income neighborhoods in one of the nation's 'fittest' cities. It was hypothesized that there will be a correlation between low income neighborhoods (> 500 households making less than $40,000/year) and the location/proximity of fresh food sources. The hypothesis was tested using the Department of Housing and Urban Development's (HUD) income data and the City of Denver's transportation and food source data in the ArcMap 10.4 computer program. By mapping the location of food sources (grocery stores, drug stores, convenience stores, markets, and gardens) by Census tract, it was determined that low income residents in Denver face many challenges when it comes to accessing healthy, fresh food. The study area had a negative correlation between low income tracts and accessibility to fresh food sources. However, this study did show a positive correlation between low income tracts and the potential for improved food access via urban gardens including school gardens within the Denver Public School District. This study can serve as a baseline and a starting point for a comprehensive analysis of food justice in cities throughout the United States.

12
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

From Fallen Women to Founding Mothers: How Petty Criminals became Pioneers on the Australian Frontier 1788-1868

KATHERINE SPENCER and Michael Gonzalez

Historians have often portrayed female convicts transported to the Australian colonies as victims of circumstance, exploited by Britain's outdated legal system, colonial authorities, and even their male counterparts. This research paper will seek to move away from the victimhood narrative that plagues the historical record of convict women and instead analyze female convict agency. Contrary to the current research on the subject, convict women in the Australian penal colonies had agency to improve their lives given their unique circumstances. Despite poor conditions, discrimination, and their image as unredeemable "fallen women" among English society, convict women were resourceful, resilient, and able to utilize the gender imbalance in the colonies and relaxed social, moral, and proprietary laws, to carve out a life for themselves that would have otherwise been impossible in traditional English society. While seen as "innately bad" by England's proper middle class, traditional moral prejudices that would have otherwise ruined a woman in England were largely ignored in the convict colonies, already full of "ruined" women. Australia's convict colonies needed women, and the gender imbalance provided convict women with power they would not have had in England, allowing the founding mothers of Australia to create better futures for themselves and their children. This paper examine the experiences of convict women and how they took the life sentence they were given to transform themselves from "fallen women" to the mothers of the modern Australia.

13
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Under Strain: a Robust Russian Foreign Posture Despite Limitations

CHIARA SUTTON and Randy Willoughby

The geopolitical maneuverability held by the Russian Federation has been considered to be intrinsically connected to the prices of hydrocarbons, as roughly half of the government's budget derives from hydrocarbon revenues. As hydrocarbon-prices stay remarkably collapsed for the third year, the Kremlin's revenue problems are compounded by international sanctions and a level of international mistrust still rippling from its aggressive actions in annexing Ukraine in 2014. It is to be expected, then, that Russian foreign posturing would be collapsed and submissive. How then is the Kremlin, being so apparently constrained by international sanctions and low hydrocarbon prices, able to conduct a foreign policy so robust and aggressive that "the Kremlin has been de facto operating in a war mode," as significant scholars like Dr. Dmitri Trenin would suggest? This study will identify and discuss the function of the most significant factors that allow the Kremlin to operate in a way utterly unexpected by contemporary understanding of the effects of low oil and gas prices on Russian foreign posturing.

15
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Human Beings and the Drive Towards Intoxication: An Interdisciplinary Study of the Relationship of Drugs vis-a-vis the Human Condition

LIA CRISTINA FIOR and Brian Clack

This project seeks to substantiate an understanding of the relationship between human beings and intoxicants that is more properly traced back to human nature, rather than to artificially construed notions of morality and legality. In particular, I critically evaluate the perspective pioneered by Freud, which regards the inclination towards intoxication as embedded in the difficulties of the human condition. The second portion of the research focuses more specifically on whether the human affinity for intoxication is an expression of a desire to escape suffering, or alternatively, of a desire to learn more about nature, ourselves, consciousness, and the world. Ultimately, this research seeks to employ philosophical, literary, sociological, archeological, anthropological and religious approaches, from a diverse collection of authors, with the aim of investigating the various attitudes that have developed towards drug use throughout history. An interdisciplinary lens, in turn, provides a more complete understanding of the longstanding relationship between human beings and intoxicants. While avoiding any generalization about this relationship, I explore a variety of motivations which seem to underly the human inclination to use mind altering substances. Ultimately, I suggest that the desire to alter ones consciousness if far more universal and timeless than we ordinarily believe.

16
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Programmable Illumination for Multimodal Microscopy Using an Electric Paper (ePaper) Display

JING (MICHELLE) WANG, Eric Gerald and Ryan McGorty

We present a highly-flexible, cost-effective multimodal microscope using an electrophoretic paper display to provide reconfigurable illumination of the sample. We demonstrate our microscope's ability to acquire bright-field, dark-field and phase contrast images. It can also be used to acquire three-dimensional images of the sample. The display can be used with either incoherent or laser illumination. Our system could be used to enhance microscopes used for biomedical diagnostics or for education in low-resource settings.

17
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Strategic and Moral Motivations of U.S.-Iranian Relations through the Nixon and Carter Administrations

KENNEDY AVERY and Kathryn Statler

The paradigmatic divide between realism and idealism as schools of thought in international relations theory creates a seemingly insurmountable gulf when trying to analyze how the world works. Realist priorities of national interest and realpolitik strategies alongside idealist priorities of human rights and moralistic strategies seem to hold no room for concession, only conflict. However, using the foreign policy engagements of the Nixon and Carter administrations with Iran as a case study, I argue that the theories are not, in fact, divided but linked. Accounting for the fact that United States foreign policy does not take place in a vacuum, but rather in a vortex of swirling domestic, international, institutional, and bureaucratic forces, is the first step to understanding the interconnected nature of realism and idealism in American foreign policy. Dynamics between the executive and legislative branches and the cabinet departments in the 1970s created an increasingly muddled distinction between realism and idealism. By the end of the decade idealism and realism had both faced demise at the hands of the other, creating a hybrid realist-idealist outlook. On the case specific level, then, I will aim to answer why Presidents Nixon and Carter, with such diverging worldviews, in fact, converged in their U.S. foreign policy engagements with Iran in the 1970s.

18
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Operationalizing Autonomy Supportive Parenting

HALEY PUGH, REBECCA SIMPSON and Adriana Molitor

Autonomy support refers to a parent's attempts to encourage a child's initiative, interests and volitional functioning. In contrast, control refers to a parent's attempts to pressure, dominate or intrude on a child's behaviors and thoughts in order to get the child to meet a parent's demands or expectations. Past research from our USD toddler lab shows that parental autonomy support is important in getting young children to willingly cooperate with parental requests. It also predicts enhanced achievement in grade-school children and is correlated with increased socio-emotional skills later in life. Conversely, negative outcomes have been associated with controlling and intrusive parenting. For example, maternal over-protection and paternal critical-control predicted internalizing problems and anxiousness in preschoolers. Despite recent focus on the benefits of autonomy support, researchers are not in agreement as to how to operationalize the concept. The present study examines whether various forms of autonomy support and control should be distinguished or if they are all reflective of a shared concept. Specifically, mothers were rated on seven behaviors reflecting autonomy support and control while helping their 30-month-olds perform a compliance task, cleaning up toys, and two teaching tasks, board lacing and a multi-dimensional shape puzzle. Analyses examine the association between maternal behaviors within these contexts.

19
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Comparative Analysis of Perceptions of Transnational Global Films by American and Spanish College Students

MELINDA SEVILLA and Kristin C. Moran

Autonomy support refers to a parent's attempts to encourage a child's initiative, interests and volitional functioning. In contrast, control refers to a parent's attempts to pressure, dominate or intrude on a child's behaviors and thoughts in order to get the child to meet a parent's demands or expectations. Past research from our USD toddler lab shows that parental-

autonomy support is important in getting young children to willingly cooperate with parental requests. It also predicts enhanced achievement in grade-school children and is correlated with increased socio-emotional skills later in life. Conversely, negative outcomes have been associated with controlling and intrusive parenting. For example, maternal over-protection and paternal critical-control predicted internalizing problems and anxiousness in preschoolers. Despite recent focus on the benefits of autonomy support, researchers are not in agreement as to how to operationalize the concept. The present study examines whether various forms of autonomy support and control should be distinguished or if they are all reflective of a shared concept. Specifically, mothers were rated on seven behaviors reflecting autonomy support and control while helping their 30-month-olds perform a compliance task, cleaning up toys, and two teaching tasks, board lacing and a multi-dimensional shape puzzle. Analyses examine the association between maternal behaviors within these contexts.

20
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Minority Rights of Germans in Belgium

DOMINIK BAER and Clara Oberle

The history of the Germans in Belgium is one of extremes. The Germans have been an undoubtedly large cultural influence in Belgium, yet they have oft been the targets of oppression, expulsion and forced assimilation. Today they have a large degree of autonomy within the larger Belgian federalization project. This was gained through a variety of factors: in particular the resurgence of West Germany, the disintegration of the French-Belgian myth and Flemish-German solidarity. The rights the Germans of Belgian gained were largely done for reasons that left the current situation of forced assimilation untenable. The acquisition of rights for Belgian-Germans was done in the shadow of larger geopolitical and societal changes within the rest of Belgium. It is an unfortunate reality that minorities are often marginalized or completely eradicated within a larger state. This is not the case of the Belgian-Germans.

21
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Food Deserts: Hungry Cities

MADYLIN MILLER and Daniel Lopez-Perez

In the contemporary American city, it is shocking to learn that there are still vast areas and thousands of people without access to fresh foods. ?Food-deserts? are geographic areas where access to affordable, healthy food options is limited or nonexistent because grocery stores are too far away, and are usually found in impoverished or urban areas such as Detroit, New Orleans, and South Chicago. Government agencies? definition of what precisely constitutes a ?food-desert? stems from a complex combination of factors that further obscures them. In light of the outburst of health epidemics, we can no longer afford to continue not to see these deserts and their underserved populations. ?Food Deserts: Hungry Cities? is out to provide methods of making healthier food options more accessible. It incorporates geographical analyses, census data, and civic projections to identify the optimal location for a solution to the food desert dilemma locally. It looks at Linda Vista?s past, as well as current efforts, as a way to confront this challenge of infrastructure, as much as of legibility. Having been a student of USD for the past four years and considering USD?s integral location in Linda Vista, ?Food Deserts: Hungry Cities? takes these questions on as their first step towards serving the community.

22
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Perceptions of Mental Health Risks of Non Dominant Partners Varying in Gender and Sexual Orientation

MAUREEN COBILE, DESIREE JOCSON, and Rebekah Wanic

Partners often have various levels of power in their romantic relationship. In this study, we refer to relationship partners varying in power as the dominant and the less dominant partners in a relationship. Based on past research, the less dominant partner, typically a woman in a heterosexual relationship, is more likely to experience physical and mental health risks in comparison to dominant partners. In addition, women who identify with the LGBTQ community are also at higher risk of experiencing mental health issues. Because little research has evaluated power dynamics in non-heterosexual relationships, the purpose of this study is to evaluate if surveyors can perceive that less dominant partners (varying in gender and sexual orientation) are at higher risk of experiencing mental health issues. The surveyors will be randomly given one of the following scenarios in which the partners vary in power: dominant male/less dominant female, dominant female/less dominant female, dominant female/less dominant male. A questionnaire is currently being distributed online and is accessible to students. Results and conclusions will be formed by mid to end of March.

23
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Quantifying the Effects of Watershed Urbanization on the Hydrology and Channel Morphology in Los Peñasquitos Reserve

MICHAEL BENNETT and Suzanné Walther

Urbanization has been linked to profound changes in estuaries, particularly in hydrologic flow, due to a combination of increased rates of runoff, decreased volumes of groundwater seepage, and the addition of freshwater from human activities. Urbanization results in alterations in the land cover makeup of a watershed to precipitate these effects on the natural hydrologic regime. This study examines changes to land cover and stream discharge between 2000 and 2017 in the upper watershed of Los Peñasquitos Canyon, a suburban zone within the arid San Diego metropolitan area. This study involves land cover analysis using field work for hydrometric data collection and geographic information science (GIS) for spatial analyses. Within the temporal scale of this study, the watershed underwent a land use conversion of approximately 10% to urban parcels, broad alterations to land cover type, and an increase in water flow in all subwatersheds. These changes have had deleterious effects on downstream coastal estuarine habitat due to the large influx of freshwater. In light of the rapid pace of coastal development, understanding the interrelationship between land use, land cover, surface hydrology, and estuarine ecosystems should be prioritized to serve goals of conservation.

24
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Antimicrobial Activity of Silver-Bonded Fabrics for the Creation of Nursing Scrubs

LAUREN RYSKAMP and Terry H. Bird

Hospital acquired infections (HAIs) are contracted by patients at or after the time of admission. It is estimated that annually 100,000 patients die worldwide due to HAI related causes and the frequency of HAIs has not decreased in the past 20 years. While many sanitation protocols are designed to reduce direct transmission of HAIs, current research is investigating how indirect transmission of HAIs may be reduced through use of antimicrobial scrubs. We investigated the antimicrobial activity of silver, a metal well known to disrupt cell membrane functions and thus kill bacteria, as an agent to be incorporated into the fabric used to make nursing scrubs. This antimicrobial fabric was tested by depositing S. aureus or K. pneumoniae onto swatches of the cloth for 0, 4, 12, and 24 hours. The surviving bacteria were then enumerated by spread-plating onto nutrient-rich agar. The results of this study could yield valuable insight into a potential method for reducing the frequency of HAIs worldwide.

25
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

The Effect of Varying Crosslinking Motifs on the Microscale Mechanics of Co-entangled Actin and Microtubules

SHEA RICKETTS, Jennifer Ross and Rae Robertson-Anderson

The cytoskeleton is a complex composite network of proteins, including filamentous proteins such as actin and microtubules, as well as numerous binding proteins that crosslink these filaments. The physical interactions between semiflexible actin filaments and rigid microtubules, as well as the wide range of crosslinking motifs that their corresponding binding proteins offer, allow cells to precisely tune their strength and structure to support mechanical processes such as apoptosis and meiosis. To determine the role that crosslinking versus steric interactions has on cytoskeleton composites we: (1) design composites of co-entangled actin and microtubules with varying crosslinking motifs, and (2) use optical tweezers microrheology and dual-color confocal microscopy to characterize the mechanics and structure of composites. Specifically, we create equimolar actin-microtubule composites in which only actin is crosslinked, only microtubules are crosslinked, and both filaments are co-crosslinked. We then measure the force response resulting from optically driving microspheres through the composites; and image spectrally distinct actin and microtubules to quantify composite mobility and morphology.

26
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Developing Catayslts for Potential Use in Chemical Industry

LILIA BALDAUF and Christopher Daley

Enantioselective catalysis is the usage of a catalyst to produce one enantiomer of a product, so that mixtures of multiple molecules does not occur. Metal mediated enantioselective catalysis is the use of a metal complex containing a bound chiral stereodirecting ligand to activate an achiral compound, generating an enantiopure or enantioenriched product. This method of catalysis has been targeted by the pharmaceutical, agrochemical, flavor, and fragrance industries because of the incredibly efficient method of yielding fine chiral products. The growing need for enantiopure compounds in the aforementioned industries has created a market for the development of new chiral catalysts and the chiral ligands. Though a large number of chiral ligands have been prepared, the need remains to develop new chiral ligands that are effective for a broader range of substrates, have greater functional group tolerance, and can be used for a wide range of reactions. The Daley lab has concentrated on the design, synthesis and purification of isolated ligands based on already successful tridentate enantioselective catalysts, and has recently began testing these catalysts with the hydrophosphinatiom of chalcones.

27
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Leisure or Work - The Costs and Rewards of Managing One's Digital Visibility

MONICA COOPER, SAMANTHA MATTICE and Susannah Stern

This study is aimed at understanding the costs and rewards of visibility for teenagers who interact in mediated spaces. Teenagers are made visible by engaging in digital practices that, by their very nature, require teens to make their presence known. For example, to participate in social media and messaging applications, teens are obligated to post content, ?likes,? or, at minimum, to create a profile or account that becomes visible on a screen. Most teens feel obligated to be visible in the digital world. Teens who are constantly subject to visual exposure find methods to manage what is visible about them online. Because their visibility can be co-constructed by what others share, they must also develop strategies for managing others. The goal of this study was to identify the range of practices teens engage in and understand how they viewed them. Thirty-four teenagers from a range of demographics were interviewed qualitatively using open-ended questions about how they manage their visibility online. Participants shared the ways they control what they share, when they share it, and whom they share it with. They discussed the process and emotions involved when others share information that they do not approve of. Additionally, they shared their opinions about the obligation to be visible online, and considered managing this digital visibility as a leisure activity, or a form of work. The findings indicate that practices are extensive, including both online strategies and offline strategies . We argue that their practices might be considered work in addition to leisure.

28
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Investigating the Value of Cryptocurrency

JACK BONACCI and Steven Sumner

Cryptocurrencies have garnered much attention over the past decade, specifically the last two years. Bitcoin and other prominent coins such as Ethereum, Litecoin, and Ripple have experienced a mystifying increase in worth. Investors and businesspeople accustomed to traditional asset markets have expressed disbelief in the sustainability of such growth, typically based on the premise that there is no inherent value in cryptocurrency: no commerce to back them, no regulation, and a plethora of security concerns, they are type casted as dangerous and confusing currency fueled solely by demand. The purpose of this project is to uncover and explain the value of the concept and applications of cryptocurrencies. In short, the answer is twofold: blockchain technology and scarcity. Beginning with the assets themselves-- chunks of code --value becomes apparent. A subsequent dive into economic theory paints a more defined picture of why the world of online, decentralized currencies has erupted.

29
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

The Effects of Over- Exposure to Social Media Influencers on Body Dissatisfaction and Overall Well Being in Young Females

MARY DOUGLASS, ALYSSA STRZYKALSKI and Mary Brinson

Modern day media images promote an unrealistic standard of beauty in an effort to appeal to young consumers. More specifically, social media outlets frequently feature impossibly thin women who have been heavily digitally enhanced to appear flawless. Adolescent females, one of the most impressionable consumer groups, often internalize the impossible standards of beauty set forth as the ideal. An increase in social media use over the past decade has lead to subsequent overexposure to these images, resulting in higher degrees of body dissatisfaction and low self-esteem. Previous studies have revealed a strong correlation between the avid social media consumer and their susceptibility to mass mediated messages. In this study an online experimental design constructed with Qualtrics will be used to survey female undergraduate students at the University of San Diego. We expect to find positive correlations between body dissatisfaction, low self-esteem and high degrees of media exposure - which support the concept of psycho-social susceptibility to media images. We argue these results suggest that participants using social media will often compare themselves to the images and perceptions of social media influencers?. Social Comparison Theory will be used to better understand exposure to media images and personal body image evaluation. The comparison between participants and the images they see potentially leads to self-consciousness, anxiety, depression, and other issues that lead to body and facial dissatisfaction. We hypothesis the data will show those more exposed to mass media images are more likely to eternal the unrealic standards as their own.

30
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Infusing More Science About California?s Coastal Wetlands for Informal Education Audiences: a More Comprehensive Way To Create Effective Educational Resources

KIRSTEN HALTMAN and Michel Boudrias

California's coastal wetlands provide vital functions for both humans and animals, including nursery habitats, flood attenuation, and pollutant filtration. But these ecosystems are vastly depleted compared to their original state, and the retention of this land has been given a poor prognosis by many scientists. Moreover, the scientific concepts behind these functions are often difficult for those outside of the sciences to comprehend. This proposal aims to translate those four key scientific concepts into an effective script that presents this information in a way which the public can easily grasp. Through effective education and more accessible resources, the public will better understand the purposes that coastal wetlands serve for both humans and the overall ecosystem and will hopefully be inspired to join the conservation efforts.

31
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Legacy of Racial Segregation and Food Deserts in Chicago

SHERMEE RANDOLPH and Eric Cathcart

Chicago is one of the most diverse, yet segregated cities in the United States. Using Geographic Information Systems, GIS ArcMap, this project will make connections between Chicago's racial past and how it affects the present day through creating food deserts.

32
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Lafayette, We Are Here: American Reconstruction, Renovation and Conservation of French Heritage Sites Since the World Wars

KATE SHUSTER and Kathryn Statler

After the devastation of two world wars, France lay in ruins. A country long recognized for its leadership on the world stage in art, architecture, humanities and diplomacy was struggling. Its farmland, infrastructure, economy and people were seriously depleted, and rebuilding would take decades. While the Marshall Plan helped to get America?s oldest ally back on her feet, some of France?s most venerated historic sites suffered not only from the damage of war, but from the scourge of neglect. During a time of desperate need and thin resources, preserving historic sites was low on the list of priorities. Beginning after World War I and continuing to the present day, Americans have contributed millions of dollars to the reconstruction, renovation and conservation of French heritage sites. Why? A review of myriad records, both public and private, points to the special history of Franco-American friendship and appreciation for cultural heritage that inspires these donations. Maintaining these ties of friendship is important in an increasingly dangerous world. While popular opinion on Franco-American relations may seem fickle, our shared history and long friendship outweighs fleeting differences. The desire to preserve our joint cultural heritage trumps politics.

34
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Unfolding Higher Dimensional Cubes

KRISTIN DESPLINTER, JORDAN READYHOUGH, Bryce Wimberly and Satyan L. Devadoss

In the 16th Century, Albrecht Durer introduced the idea of unfolding polytopes by means of cutting along edges and laying down the faces in a flat plane, keeping the faces connected and non-overlapping. Such an unfolding is called a net. Durer's Conjecture states that every convex polyhedron has a net, and remains one of the great unsolved problems in geometry. Our research looks at the unfolding of n-dimensional cubes, specifically looking at the geometry of the unfolded nets. We first develop an algorithm which provides the net geometry, which is then used to prove that every unfolding of the n-dimensional cube yields a net. We then place specific emphasis on Hamiltonian paths and cycles, and the properties associated with them. Considering these specific cycles, we are able to enumerate them using the theory of chord diagrams. We implement an algorithm to discover geometric lengths of unfoldings on these diagrams, creating a coherent categorization of these cycles.

35
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

!Driven Too Far!

JACLYN CHAVEZ and Daniel Lopez-Perez

Transportation has dramatically changed over the last century; today we have access to a host of incredible developments from planes to bullet trains. Despite our advancements in mobile efficiency and design, they have not translated to our cities. Our roads remain clogged as consumers spend significant fractions of their lives traveling alone, slowly, in metal cases. Our cities remain littered by cars. Consumers have become dependent upon vehicles, and the way we have handled infrastructure expansion, has only encouraged this problem. The problem is driven by environmental pressures, population pressures, political, and economic pressures. Planners are often forced to design in response to relatively short term goals--addressing problems only after they arise--but we're getting to the point where that can no longer occur.
Driven Too Far zooms into Little Italy, a community in San Diego, and proposes dramatic alterations to the existing neighborhood structure. To fortify the San Diegan infrastructure in preparation for dramatic population increase, this section of the city is reformed into an area not reliant on the automobile, to create a strong pedestrian and public transport system within a small community; "re-orienting city design toward the pedestrian and cyclist."
The amount of space dedicated to supplying to parking demands reinforces a seemingly exponential cycle; where parking forces buildings further apart, makes walking more challenging, thus encouraging the masses desire to drive more, creating a need for more parking. Our parking spots and our streets prohibit our capacity to build densely, and thus I plan to remove these barriers to compact efficiency. Through the implementation of systems substantial to existing large cities, I plan to incorporate several transport elements, such as boardwalks, subway systems, etc. to connect the city to the water, promote density, increase housing, reduce carbon emissions, encourage public transport, and reduce automobile dependence.
My concern is one of planning; unless we directly address and change the American attachment to oversized, personalized automobiles, planners have to work to accommodate space in relation to sprawl. San Diego currently has a population of about 1.5 million. A population size which is expected to more than double by 2050. In order to accommodate this substantial increase in residential growth, extensive parameters need to be outlined to fortify the San Diego infrastructure in the next 30 years, my project addresses these problems with temerity, to explore more eccentric planning possibilities.

36
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Hume's Blank Check

NICHOLAS NORITA and Jack Crumley II

In this research paper, I examined Hume?s argument from imagination in an attempt to refute it by conceptually analyzing the concept ?uncaused? in relation to Hume?s other commitments. In previous literature attempting to forgo Hume?s conclusions about causality, there have been efforts to bring external philosophical apparatuses to bear on Hume?s system, which have been successful to the extent that readers accepted either the application of those external systems or the systems themselves. While impressive, internal critiques are very often the strongest. Along these lines, G.E.M. Anscombe mounted a famous internal move against Hume?s argument from causality, but, as noted by A.C. Genova, failed. I believe that the spirit of her idea, that the idea of uncaused objects has a questionable imaginative status, was correct. Using only Humean philosophical machinery as a basis for critique, I will attempt to tease out the implications of the Copy principle on the meaningfulness of the notion ?uncaused? and how this interacts with his doctrine of abstract ideas. If, as is I try to show, Hume cannot rightfully say that we know that we can imagine uncaused objects, his argument from imagination fails. This is an entirely epistemic move, attempting to show that Hume?s epistemology precludes him from saying that he knows he is imagining an uncaused object. I will argue that our epistemic position does not provide the requisite impressions to say that the concept ?uncaused? is meaningful to us.

37
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Numerical Simulations of the Interior of an Accretion Disk

TED DEZEN and Steven Tran

The photon spectra from black hole X-ray binary systems often display energetic significant power-law tails that could extend well into the gamma regime, implying that the energy distribution of charged particles may be non-thermal. In an effort to study a new particle acceleration mechanism that would explain this spectral tail, we examine how variations in the propagation of magneto-sonic waves transition these linear perturbations into non-linear photon-bubble shock trains. Furthermore, we examine the effects photon-bubble shock trains inside of radiation-dominated accretion disks to determine if these shock trains are capable of sustained particle acceleration. If this mechanism is sustained long enough, this non-thermal process can produce a photon energy spectrum that matches real observations made. Two and three-dimensional numerical magneto-hydrodynamic calculations of small patches of an accretion disk are used to resolve the growth rate of short wavelength waves that propagate these non-linear shock train patterns.

38
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

The Relationship Between Hunger and Courtship Behaviors in Drosophila melanogaster

THALIA LUNA, LAUREN WOOD and Divya Sitaraman

The ability to forage and feed is crucial for meeting the energy needs of an organism. Hence, it is not surprising that hunger and food-seeking behaviors are controlled by complex neural circuit mechanisms. When food is not readily available animals respond by suppressing other behaviors like sleep, courtship, etc. in order to search for food. This starvation-induced suppression of other behaviors signifies a critical choice in organisms and likely involves complex interplay between circuits controlling individual behaviors. The goal of the PURE proposal was to identify and characterize the effects of hunger on neural circuits underlying courtship decision-making. To this end we chose Drosophila melanogaster, fruit fly, a widely used genetic model organism because of its experimental manipulability, ease of rearing, short life cycle, and ability to clearly observe behavioral choices. It is estimated that 75% of human disease genes have a homolog, or similar gene, in the fruit fly, justifying the importance of studying their genes as well. Many neurons involved in hunger signaling have been previously identified and the behavioral link between hunger and courtship can be studied at a level of individual neurons and circuits. Here we present data through bilateral controlled groups of satiation. The resulting behavior during courtship was observed and categorized to evaluate the nature of the relationship.

39
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

The Pain of Not Belonging: Emotional Pain and Belonging Following Rejection

HANNAH CARTER and Jennifer Zwolinski

Numerous studies have shown that the pain of rejection yields similar outcomes to the pain of physical injury. This study examined how emotional and physical pain were related to rejection. Participants were 45 college students (32 females) randomly assigned to two groups of the Partial Future Life Alone Rejection paradigm (PFLA): non-rejection (n=22) and rejection (n=23). After all participants provided a baseline pain rating, they took a personality test as part of the PFLA. Participants were asked to think about the results of the test feedback presented on a computer screen. For both conditions, participants received accurate personality test feedback. Participants in the rejection condition received additional feedback that their future lives would be marked by social rejection. All participants were asked to consider their feedback for five minutes before undergoing a second pain rating. The Wagner FPX 50 Algometer was used to measure pain tolerance and threshold at baseline and after PFLA. The Aversive Impact Index was used to measure the validity of the social threat as well as belonging and emotional pain. Results showed a zero correlation between self-reported emotional pain and change in pain tolerance for both groups. Results also indicated a negative relationship between emotional pain and belonging in the rejection group (r =-.54, p =. 01), but no relationship in the non-rejection group (p >.05). This suggests that emotional pain following rejection is associated with belonging. This tendency may motivate rejected individuals to attend to their social injury by seeking out the company of others.

41
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Video Games as an Intervention in Cerebral Palsy: A Case Study

THALIA LUNA, LAUREN WOOD, MCKENNA WADE, Jackie Nguyen, Michael Gramlich, Leanne Chukoskie and Jena Hales, Divya Sitaraman

This case study investigated the effectiveness of video games developed for attention training as a vision therapy tool in Cerebral Palsy, with a secondary goal of improving quality of life. The subject is an adolescent with a diagnosis of Cerebral Palsy, and has limited verbal and physical ability. The video games used are gaze-contingent, designed to train the speed and accuracy of attention orienting and saccadic eye movement behavior in Autism Spectrum Disorder, typically played with a remote pupil tracker. In this case study, the game interface is adapted through a worn pupil tracker to fit the vision therapy sub-goals of reducing head-box size, attention orienting and training saccadic eye movement. The subject used an at-home setup of the video games and worn eye tracker, and played for a set amount of time each day. In-lab game play is used to establish pre-, mid- and post-intervention performance, and evaluated for changes in head-box size, attention orienting, and saccadic eye movement. The subject demonstrated a reduced head-box, improved attention orienting and saccadic eye movement after Phase II. These results are suggestive of improvement with regular gameplay, and that these games may be a viable vision therapy tool in Cerebral Palsy. Further, in a follow-up appointment, the subject demonstrated ability to successfully engage with a remote eye tracker, which was not the case prior to this study. This new capacity allows for the possibility of implementing a gaze-controlled digital speech system, improving the subject?s communication options.

42
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Probing the role of the interface on activity and regulation of gMDH

NINA MARIE GARCIA, Michael Schwabe and Ellis Bell

Interfaces between subunits play important roles in communicating activation or inhibition critical for an organism?s survival. The molecular mechanism of such interactions has not been fully understood. Glyoxysomal malate dehydrogenase (gMDH) is a homodimeric enzyme whose interface is thought to participate in regulation both by citrate and by substrate inhibition and a proposed reciprocating subunit mechanism of the overall catalytic cycle. The interface contains a variety of electrostatic and non-polar interactions. To understand the mechanism of subunit interactions we have probed the role of individual sidechains at the interface by site directed mutagenesis to determine the effects on stability, activity, and regulation. L269 and S266 appear to form a relay system that connects the active site to the interface. We have constructed, expressed, and purified two mutants, L269A and S266A. Biochemical and biophysical techniques were used to evaluate the structure and stability of the mutants. Size exclusion chromatography and chemical cross-linking experiments demonstrate that L269A and S266A are dimeric. Comparison of CD spectra of the mutants to the native showed similar secondary structure and, via thermal melts, TM values. To study the role of these residues in gMDH activity, initial rate kinetic studies were performed and showed that S266A and L269A have a lower affinity for OAA while, unlike the native enzyme, the L269A mutant is not saturated by NADH over experimental ranges. This, coupled with the decreased activity of both mutants, suggests that the residues play a key role in the binding of NADH and regulation of gMDH by OAA. This was supported by fluorescence based thermal shift (FTS) studies that demonstrated how NADH binding is greatly decreased in L269A. The results suggest that subunit interactions mediated at least in part by S266 and L269 are part of a relay system between active sites in the homodimer that regulates activity and inhibition of gMDH

43
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Client Engagement Challenges Associated with Use of Evidence-Based Strategies in Community Mental Health Settings

MARY KUCKERTZ, Lauren Brookman-Frazee, Teresa Lind, Anna Lau and Kristen McCabe

Treatment engagement with parents and youth is a major predictor of client success in clinical settings and has been associated with various positive outcomes including reduced symptomatology and higher rates of program completion among children. Clients? negative attitudes toward treatment and socioeconomic variables are associated with reduced engagement whereas clients? positive perceptions of therapy are correlated with increased client engagement. Beyond these links between engagement and client factors, research examining the influence of specific therapy strategies on client engagement is limited. The current study examined session-level engagement challenges that are associated with 4 specific evidence-based strategies administered during that session. Survey data from 103 community mental health therapists and 274 clients across 696 therapy sessions in Los Angeles County were used within the context of a fiscally mandated multiple EBP implementation effort. Multilevel modeling analyses were employed to analyze the relationship between session-level engagement challenges (expressed and disengaged) and specific session-level therapy strategies (psychoeducation, assigning and reviewing homework, role play/practice, and trauma narrative) across six EBPs. Therapy sessions were recorded, and all items were coded by an independent observer. Results indicated that use of psychoeducation and assigning/reviewing homework were both associated with an increase in expressed but not disengaged client engagement challenges. Role play/practice and trauma narrative on the other hand were not associated with expressed nor disengaged client engagement challenges. These findings are useful as they inform therapists who deliver these strategies in their work with youth and parents in clinical settings.

44
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Polysaccharide-Based Hydrogels Incorporating Iodine-Loaded Starch Granules

MELISSA TRAN, Jordan Castro and Peter Iovine

We have prepared a series of polysaccharide-based hydrogels that incorporate iodine-stained starch granules into the matrix at different loading densities. The synthesis and physical characterization of these hydrogels will be described as well as an assessment of their antimicrobial properties. Lastly, the release iodine release kinetics will be evaluated as a function of the starch granule and also the chemical composition of the hydrogel.

45
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Leisure or Work - The Costs and Rewards of Managing One?s Digital Visibility

MONICA COOPER, SAMANTHA MATTICE and Susannah Stern

This study is aimed at understanding the costs and rewards of visibility for teenagers who interact in mediated spaces. Teenagers are made visible by engaging in digital practices that, by their very nature, require teens to make their presence known. For example, to participate in social media and messaging applications, teens are obligated to post content, ?likes,? or, at minimum, to create a profile or account that becomes visible on a screen. Most teens feel obligated to be visible in the digital world. Teens who are constantly subject to visual exposure find methods to manage what is visible about them online. Because their visibility can be co-constructed by what others share, they must also develop strategies for managing others. The goal of this study was to identify the range of practices teens engage in and understand how they viewed them. Thirty-four teenagers from a range of demographics were interviewed qualitatively using open-ended questions about how they manage their visibility online. Participants shared the ways they control what they share, when they share it, and whom they share it with. They discussed the process and emotions involved when others share information that they do not approve of. Additionally, they shared their opinions about the obligation to be visible online, and considered managing this digital visibility as a leisure activity, or a form of work. The findings indicate that practices are extensive, including both online strategies and offline strategies . We argue that their practices might be considered work in addition to leisure.

46
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Biometric Authentication through Deep Learning

MATTHEW STANDLEY and Eric Jiang

Biometrics are the unique human characteristics that can be used to verify a person's identity for access control. Biometrics use human characteristics such as voice, fingerprint, facial structure and iris as a form of authentication. Deep learning and A.I are growing fields that allow computer technology to learn and recognize patterns of individuals for authentication. I aim to research different types of deep learning methodologies such as CNN (convolutional neural networks) to develop a form of biometric authentication using signature and fingerprint data. CNN is a biologically inspired form of a multilayer perceptron neural network. I am researching the effects of data augmentation on the learning outcomes of the neural network. Data augmentation will make more copies of one's signature and fingerprint to increase accuracy of the neural network model without requiring the user to give many copies of their own fingerprint and signature data.

47
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Fossil Pollen Evidence of Bronze Age Vegetation in Jerusalem, Israel

TERRA NEVIN and Patrick Geyer

Pollen grains are an extremely durable organic material providing scientists with an easy way to identify vegetation from the past. This study is based off a core sample taken from the plaster lining of a Bronze Age water channel in the City of David, Jerusalem that was fed by the Gihon Spring. The pollen from the hills surrounding the City of David accumulated in the spring and was fed into the water channel. The pollen from the core sample was analyzed to gain knowledge of the environmental plants of Jerusalem during the late Bronze Age. The pollen was floated free from the matrix by placing it in a solution of Zinc Chloride after a chemical separation was performed to loosen the pollen from the plaster sample. The pollen was extracted, placed in a glycerol medium and mounted on individual slides. A statistically standard 200-grain count was performed for the sample using a standard biological scope and identification of pollen was based upon a digital reference collection. The pollen count resulted in 38.5% hydrophytes (15% Salix sp., 10.5% Scirpus sp., 9.5% Cyperus sp.), 37% cultivars (12.5% Grains, 9% Olea sp., 8% Allium sp.), 15% arboreal (7.5% Quercus sp., 6.5% Myrtus sp.) and 9.5% indicator species. The pollen count from the sample provides evidence that the environment during the Bronze Age was disturbed by humans through the cultivation of crops and the footpaths associated with the cultivation.

48
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Die Reden bei der Mauer: A Historical and Linguistic Analysis of American Presidents' Speeches at the Berlin Wall

SAM DEDDEH and Michael Gonzalez

Why do Americans and Germans differ in historical and linguistic understanding of the Berlin Wall? One answer is American Presidents? speeches at the Wall, which are important parts of American memory of the Wall. American Presidents represent their fellow citizens? views about the Wall at particular points in time. Presidents Kennedy and Reagan both spoke in Berlin while the Wall was up, and though their speeches came at different periods and from men on separate ends of the political spectrum, they are similar in perpetuating an American view of history that contrasts with that of the Germans. President Obama continues the pattern twenty-six years after Reagan?s speech and twenty-four after the fall of the Wall, using the American view of history to frame memory of the Berlin Wall. In Kennedy and Reagan?s speeches there is also a linguistic difference. Direct translations of the German versions of the speeches, as well as certain word choices convey a different meaning than the English originals. The Germans were thus hearing a different speech that agreed with their view of the Wall?s history. The German perspective of the Wall should be considered, as it will give Americans a broader understanding of the Berlin Wall period, and help explain certain issues Germany faces today. Using the Presidents? speeches and drafts, including the German translations, as well as testimony from Germans who lived on both sides of the Wall, this paper will add the German historical and linguistic view that is often overlooked in American historical narratives.

49
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

CFD Toolkit

GREGOR BARR, KAI HAUGLAND, MICHAEL KILCOYNE, KIM MAHONEY and Matthew McGarry

Heat transfer is an important concept in many aspects of mechanical engineering. Even though every mechanical engineering student takes a Heat Transfer (MENG 400) class with a lab during their senior year, there is still no way for these students to visualize heat transfer concepts. One of the best methods to visualize how heat transfer happens is to use computational fluid dynamics (CFD) software to model different scenarios. This project aims to utilize the CFD software Fluent by ANSYS to make simple models that Heat Transfer students can run on their lab computers in order to visualize the concepts that they are learning in the classroom and demonstrating in the lab. Assuming the students have no prior experience with CFD software, there will be a step-by-step manual included to guide them on its use.

50
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

A Feminist-Marxist Critique of Work in The United States

NOUR SULEIMAN and Lori Watson

This project will examine the role of female work as it has existed in systems of capitalism and arrive at a conclusion that suggests a reevaluation of the gendered structure of work as we know it today. In doing so, I plan to investigate the historical and modern position of women in and outside of compensated fields of work. I will address the intersections of Marxist and feminist philosophical theories as they apply to gendered roles. More specifically, I will study the role of women as mothers and implications for sex equality. In doing so it is necessary to address the function of work in a capitalist system and its consequences for women?s work. As such, I plan to look at the value placed on work and how it has contributed to the unequal standing of men and women in the workforce. Moreover, central to this work will be a discussion of the circumstances surrounding traditionally female work ? specifically, housework. That is, why is it that women have been expected to do certain jobs and men others, and what has the meant for sex equality? Ultimately, this work is meant to arrive at a conclusion that adequately frames the reasoning for a new ideal of work in the United States that will reshape the inherently sexist system that exists today. Its goal, thus, is to identify a system of work that will, in theory, aid in dismantling the patriarchal structure of American social, economic and political life.

51
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Does coevolution with toxic milkvetches drive diversification in seed-feeding beetles? Investigation using new genomic techniques.

MARY TENUTA and Geoff Morse

Plant-insect relationships are among the most common interspecific relationships observed in biology. As these two organisms closely interact with one another, profound effects on adaptation and interaction can be observed. The genus Astragalus (milkvetches) is the most rapidly speciating plant lineage known, with an astounding array of fruit morphology and defensive chemistry. We lack an empirical understanding as to why speciation rates are so high in this genus, but one possibility is that rapid diversification is driven by specialist seed beetles. Because of the phenotypic diversity of the plants that seems related to defense against insects, the anticipated paradigm is that only specialists would utilize each species as a host. However, the seed beetle Acanthoscelides pullus is able to utilize >25 Astragalus species. This relationship poses a challenge for understanding the nature of specialization and speciation in these seed beetles. There are three alternative scenarios that offer the most plausible explanations: Ac. pullus is a generalist species, a genetically structured species, or an ecologically structured cryptic species. I am using molecular genetic techniques in order to assess patterns of genetic variation that would be predicted based on these different scenarios. I will then use a pairwise population comparisons across host plant and geography in order to estimate the amount of gene flow that occurs between each population. The information obtained from the genetic data and pairwise comparisons allows us to examine whether genetic variation is partitioned via ecological parameters or more neutral geographic parameters.

52
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

How big is 8,000,000 square feet? Exploring options for Amazon's HQ2 project.

SAM HANSEN and Daniel Lopez-Perez

Currently, there is a trend among large corporations to build alternative or attractive office space types. Companies are adding elements to their headquarters or office space to make them appealing and exciting to not only their employees, but to the public. Amazon is known for its glass domes, Apple is known for its giant ring-shaped building, and Google is the best known for its playground-like vibe of total employee work/enjoyment experience. These novelties have become part of the brands of companies. In the past, cities have competed to host public attractions such as the Guggenheim Museum. Now, with the announcement of Amazon?s plan to build a second corporate headquarters, cities are competing to host offices. Not just any offices, though, the largest corporate presence the world has ever seen: 8,000,000 square feet of office space for 50,000 employees. This is double the size of Citi Bank in New York, the second largest corporate presence in a single city. Over ten years, the 8m square feet of space will be built, but has been already planned and proposed by cities that want to host Amazon?s ?HQ2.? I have been looking at the announced site proposals as well as case studies of campuses that are of similar scale to eventually lead to my own design for what I think HQ2 should look like. While most directly applicable to Amazon?s requirements, I intend for my design to end up as a universal, alternative corporate campus that benefits employee productivity and well-being.

53
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

To Encyst or Not to Encyst? Elucidation of a Signal Transduction Pathway Involved in the Regulation of Encystment and Motility in Rhodospirillum centenum

NATHAN GRASSI and Terry Bird

Microbes are the most important organisms on the planet as they play vital roles in obligate symbioses, nutrient retention, biogeochemical cycles, and complete countless other crucial functions. Anthropogenic factors are greatly influencing the microbial diversity around the world so better understanding how microorganisms respond to environmental alteration and stress is necessary. Two common responses to environmental stress are motility and encystment, in some cyst-forming species. This study begins to elucidate the signal transduction pathway involved in the regulatory ?decision? in Rhodospirillum centenum to differentiate into a motile cell or a dormant cyst. The identification of the similar CckA-ChpT-CtrA signal transduction pathway mediating cell replication and differentiation in the well-studied organism, Caulobacter crescentus, has enabled the discovery of co-opted genes in R. centenum that regulate the motility and encystment phenotypes. The generation of mutant R. centenum strains that possess knockout mutations of several of these genes allowed for a characterization of the corresponding protein?s function. The results of these experiments have allowed for the construction of a model for this particular pathway that involves the conserved phosphorylative association between the CckA homolog (called cyd2), the histidine phosphotransferase ChpT, and the transcription factor CtrA.

55
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

The Role of MYC in the Initiation of Pancreatic Cancer

MARY THOMA and Curtis Loer

Pancreatic cancer is the fourth deadliest cancer in the United States. Patients are given, on average, six months to live, and less than 8% of patients survive five years past diagnosis. This lethality is largely due to late detection, as pancreatic tumors are nearly impossible to detect due to the location of the pancreas deep in the body cavity. A better understanding of the early stages of pancreatic cancer can lead to identification of precancerous markers, helping improve early detection. One of the earliest known events in the progression from healthy pancreatic tissue to pre-cancerous tissue is the transdifferentiation of acinar cells, which produce digestive enzymes, into ductal cells, which eventually grow abnormal and contribute to tumor formation. This process is called acinar-to-ductal metaplasia, or ADM. Our research focuses on the association of ADM with the protein MYC, which has been shown to be upregulated in pancreatic cancer. We isolated acinar cells from the pancreata of mice and induced transdifferentiation into ductal cells. Analysis of the protein and RNA expression of MYC and its related proteins indicates that MYC is down-regulated in populations undergoing ADM. Furthermore, addition of exogenous MYC to acinar cells decreases the occurrence of ADM. This suggests that MYC may be initially down-regulated to promote cellular transdifferentiation, and later up-regulated to promote the progression of pre-cancerous lesions. This contributes to the understanding of pancreatic cancer initiation, which in turn can lead to earlier detection.

56
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Postitive Social Influencers? The Effect of Instagram Influencers on Female's Body Dissatisfaction and Perceptions of Reality

TARYN BEAUFORT, DELILAH BISHOP and Mary Brinson

The use of social media, such as Instagram, is prevalent among young females between the age of 18 to 24 and continues to grow. These young women tend to be especially vulnerable to the influence of media messages. Cultivation theories of body image suggests that body perceptions and subsequently body dissatisfaction can result from overexposure to body image ideals via media.The current study seeks to better understand whether social influencers and the amount of social media usage by young women affects body dissatisfaction. It incorporates an online survey created using Qualtrics.The online survey was completed by undergraduate women at the University of San Diego in April 2018. The survey included multiple questions pertaining to media usage over time, overall Instagram feed, current body ideals and perceptions, and basic demographics. Correlation tests will be used to test our hypotheses. We expect to find that high social media usage will result in a negative correlation with body dissatisfaction and with susceptibility to social influences. Current body ideals reside in females valuing the thin ideal, but through the survey analysis we predict that other idolized body ideals will become apparent.

57
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

The Effect of Cytoskeletal Crowding on the Mobility and Conformational Dynamics of Circular and Linear DNA

RACHEL DOTTERWEICH, KATHRYN REGAN, Shea Ricketts, Sylas Anderson and Rae M. Robertson-Anderson

In order to carry out key processes such as gene transcription and cell replication, DNA must diffuse through a highly crowded cellular environment. Previous studies aimed at understanding intracellular DNA transport have mainly focused on the effect of small mobile crowders. However, the cytoskeleton, composed of filamentous proteins such as semiflexible actin and rigid microtubules, has been identified as a key factor suppressing viral transfection and gene delivery. Here, we investigate the effect that cytoskeletal proteins have on the transport properties of linear and circular DNA. Specifically, we use fluorescence microscopy and custom single-molecule tracking algorithms to measure center-of-mass transport and time-varying conformational changes of single DNA molecules diffusing in in vitro composite networks of actin and microtubules. We determine the role that DNA topology (linear vs circular), as well as cytoskeletal filament rigidity (actin vs microtubules), has on DNA transport and conformational states. We specifically quantify DNA diffusion coefficients, degrees of anomalous diffusion, and conformational sizes and shapes for protein networks with varying concentrations and polymerizations states of actin and microtubules.

58
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Vildosola Racing Front Suspension Improvements

MICHAEL CAPPELLA, NOUF AL SABAH, RAED AL MUTAIRI, MANUEL GOMEZ DEL RIO, JOSE LOPEZ-MONIS and Matthew McGarry

The Vildosola Racing Team seeks to gain a competitive advantage by improving the drivability and tire wear of their Baja Trophy Truck. Our team will determine the effect of front suspension geometries have on the overall vehicle handling and tire wear. Through various experiments and scale models, we can determine where improvements can be made, and suggest these designs to Vildosola. We seek to model the Vildosola Trophy Truck, by using a front suspension kit model to analyze the effects of the camber and caster. This model will allow us to change the various suspension geometries and perform tests to determine the optimal configuration for most improved handling and minimal tire wear. Our work will build off of the continued efforts of the Vildosola team, as well as the conclusions of the previous two USD Senior Design teams.

59
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

From The Rolling Stones to Elton John: The Music of History

WILL NOONAN and Cecily

There are no less than three types of historical thought: Traditional, mainstream, and constructional. For traditional historians, history is the practice of reconstructing the past to build a fuller historical narrative. Mainstream history is the ? common knowledge? that the average person carries. Constructional history is a philosophical view that the past is not a single narrative, but several interconnected ones. A central problematic with such constructs of ?history? is that it places limits on understandings of the past, by compartmentalizing and ordering events, thereby introducing biases that interrupt. One possible way to deconstruct such limitations is decentering narratives of history by making interdisciplinary connections. I argue that viewing traditional history through musical expression offers a way to gain a historical understanding with fewer limits. Unlike other disciplines, the making and appreciation of music is not limited to any one socio-economic or cultural group. Anyone, from slave to president seeks expression through sound and lyric, making the music coming from a particular period a commentary on the events of it. Lyrics, for one, can serve as a unique perspective of the past from the view of the previously unheard. Furthermore, traditional and mainstream history has a ?music? of its own by its tempo, cadence, and vibrato. My project studies one particular period in history?s music (1962-1972) in which socio-political turmoil coincides with the birth of rock and roll. It is from here that I suggest a view of the ?music of history? so as to re-assess an academic history without limits.

60
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Temporal Changes in Spatial Coverage and Community Composition within Amathia verticillata Colonies in Mission Bay

ELIZABETH BARKER, Kristen Garcia and Michel Boudrias

Amathia verticillata, the spaghetti bryozoan, appears as a fouling invasive species in coastal waters that experience anthropogenic aquatic activity; this allows the colonies to move into new habitats and compete for space that would usually be available for other local sedentary organisms (Amat and Tempera 2009). A. verticillata colonies are commonly found on docks in Mission Bay, San Diego mostly in summer and fall. Changes in spatial coverage and analysis of the benthic community composition found within the colonies were determined through weekly sampling from late summer into early fall of 2017, adding to a data set that was started in 2016. Fall of 2017 experienced a clear rise in spatial abundance from late August into September, with a drastic drop off in late September, due to possible anthropogenic interference. Soon after, the bryozoan displayed a rebound of special coverage and finally a gradual decrease, similar to what was observed in 2016. Benthic community composition changed from isopod dominance to an increase in diversity, specifically more large nematodes, after the anthropogenic interference. Further analysis of the community composition within colonies of Amathia verticillata and an internannual comparison of the temporal trends should help determine if this invasive species can provide a beneficial habitat that supports a diverse and abundant community of local species.

61
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Exploring Subunit Communication of Malate Dehydrogenase through Interface Point-Mutations

MICHAEL SCHWABE, SHARON SHANIA and Ellis Bell, Jessica Bell

Malate Dehydrogenase (MDH) catalyzes the oxidation/reduction of malate/oxaloacetate through coupling with NAD+/NADH conversion, a key area in cellular metabolism and has been shown to be regulated by citrate. MDH is a homo-dimer x-ray structures show a flexible loop, which upon substrate or citrate binding induces a closed conformational in one subunit, while the other remains open. This implies an as of yet unknown means of communication between the two subunits to convey the open/closed loop response. Concurrent work in the Bell Lab has shown two mutations, S266A & L269A, located in the active site and interface regions display significant changes in kinetic parameters. To further probe these regions and assess individual residue contributions to subunit communication several additional point mutants (I88A, K261M/Q, S270A/C, T255E/V) located at the subunit interface have been constructed. I88 is thought to interact with L269 on the opposite chain, while T255 may be involved in substrate binding at the active site. Both I88A and T255E have shown a 10,000 and 1,000 fold decrease in Vmax respectively. Kinetic parameters for NADH display a decreased affinity in I88A, while T255E remains unchanged. This data is consistent with predicted effects of interface and active site mutations and contribute to understanding a predicted subunit relay system to induce asymmetric conformational changes. In addition to characterization of their kinetic properties, a SYPRO-Orange based thermal shift assay was used to assess a variety of ligands binding to native or mutant forms of the protein.

62
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

Synthesis of Peptides Containing Prebiotically-Plausible Amino Acids for the RNA World Hypothesis

ESTEFANIA MARTINEZ VALDIVIA, Matthew Lucas, Raj Patel, Micaella Jorge and Joan Schellinger and Ulrich Muller

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 current life forms. Core components of this hypothesis are ribozymes, which are RNA polymers that are able to be both catalysts and propagators of genetic information. The further investigation of ribozymes may indicate how RNA world organisms could have existed. Due to the modern interdependence of proteins and nucleic acids, it is likely that ribozymes were surrounded by amino acids and peptides, which have been generated in experiments that mimicked prebiotic conditions. The current study focuses on the effects of peptides on the ribozyme?s catalytic activity, which will be investigated using in vitro selection assays. Here we present the results of the synthesis and characterization of ten prebiotically plausible peptides. The syntheses were completed using Fmoc chemistry and solid phase peptide synthesis techniques, and the characterization was performed with reverse-phase high performance liquid chromatography and mass spectrometry (LC-MS). The peptides will be co-incubated with ribozymes using in-vitro selection assays, to determine if they enhance their catalytic ability. The results of this investigation may open a novel focus within the RNA world hypothesis, introducing insights regarding the chemical interactions between nucleic acids and polypeptides the and processes that ultimately led to the origins of life.

63
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

The Impact of Infectious Disease on Costly Social Signals

NICOLE POTTS, Cassidy Pearson, Doug Cornwall and James Ruff

Male house mice (mus musculus) excrete large quantities of proteins, known as major urinary proteins (MUPs), in their urine. Few studies have directly addressed to what extent MUPs are an honest signal of an individual?s health. We assessed this relationship by measuring the effects infection (a high energy cost) had on urinary MUPs concentration. BALB/c and wild-derived male mice were infected with either a low or high virulence strain of Friend Virus Complex (FVC). Their MUPs concentration were analyzed before infection, during infection and post infection. Virulence was measured using spleen mass as FVC causes splenomegaly. Initial results showed no change in MUPs levels over the course of infection with an average protein-creatinine ratio between 15 and 17 mg/ml at each time point. This is likely due to both strains in actuality being low virulent strains, as only an approximately 50% increase in spleen mass was observed in infected individuals. The experiment was repeated with a more virulent virus strain. Results indicate that mice do significantly lower MUPs levels when faced with infection; MUPs went from 53.04 ± 9.61 mg/ml (pre-time point) to 47.88 mg/ml (post-time point) representing an approximately 11% decrease. This is likely because they need to divert the energy typically allocated to MUPs to fighting off an infection. However, the slopes of decrease between the infected and control mice were not significantly different, thus additional studies need to be performed in a semi-natural habitat, under social competition, where mice will experience more natural stressors.

64
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

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

SHANE DAVIS and Joseph Provost

Mammalian cells ubiquitously express the Sodium-Hydrogen Exchanger (NHE1)a membrane transporter responsible for intracellular pH i , 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 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 understand how the these domains of CHP1 and CHP2 confer to the properties of the CHP, particularly cell proliferation and migration. To identify possible differences of structural conformation that could be related to function of each CHP isoform we exchanged the aa-aa of CHP1 and aa-aa of CHP2 using gibson cloning. Gibson cloning allows us to manipulate fragments created by PCR to make mutants of our wild-types. These constructs were then transiently transformed into cells and changes in proliferation and migration analyzed compared to wild-type expressing cells. We hypothesize that there is an interaction between CHP1 and CHP2 that allow for their individual absence or presence to affect the proliferation and motility function in lung carcinoma.

65
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forums

The Effect of Water Level on Burial in Beetle Family Haliplidae

NATALIE CONSTANCIO, Sophie Dunkelberger and Kate Boersma

Climate change causes unpredictable fluctuations in weather patterns; this includes unseasonably warm and cold water temperatures across the globe. Many aquatic taxa have adaptations to minimize the effects of changes in temperature, including seeking thermal refuge by burying. Previous studies have tested the individual effects of changes in temperature and other climate variables on the behaviors of aquatic taxa. However, in many of these studies, the different water quality parameters are not isolated from one. To better understand the independent and interactive effects of climate variables, we created a factorial experiment manipulating temperature and water level and recording the behavioral responses in aquatic beetles in the family Haliplidae. We combined three temperatures (8, 16, and 24 degrees Celsius) and three water level treatments (damp sediment, 0.5cm, and 2.0cm), to create a total of nine climate change conditions and recorded beetle behavior. We hypothesized that as water level decreased, the number of animals buried would increase. Contrary to our hypothesis, we found that at 8 Celsius, as water level decreased, burial also decreased (ANOVA: $f=40.738$, $d.f.=2$, $p<0.001$). A follow up analysis suggested that the unexpected results were not due to the time the experiment ran (Linear Regression: $f=0.299$, $d.f.=1$, $p=0.589$). Analysis focused on the lowest temperature because of lack of data for the medium (16 Celsius) and high (24 Celsius) temperatures. Our findings suggest that climate change may impact the behavior of Haliplidae, particularly burial behavior in cold weather. It is unknown how changes in behavior, especially burial, will impact freshwater ecosystems.

66
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Observing Aggregate Formation of Phytoplankton Cultures at Different Growth Phases Using Stereoscopic Imaging

RILEY HENNING, Katie 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.

67
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Kurdish Exceptionalism: a Comparative Analysis To Highlight the Unique Position of the Kurds

TAYLOR WRIGHT and Ali Gheissari

The Kurdish nationalist movement is most often discussed in scholarship as a regional phenomenon for their host states to navigate around. To properly understand the Kurdish nationalist movement, it becomes imperative to dissect their shared history across a fractured region. In synthesizing a portrait of the Kurds as a whole from more regionally focused scholars, it becomes readily apparent that their history between the three great Middle Eastern peoples, the Turks, Persians, and Arabs, set the precedent for their modern nationalist rhetoric. Furthermore, Kurds have disregarded significant Islamic trends over the centuries, setting them apart from the greater community of believers, and especially other Muslim nationalist movements. When examined critically and compared with other nationalist movements across history, the Kurds exhibit an abundance of unique characteristics that explain their current position as an enduring nationalist movement with international recognition. This ?Kurdish exceptionalism? highlights their distinct political, religious, and diplomatic traditions to explain their ascension from regionalized transnational movement to globally recognized cause.

68
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

3D Printing Applications in Microfluidics

MICHAEL SWEEN and Gordon Hoople

Microfluidics is a field of engineering concerned with the usage and processing of small quantities of fluids using channels with dimensions ranging from tens to hundreds of microns. Microfluidic devices take advantage of small sample sizes to detect and separate minute concentration gradients. Microfluidics are increasing in importance with application in the fields of artificial photosynthesis, lab-on-a-chip, biodefense, molecular analysis, molecular biology, tissue engineering, and microelectronics. The overall goal of my research is to determine the capabilities of a particular 3D printer, the Form2, for manufacturing microfluidic devices. As a part of this larger goal I will characterize the microscale fabrication capabilities of the Form2 3D printer, identify optimal parameters for fabricating micro scale features with high degrees of precision, accuracy, and reliability, develop a standard processes for the prototyping of microfluidic devices, and fabricate a droplet generator, a common device used in lab on a chip applications such as DNA sequencing.

69
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Race,Space and Education's Place

ROGERS TIASHA and Tom Reifer

Juvenile delinquency is critically mediated by the intersection of race, space and education?s place. This paper explores the centrality of race, space and education?s central place in creating/reproducing juvenile delinquency, or fostering agency-laden education in areas of spatially and racially concentrated neighborhood disadvantage. My main focus is the extent to which education creates/reproduces juvenile delinquency or fosters agency among young people. My goals is to explore how juvenile delinquency can be decreased through improving educational systems in these communities. To this end, I explore the literature on juvenile delinquency, questions of agency and social struggles over education.

70
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Attack on Frost Giant: How Shingeki no Kyojin Examines the Norse Cycle of Fate

RACHEL TRUONG and Joseph McGowan

One of the most prevalent themes in Norse mythology is the cycle of destiny, which can never be changed, even by the will of the gods. This same idea is often presented in works that parallel their stories with those of Norse mythology, such as Hajime Isayama?s graphic novel, Attack on Titan. The presence of ancient stories in a modern storytelling medium opens the door to allowing these myths and the values and lessons they convey to endure into the modern day. This study explores the strong parallels between Attack on Titan and Norse mythology to reveal how Isayama modifies and manipulates such parallels to present and comment on the Nordic cycle of destiny in comparison to the modern value of free choice. These parallels will be drawn and examined from careful study of primary sources concerning Norse mythology and Attack on Titan. They will most specifically be examined for their significance to the development of Isayama?s story and their contribution to the overarching theme of breaking the cycle of destiny. In examining both ancient stories and modern retellings, this project will contribute to further study of enduring values and how such values can shift and reshape themselves from ancient history to the present day.

71
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Amide-Directed Alkane C-H Boylation

STEPHEN HYLAND and Timothy Clark

The metal-catalyzed functionalization of unactivated alkane C?H bonds remains a significant challenge that could provide new approaches to a range of synthetic targets. The borylation of sp3-hybridized C?H bonds is one area that has great potential based on the diverse reactions of carbon?boron bonds. Such reactions have been limited outside of the functionalization of primary, unfunctionalized alkanes or benzylic C?H bonds. One notable exception was reported by Sawamura and co-workers in 2012, in which they used silica-supported phosphine ligands to mediate the amide-directed functionalization of C?H bonds alpha-to nitrogen. Under these conditions, some examples of secondary C?H borylation were also reported. Based on the work by Sawamura, the amide-directed C?H borylation of sp3-hybridized C?H bonds was examined using readily available catalyst systems. Using [(COD)Ir(OMe)]2 as the pre-catalyst in conjunction with an XL-type ligand reported by Smith and Maleczka, 8-(diisopropylsilyl)quinolone (QSi) was found to afford the desired C?H borylation reaction. The reaction selectivity, scope, and proposed mechanism will be discussed.

72
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Synthesis of Starch-Functionalized Dibromomaleimide for Peptide Delivery

NATHAN LORENTZ, TINTIN LUU and Joan Schellinger

The application of peptides as pharmaceutical drugs demonstrates many advantages including high specificity, low toxicity, and high biocompatibility and degradability. Although peptide-based therapeutics is an advantageous method of peptide delivery, one of the main challenges with the use of peptides is the enzymatic degradation of peptide-based drugs in the bloodstream due. PEGylation has been used to increase the circulation half-life of peptides, but it does so at the cost of accumulating PEG in organs and releasing potentially toxic by-products upon degradation. One alternative is the covalent attachment of saccharides as the transport moieties. Utilization of saccharides is growing in the field of drug delivery because they are abundant, renewable, and low costing with excellent biodegradability and biocompatibility. In particular, starch is one of the most versatile polysaccharides for synthesizing new hybrid biomaterials because its structure can easily be manipulated. Our research group aims to synthesize a novel starch-peptide conjugated macromolecule consisting of peptides, a hetero-functionalized small molecule linker, and starch as a peptide drug carrier system. In previous studies, the macromolecular nature of the starch moiety caused the saturation of NMR signals and obscured the peak readings. Our prospective work includes investigating optimal reaction conditions to perform successful copper click reactions of the linker molecule and starch moiety in order to conjugate peptides to our starch-linker complex. We hope that final molecule will find utility in the development of peptides as drugs and other drug delivery systems.

73
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Metals concentrations in Tijuana River estuary sediment

SIDNEY WILLIAMS and Suzanne Walther

Wetlands provide a number of important services in coastal areas, including protection from flooding and providing habitat for threatened and endangered flora and fauna. Aspects of the health of an estuarine environment can be measured by assessing the presence of metals within the ecosystem. This study examines the abundance and spatial distribution of heavy metals present in the Tijuana River Estuary system. To do so, we collected sediment samples in the Tijuana River Estuary in July 2017 using cross-sectional transects in the south, east, and western areas of the estuary; a total of 69 samples from 4 sites. We dried, homogenized, and analyzed the sediments in triplicate using an X-Ray fluorescence (XRF) machine to determine the abundance of six metals, nickel, arsenic, lead, mercury, copper, and zinc, all known to have impact on estuarine ecosystems. Using GIS to spatially analyze the data and identify geomorphic patterns of metal deposition, we generally found the highest metal concentrations on the floodplains, on both sides of the channel, and the lowest concentrations within the channels. This is likely due to the deposition of fine sediments on the floodplain during flooding, whereas in-channel sediments are flushed to the ocean. The relationship of grain size to metal abundance is the topic of future research. At all locations, the concentrations of arsenic and lead exceed the EPA standards. This may be due to increased input of metals from urban storm-water runoff as well as from the local sewage plant within the watershed in Tijuana, Mexico. The distribution of metal concentrations in estuarine sediments can inform management and restoration efforts to improve the health of these important ecosystems.

74
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

SIKE affects processes involving cytoskeletal rearrangement

RYAN MCCOOL, Christian A Quintero, J. Ellis Bell and Jessica K Bell

Suppressor of IKK Epsilon (SIKE) is a protein in the virus- and TRL3- triggered cascading signal pathway. SIKE has been shown to directly interact with alpha-actinin, a protein involved in cytoskeletal rearrangement, in coimmunoprecipitation and in vitro precipitation experiments. However, the exact cellular processes SIKE affects are still unknown. To bridge this gap, we examined two processes that require cytoskeletal rearrangement, migration and phagocytosis, to determine if SIKE functions in these processes. Our model system is a parental cell line, HAP1, and a CRISPR/Cas9 knockout of SIKE, SIKE-CR. Scratch assays were performed on parental HAP1 cells and SIKE knockout cells. To induce an anti-viral response, dsRNA, a viral mimic, was applied to cells prior to the start of scratch assays in a second set of experiments. Phagocytosis assays, using latex beads coated with FITC labeled IgG, were performed and analyzed with a novel ImageJ procedure to determine the effects of SIKE on phagocytosis. The scratch assays indicate that loss of SIKE decreases cellular motility by ~30% whereas SIKE decreases cellular ability to perform phagocytosis. These studies suggest that SIKE links the innate immune system?s antiviral response to cytoskeletal rearrangements necessary to host defenses. Support or Funding Information Studies were funded by USD SURE and NIH-NIAID R21 to JKB.

75
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Feeding the Brain: A Review of the Nutritional Effects on Adult Neurogenesis

SARAH KHAN and Jena Hales

Our brains generate new neurons. This process of neurogenesis has been shown to occur even into adulthood. Although it has been identified, the complete understanding of the mechanisms and influencing factors on neurogenesis remain unclear. Emerging research states that neurogenesis supports brain plasticity and learning and memory, therefore being a critical element of brain health particularly in older age. While prior research has shown environmental factors? impact on neurogenesis, it has yet to fully establish the effects of nutrition. Several dietary factors have been demonstrated to be involved in the process, including regulation of the gut-microbiome, caloric consumption, food texture, and certain nutrients. These factors modulate the creation of new neurons through a variety of mechanisms, such as regulation of positive gene pathways, enhancing the production of progenitor cells, and elevation of vital chemicals like brain-derived neurotrophic factor. A growing amount of research is focused on investigating the influence of nutrition on brain health, including mood and cognitive function. By analyzing the current body of research and comparing methods of study, we can evaluate the possible implications of diet-mediated neurogenesis on neurological function. Connecting nutrition and neurogenesis offers promising evidence for potential therapeutic intervention and preventative measures to cognitive impairment associated with aging.

76
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

SIKE's Direct Protein-Protein Interactions

TIMOTHY MARSHALL and Jessica Bell

Suppressor of IKKepsilon (SIKE) is a naturally occurring protein in humans that becomes phosphorylated when double-stranded(ds) RNA is introduced into the body typically as part of a viral infection. The phosphorylation of SIKE occurs due to a signaling pathway induced by Toll-like receptor 3 (TLR3), that activates host defenses and leads to the interruption of the viral replication. Although the functions of SIKE are unknown, it has been shown that SIKE associates with cytoskeletal proteins. To determine the interactions that SIKE has with cytoskeletal proteins, In Vitro Precipitations (IVP) were performed. During the IVP experiments, the 6x His-tag labeled SIKE is first incubated with various cytoskeletal proteins and then incubated with Ni-NTA resin. By analyzing the samples of the reaction that are bound and not bound to the resin, the proteins that directly interact with SIKE can be identified. When using an N-terminal 6XHis-tagged SIKE, alpha-actinin appeared to prevent SIKE from interacting with the Ni-NTA resin suggesting that alpha-actinin was binding near the N-terminus of SIKE blocking the Ni-NTA-SIKE interaction. To test this hypothesis, a C-terminal 6XHis-tagged SIKE was incubated with alpha-actinin. The C-terminally labeled SIKE retained its interaction with the Ni-NTA resin and alpha-actinin consistent with the SIKE-alpha-actinin interaction occurring at the N-terminus of SIKE. These results confirm a direct interaction between SIKE and alpha-actinin. This work lays the foundation for understanding how this interaction may affect the function of alpha-actinin in the context of cytoskeletal protein rearrangements and function in the host?s response to viral infection.

77
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

How Multiple Memory Systems Interact in Learning a Spatial Alternation Task in the Rat

NICOLE REITZ, JONATHAN VINCZE, NINA TABRIZI, KIRAN LONG-IYER, MEGAN MIR and Jena Hales

There are multiple memory systems that work in our brain to form declarative and non-declarative memories. Each of these systems engages distinct brain structures. Declarative memories are encoded by the the hippocampus while non-declarative memories are formed by other regions, including the striatum (Squire, 2004). Interestingly, studies have consistently shown that with enough training, rats with hippocampal lesions can eventually perform at a level comparable to controls, even on tasks considered to be hippocampus-dependent (Morris & Frey, 1997; Hales et al., 2014). This finding suggests involvement of an alternative memory system, and our study probes two possibilities for how these memory systems interact: 1) an alternative memory system using the striatum compensates for the damaged hippocampus only when the hippocampus is not functional, or 2) the striatum is always engaged but the more effective hippocampus masks its contribution. To examine these possibilities, we tested rats with bilateral excitotoxic hippocampal lesions and sham lesions on a hippocampus-dependent, delayed alternating T-maze task (Ainge et al., 2007). Upon reaching criterion performance, hippocampal- and sham-lesioned rats were immediately perfused and brain tissue was stained for c-Fos expression. Another group of sham rats were overtrained past criterion (reaching a number of training days similar to the hippocampal-lesioned rats). Overtrained rats were then perfused and brain tissue stained for c-Fos expression. The critical comparisons were the levels of c-Fos expression between the hippocampus of the overtrained and naive rats and the levels of c-Fos expression between the striatum of the overtrained and hippocampal-lesioned rats.

78
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

The effects of hatchery rearing on the composition and mass of hearts in California Yellowtail (Seriola dorsalis)

SINGNE BROWN, Tara Toman and Mary Sue Lowery

California Yellowtail, Seriola dorsalis, is a migratory species demonstrating high performance swimming adaptations and is expected to be extremely active in the wild. Typical aquaculture tanks provide lower current velocity and restricted space, likely presenting wild-caught fish with reduced opportunities for high-speed sustained exercise. Few studies have examined the effects of hatchery rearing on the composition and mass of hearts in yellowtail. There were four sample groups this study looked at: wild-caught juvenile fish, hatchery-reared juvenile fish, adult wild-caught fish reared in hatchery conditions for eight months, and adult hatchery-reared fish. Heart size, glycolytic (pyruvate kinase, PK) and oxidative (citrate synthase, CS) enzyme activities in the ventricle tissues of juvenile wild-caught and age matched hatchery-spawned yellowtail were compared at capture and after an eight-month period in standard aquaculture tanks. There were significantly higher activities for CS and PK in hatchery-reared juveniles. However, after eight months there were significantly higher CS and PK activities in wild adults. There was no significant difference between ventricle masses in the age-matched fish. A previous study found that wild caught juveniles had a lower basal metabolic rate, which could contribute to their lower levels of CS upon capture, however this was no longer consistent with whole body metabolic rate later on. In general, there was little difference in the biochemical indicators of heart metabolism in hatchery reared versus wild caught yellowtail.

79
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

A Teacher's Decision: An Investigation of the Agency of Teachers Under the Nazi Regime, 1933-1945

SARAH MAC INNES and Clara Oberle

Education has always involved a certain element of indoctrination. Whether it is the repeated drilling of math facts to foster scientific achievements in society, or the ideologies of modern dictatorships, the classroom is pivotal in shaping societies. Certain regimes, such as the Nazi regime, utilized the education system in an attempt to exert total control over its people. Teachers are the gatekeepers of the educational world, having the ultimate last word in what material is taught. Yet, under the Nazi regime there is evidence that shows teachers both complying with and resisting Nazi ideologies in their classrooms. The question then becomes how much agency teachers had in making the decision to collaborate or resist in the first place. Certain factors such as geographic location, political affiliation, religious beliefs, pedagogical beliefs, economic incentives, and gender affected teachers? freedom of choice during the Nazi regime. Through the review of secondary literature and primary sources such as interviews, diaries, and the Nazi curriculum, this paper will show how these specific factors dictated the agency of teachers. This project serves as an investigation into the reach of a modern dictatorship?s aim of total control over society and the education system, specifically by tracing the impact of the Nazi regime on teachers? agency and the available choices within the educational sphere.

80
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Parent-Child Cultural Mismatch and Differences in Evaluating Functional Impairment

YESSICA GREEN ROSAS, CARLI PROCTOR, Raymond La, May Yeh, Argero Zerr, Erika Luis Sanchez, Mckenna Sakamoto, and Kristen McCabe

Few studies looked into parent-child cultural match and its relationship to parent-child differences in evaluating the child's functional impairment. Analyzing how parent-child cultural mismatch relates to different functional impairment evaluations can give insight into how cross-generational differences in cultural affiliation can lead to differences in the way in which parents and children view the child's mental health needs. The authors examined parent-child cultural affinity differences in a sample of service-using youth aged 12-18 (n = 269) to determine if this difference is associated with parent-child differences in evaluating functional impairment in three different domains. Cultural affinity was assessed using the Pan-Acculturation Scale (PAN). Functional impairment evaluations were measured using the Columbia Impairment Scale (CIS) and three domain subscales developed by Singer and others (2011): School, socialization, and home. We hypothesized that greater cultural mismatch would be associated with greater differences in functional impairment evaluations in total and across all three domains. Greater American cultural mismatch was associated with greater parent-child differences in evaluating school functional impairment ($t(267) = 2.27$, $p = .024$) but not in total impairment and in the social and home subscales. These findings suggest that greater American cultural mismatch only influences parent-child differences in evaluating functional impairment in the school domain. Cultural mismatch may only relate to parent-child impairment evaluation differences when they are not evaluating the domain with the same environmental context; parents may evaluate school-specific impairments using the context of their cultural affinity, since there is not a shared environmental context in this domain.

81
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Studies Toward the Development of a More Accurate Structural Model of the Nitrile Hydratase Active Site

WESLEY CHOW, RAQUEL MARKHAM and Christopher Daley

In nature, enzymes with thiolate (sulfur groups) coordinated mononuclear non-corrinoid Co(III) or non-heme Fe(III) metal ion active sites, notably iron-sulfur centers, are generally found to use RedOx-based (electron transfer) mechanisms of action in their catalysis function. However, there exist a few enzymes in which metal active sites do not appear to participate in RedOx-based catalysis mechanisms including our enzyme of interest: nitrile hydratase (NHase). The structure and chemistry of the NHase active site has drawn significant attention in the past due to its unique features that include: i) redox-inactive metal ion bound to cysteine thiolates, ii) the very rare backbone carboxamido nitrogen coordination to the metal ion, and iii) asymmetric oxidation of the cysteine bound thiolates. Our group has been working on developing structural and functional models of NHase in order to better understand its chemistry. Specifically, our investigations are performed through the development of small molecular models of the 1st coordination sphere of the NHase active site (atoms directly bonded to the active site) using the synthetic analog approach. Herein, we report on our progress towards the development of analogs that more accurately model the active site in their Co(III)- and Fe(III)-NHase form of the native enzyme. Of note, specific structural models were designed to develop a better understanding of potential hydrogen-bonding within the 1st coordination sphere of the active site. The synthesis and characterization of the complexes are reported with the latter using standard techniques (NMR, UV Vis, and ESI-MS) and x-ray crystallography, where possible.

82
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Population dynamics of the myctophid fish, Electrona antarctica, based on otoliths in the diet of a predator, the Antarctic fur seal, Arctocephalus gazella

RILEY READ and Ron Kaufmann

Myctophids are abundant mesopelagic fishes, inhabiting deep water throughout the oceans. Many of these fishes exhibit diel vertical migration and are important links between primary consumers and top predators. They are commercially exploited for use in fish meal as well as fertilizers, which is concerning because they have low fecundity, and their population dynamics are poorly understood. In the Antarctic, Electrona antarctica has been historically abundant and plays a particularly important role in the food web as an alternative pathway when Antarctic krill are less plentiful. Trawl surveys between 2002 and 2008 indicate that populations of E. antarctica may have declined dramatically, but trawl collections suffer from biases, including limited temporal and spatial coverage, as well as net avoidance by fishes. Recently, scientists have begun to use predators as ?biological samplers? to study the dynamics of prey populations. The goal of this study was to examine the population dynamics of E. antarctica from 1999-2008 using otoliths obtained from Antarctic fur seal scat at Cape Shirreff, Livingston Island in the South Shetland Islands. Sagittal otoliths were cleaned and identified, then imaged, weighed, and their areas and lengths measured using ImageJ. Relative abundance was highly variable, with a range of 261 to 2737 otoliths recovered in individual years. Otoliths had approximately normal area and length distributions that varied markedly with time. Initial analysis reveals substantial interannual variability in otolith size but does not suggest a progressive change in mean otolith dimensions over time in this region.

83
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Effect of Chemical Cues on Molting of Fiddler Crab Megalopae in 10 ppt Seawater

SYDNEY RILUM and James Welch and Kathleen Reinsel

Three species of fiddler crabs, Uca minax, U. pugnax, and U. pugilator, are commonly found in estuaries along the Atlantic coast, each with distinct adult habitats differing in salinity and sediment grain size. Prior research has found evidence for larvae exhibiting selective settlement; however, the degree to which and the method by which they choose their species-appropriate habitat to settle in is still unknown. Additionally, a recent study determined that chemical cues from adult crabs stimulate molting in field-caught fiddler crab megalopae, as previously determined in lab-reared megalopae. However, in 35 ppt seawater, few U. minax molted. This study tested the hypotheses that 1) chemical cues from adult fiddler crabs would stimulate molting of conspecific megalopae in 10 ppt seawater, and 2) that at 10 ppt, more U. minax would molt than at 35 ppt. Adult chemical cues accelerated molting in field-caught megalopae of U. pugilator and U. pugnax, which both molted significantly earlier in all odor water treatments than in the control water, and fastest in conspecific water. U. pugilator megalopae were stimulated to molt in all treatments, whereas U. pugnax molted mostly in conspecific odor. However, even at 10 ppt, few U. minax molted, and there were no differences in molting frequency or time among treatments. The few U. minax molts suggest that these experimental conditions may still not be ideal for them, and other factors may be responsible for stimulating and accelerating their molting and settlement site selection.

84
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Full Range Small Wind Turbine Inverter

TODD LEMAY, RICHY BURGO, ENRIQUE DE LEYVA, SALMAN ALHARTHY and Venkat Shastri

Small wind technology faces numerous challenges when providing grid tied power. Small wind turbines typically use variable speed systems with permanent magnet generators to produce electricity with voltage and frequency that is proportional to rotational speed. Inverters are required to convert the electrical power into grid quality electricity of the proper voltage and frequency. Unfortunately, most inverters for small wind turbines operate at a low or a high voltage range. As wind speed increases the voltage increases and the available energy to capture increases as a cubed function. Current inverter technology forces small wind turbine owners to forego the frequent, but lower power, wind speeds or the less frequent, but more powerful, high wind speeds. The Full Range Inverter will allow small wind turbines to generate grid quality electricity at both high and low wind speeds by employing a microcontroller with off the shelf inverter technology. The Full Range Inverter incorporates a voltage sensor with a microcontroller and a switching circuit to direct power. The low voltage power produced at low wind speeds will be sent to a low range inverter and high voltage power produced at high wind speeds will be sent to a high range inverter. A wider range of wind speeds will be converted to grid quality electricity using existing inverter technology. The Full Range Inverter will operate with an efficiency of over 90% while following applicable UL and NEC safety standards. The power outputted to the grid will meet IEEE 1547-3000, IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems. Wireless communications will provide the owner with data on their wind turbine performance.

85
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Water Quality in Uganda

YUN JI KIM and James Bolender

Drinking water quality monitoring is critical in the effort to improve health outcomes in developing countries. Poor waste management, rapid industrialization, agricultural activity, and soil erosion are examples of anthropogenic and natural processes that affect the concentrations of heavy metals, anions, nutrients, and bacterial concentrations in water. The purpose of this study was to investigate the concentrations of these contaminants in water from shallow wells, boreholes, rivers, and lakes in the southwestern region of Uganda. The water samples were analyzed in the field and in the laboratory at USD and at the U.S. Geological Survey in Boulder, Colorado to determine the concentrations of various anions and cations that may have long-term health impacts. Data presented here depict single sampling events at the various locations and provide a snapshot of the various water quality issues facing a developing country like Uganda.

86
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Identification and Classification of Arsenic-Resistant Bacteria Isolated From Heavily Contaminated Soil In Black Mountain Mine

STEPHANIE KATZ, ELENA BETTALE and Terry Bird

The diversity within the domain bacteria is unparalleled. They have colonized practically every niche on the planet, including environments that are toxic to most living organisms. Arsenic is a metalloid that is toxic to most organisms because it disrupts ATP synthesis. However, some bacteria are able to survive and even thrive in arsenic-contaminated environments (Pepi et al. 2007). A location on Black Mountain, located in East County San Diego, was mined for arsenic in the 1920?s. The resulting mine tailings liberated copious amounts of arsenic oxide and created a challenging evolutionary pressure for the local microbial community. The goal of this study was to identify arsenic-resistant bacterial species in and around the mine entrance. We isolated 54 species from soil samples and sequenced their 16s rRNA genes. The data was used to create a phylogenetic tree to examine the diversity and relationships within the arsenic-resistant microbial community. Individual isolates were also grown in the presence of increasing amounts of arsenite to elucidate their minimum inhibitory concentration. Our results show that the Black Mountain mine community of arsenic-resistant bacteria is genetically and phenotypically diverse.

88
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Enzyme Correlates of Aerobic and Anaerobic Metabolism in Hatchery Reared versus Wild Caught California Yellowtail (Seriola dorsalis)

TARA TOMAN, Singne Brown and Mary Sue Lowery

California Yellowtail (Seriola dorsalis) are highly migratory yet few studies have looked at the impacts of hatchery rearing on muscle characteristics and swim capacity of these fish. Glycolytic (lactate dehydrogenase, LDH and pyruvate kinase, PK) and oxidative (citrate synthase CS) enzyme activities in juvenile wild caught and age matched hatchery-spawned yellowtail were compared at capture and after an eight-month period in standard aquaculture tanks. Wild yellowtail had a lower standard metabolic rate and higher aerobic scope at capture, but no difference in muscle CS activity. Hatchery-spawned fish had higher PK and LDH activities than wild caught fish upon capture, but most differences in glycolytic activities seen initially dissipated in captivity. Only PK activity remained higher in the white muscle of hatchery-reared fish after 8 months. Following the hatchery rearing period, wild caught yellowtail had 15% lower CS activity in both white and red muscle, indicating a relative loss of maximum aerobic capacity in the muscle. However, the reduction in CS was fairly modest considering an assumed substantial loss of daily activity in the hatchery setting compared to the wild. Overall, there was little difference in these biochemical indicators of muscle metabolism in hatchery reared versus wild caught yellowtail.

89
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Spatial distribution of zooplankton during the Spring bloom 2017 in Mission Bay, San Diego, Ca.

WILLIAM PORTER and Michel Boudrias

Mission Bay, is the largest aquatic park in the United States and is a major economic engine for the region with millions of tourists and locals using this park for recreation. Because of this, it is important to quantify the natural resources of Mission Bay, the abundance and distribution of marine organisms that live in it, and the potential anthropogenic impacts to the bay. My research focused on the spatial distribution and abundance of zooplankton in Mission Bay in the Spring of 2017, as well as some possible factors for explaining their distribution. Different copepods species varied both spatially and in abundance when comparing different regions of Mission bay (back, middle and front of the bay). In general, more zooplankton were found closer to the mouth of Mission Bay, and fewer towards the back where we find more freshwater and human influence. This study could be used to help understand the spatial trends of plankton in Mission Bay over several time scales (monthly, seasonally, yearly). Plankton are key organisms in the Mission Bay ecosystem are important in the food web for many other species.

90
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Mapping the Disulfide Bonds of Nurse Shark Joining Chain

TESS ROBESON and Valerie Hohman

Joining chain is an essential protein in mucosal immunity in many organisms including mammals. However, little is known about J chain in elasmobranchs such as nurse sharks. Their amino acid sequence appears to be missing key cysteines which could lead to structural differences when compared to mammalian J chain. This research aims to map the disulfide bond pattern in nurse shark J chain and to assess the similarities or differences between it and mammalian J chain. After isolating - Immunoglobulin M (IgM) from whole nurse shark sera, the antibody was digested using the enzyme trypsin. The resulting peptides were separated using a HPLC/Mass spectrometer, and the subsequent data was analyzed using the MassMatrix disulfide bond mapping software. Bovine IgM was used as a control due to its known disulfide bonding pattern. Analysis using the disulfide bond mapping software resulted in some incorrectly mapped cysteines in the bovine J chain. Alternative enzymes for IgM digestion and a reagent with which to block the free cysteines that potentially cause bond scrambling are needed to optimize disulfide bond detection and are being investigated. Determining the disulfide bond pattern of nurse shark J chain can enlighten the potential function of the protein in the nurse sharks. As the nurse shark J chain is missing two key cysteines present in mammalian J chains, it may not have the same function as its mammalian counterparts. This potential difference in function suggests that the role of J chain in mucosal immunity may have evolved over time.

91
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Extrinsic Interiors

ANELISE HUNZIKER and Daniel Lopez-Perez

As the sharing economy emerges, the line between public and private space are beginning to blur as a new breed of short term rentals develops. Our constructed views of domesticity are being challenged and the meaning of the 'home' refined due to the explosion of short term rentals. The sharing economy has caused domestic space to be less private and even less a commodity. Sites such as Airbnb now provide us a catalogue of interiors furnished with brands such as IKEA and other leftover items put together by a host hoping to be appeal to the market. In this two way exchange people rent their rooms out to compete to become superhosts. Sections of cities are being leased for rentals while also being defined by them: Airbnb's description of San Francisco's Bayview neighborhood is marketed as 'D-I-Y by the B-A-Y'. People are designing spaces in order to be defined by their reviews just as cities are being labeled in order to be monetized. Owning a private house is now becoming less important yet we still want all the commodities and materials it provides. This project seeks to provide an array of analysis and solutions to help guide people on how to design private space for the public. It aims to provide a new way of design for a more experiential and engaging domestic space that is both appealing and marketable to the public eye.

92
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

The Colonization of Indian Hatha Yoga as Sold to American Consumers

ABIGAIL DOW and Atreyee Phukan, Louis Komjathy

"Spiritual privilege and "hybrid spirituality" in the United States isintricately tied to the phenomenon of "spiritual but not religious" (SBNR) and the new religious movement (NRM) of "American Yoga." "Hybrid spirituality" is a fusion of different religious beliefs and concepts selected by an individual based on his or her personal preferences. Basically, an individual composes a unique spiritual identity by using various source traditions, typically Asian religions. As Louis Komjathy has argued, this relates to the decontextualization and reconceptualization of various source-traditions, which often involves "spiritual colonialism". This phenomenon is a direct continuation and resurgence of America's 1960's counterculture, for which Esalen Institute in Big Sur, California is a key center. Founded in 1962, Esalen is a retreat center where the floodgates to esoteric spirituality were opened, and its influence reached far beyond its walls and into mainstream American culture. The spiritual movement represented by Esalen Institute not only lives on but also currently defines Americans' personal identities and existential realities. To examine this trajectory, I researched how Indian Hatha Yoga has been "Americanized", sold, and taught as a new form of "yoga" that expresses and cultivates personal well-being, fitness, and American beauty. While Americans' interest in "yoga" may be genuine, the phenomenon of "American Yoga" is highly problematic. As Edwin Bryant states, it is "antithetical to the informing views and soteriological system of classical yoga". My project in turn aims to observe critically and question the culture, space, and environment of American yoga studios."

93
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

How do Earnings Calls Affect Analysts?

NICHOLAS ROBERTI and Biljana Adebambo

Four times a year a company often chooses to directly interact with a select group of analysts in the form of a conference call. This is to give them information on their prior quarter's performance and an idea of how they will perform in the coming quarter. There are many critics of this legislation that claimed that the firms would be unwilling to share important information because it would be required to free for all to hear. The question that hovers around earnings calls is what impact do they have on how performance is interpreted and predictions are made by the major sources of investment information? Analysts might be influenced by the curated information to have a more positive opinion on company prospects. Analysts could also be more optimistic in order to continue to get invitations to participate on earnings calls. The methodology around this research will be very simple because of the data available. What is of interest is that there is no research on this topic, only opinion pieces on the possible or expected impact of these calls. I will be utilizing Bloomberg to compile a large number Analyst Reports, Expected Returns and Target Prices. From there I will run a regression on their target prices before and after the call to see if there is a significant difference between the two. From these outputs, I will hopefully be able to conclude on a difference between them and may be able to add some more questions to be answered by the data collected as the process continues.My tentative conclusion is that there is an impact of earnings calls. I would like to compile more companies in order to see how prevalent and how large this difference is.

95
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Amerasians: A Physical Legacy of the Vietnam War

DEMI FLORES and Michael Gonzalez

The Vietnam War is often characterized as a grim war that lacked public support on the American home front, eventually resulting in a devastating U.S defeat. However, after the war ended and the American servicemen returned home, there remained in Vietnam a very physical legacy of this war- the Amerasians. Amerasians is a term used to describe those who were fathered by an American serviceman and conceived by a local Vietnamese mother throughout the Vietnam War. Abandoned by their American fathers after the war, the Amerasians in Vietnam endured ridicule, harassment, and persecution; they were ultimately rejected by Vietnamese society. On the contrary, by the late 1980s, public outcry in support of the Amerasians led to the passing of legislation that gave 21,000 Amerasians the opportunity to leave Vietnam, come to the U.S., and reunite with their fathers. Through an examination of oral histories, newspaper articles, and biographies, this paper aims to examine the factors that can explain the disparity between the American and Vietnamese responses to the Amerasians. So long as war is an inevitable aspect of society, it is important to explore the topic of the Amerasians to shed light on an often-overlooked reality of war and examine how societies respond to children who are born of servicemen and local women in times of war.

96
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Measuring genetic divergence of endemic seed beetles Acanthoscelides pullus through reproductive isolation

DANIEL SHERIDAN and Geoffrey Morse

The legume genus Astragalus contains some of the highest levels of morphological diversity in plants and has the highest diversity accumulation known. In addition, Astragalus lineages possess toxic secondary compounds which are predicted to deter herbivory. Although the reasons behind the rapid speciation of this genus are uncertain, it is predicted that the specialist seed beetles that oviposit their eggs on the seeds of Astragalus decrease the fitness of this plant. Despite rapid speciation in the plant, the specialist seed beetle Acanthoscelides pullus is able to successfully live on approximately 25 known species of Astragalus which are generally geographically isolated. If coevolution is driving speciation in the beetles and plants, one prediction is that host association will be a better predictor of barriers to gene flow (e.g. migration rates or reproductive isolation) than geography. On the other hand, geographic isolation alone would only promote allopatric speciation in association with geographic distance through the evolution of reproductive barriers between population attributed genetic drift. In order to measure the relative role of host plant and geography in lineage diversification within Ac. pullus, reproductive isolation experiments were performed to see if geographically isolated populations of beetle or beetles reared from different host plants in the field are able to mate and lay viable eggs that develop into hybrid offspring. Preliminary data suggest that both may play a role in the evolution of reproductive isolation, as Ac. pullus displays reproductive isolation between isolated populations and between different host plants.

97
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Experimental and Numerical Modeling of Heat Transfer in Directed Thermoplates

QUINN PRATT, Ryan Hayes, Christopher Spitler and Imane Khalil, Daniel Codd

We present three-dimensional numerical simulations to quantify the design specifications of a directional thermoplate expanded channel heat exchanger, also calleddimpleplate. Parametric thermofluidic simulations were performed independently varying the number of spot welds, the diameter of the spot welds, and the thickness of the fluid channel within the laminar flow regime. Results from computational fluid dynamics simulations show an improvement in heat transfer is achieved under a variety of conditions: when the thermoplate has a relatively large cross-sectional area normal to the flow, a ratio of spot weld spacing to channel length of 0.2, and a ratio of the spot weld diameter with respect to channel width of 0.3. Experimental results performed to validate the model are also presented.

98
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Palmitoylation Regulates the Functions of NHE1

EMILY PITSCH and Joseph Provost

The sodium hydrogen exchanger isoform 1 (NHE1) is a ubiquitously expressed transmembrane protein that regulates intercellular pH (pHi) and interacts with proteins involved in cell migration and adhesion. Within the extended cytosolic tail, there are three cysteine residues, which are potential sites for palmitoylation. Palmitoylation is a post-translational fatty acid modification that is unique due to its reversibility. 2-bromopalmitate (2BP) irreversibly inhibit palmitoyl acyltransferases that transfer palmitate to cysteines. Lung fibroblasts expressing NHE1 (PSN) showed minimal decrease (8.5 ± 2.5% SEM) in cell viability after treatment with 50 µM 2BP after 72 h. Palmitoylation plays a critical role in cell adhesion and motility. Cells that were incubated in 15 µM 2BP for 18 hrs displayed a significant decrease cell adhesion in low serum conditions and cells treated with 2BP did not fully migrate into vacated space after 24 hrs in a wounding assay. Impact on cytoskeletal structure by 2BP treatment was also investigated. Lysophosphatidic acid (LPA) increased actin stress fiber formation 40% over control cells. This LPA-induced stress fiber formation was inhibited more than two-fold in the presence of 2BP. This is important as LPA-induced stress fiber formation requires NHE1; therefore, palmitoylation is required for NHE1-dependent actin stress fiber formation. To determine the effect of palmitoylation on NHE1 transport activity, PSN cells were treated with 2BP and the pHi was measured. Addition of increasing concentrations of 2BP inhibited NHE1 transport in cells with and without serum, but the effect was enhanced in low serum conditions. Interestingly, LPA stimulation of NHE1 activity was inhibited by 60%, but not to baseline. This indicates that in addition to cell adherence, motility, and cytoskeletal formation, palmitoylation is critical for NHE1 transport. This research was partially funded by the Beckman Foundation.

99
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Aqueous RAFT Polymerization of Positively Charged Monomers

JONATHAN TRAN, AMANDA ENNIS, Alisson Mae Magsumbol, Ella M. Giles, Alexandra Jameson, William Sherwin and Joan Schellinger

Reversible Addition-Fragmentation Chain Transfer (RAFT) polymerization is a form of controlled radical polymerization. RAFT polymerization is a relatively new way to create polymers, including peptide based polymers, which is characterized by a decrease in the discrepancies in molecular masses of the polymers as compared to conventional free radical polymerization. Aqueous RAFT polymerization has never been attempted. This project focuses on microwave assisted aqueous RAFT polymerization of positively charged molecules with hopes to one day polymerize a polymer composed of peptides. We will be using N-(3-Aminopropyl) methacrylamide (APMA)and N-[3-(Dimethylamino) propyl] methacrylamide (DMAPMA), since they are two chemicals that mimic the side chains of the amino acid lysine and are positively charged. After the primary polymerization, these polymers will be repolymerized using the same monomer to test for the fidelity of the chain transfer agent. The results of this project will allow for the future synthesis of polymers using more greener chemistry.

100
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Therapeutic Implications of Cell Clearance Molecules on Disease States

MITCHELL KLEIN and Anthony Bell

Certain diseases, such as cystic fibrosis (CF), lupus, and rheumatoid arthritis are exacerbated by the release of proinflammatory mediators into extra-cellular matrices (ECM). One particular mediator, a neutrophil chemoattractant "High Mobility Group B1" (HMGB1), is found in higher levels in produced fluids of CF patients. HMGB1 can enter the disease cycle via either release from neutrophils and macrophages or leakage from lung damage. This leakage of HMGB1 triggers the cyclical production of more HMGB1, which eventually leads to complications such as decreased airway function and inflammation. We hypothesize that HMGB1 can act as a phagocytosis regulator that exacerbates disease states such as CF and aim to identify new cell clearance biomolecules that bind HMGB1. This will be determined through various specific experimental objectives, utilizing far-western blots to initially screen key proteins, and to detect protein-protein interactions. This will allow us to understand which proteins are likely to bind HMGB1, which is advantageous for the medical implications of this research. There are currently no preliminary results relevant to my specific aim of the research, but there is compelling existing research and results from previous objectives of this project that suggest our hypotheses will be verified. Numerous previous accounts imply the functions of the cell clearance biomolecules involved in this study, and we aim to confirm these theories through collection of aforementioned data.

103
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

Suicide: A Philosophical Investigation

ERIC KRAFT and Brian Clack

The question—the most serious of all questions—is whether life is worth living, and consequently whether suicide is permitted. Objectivity is difficult to maintain when the topic is one as contentious as suicide. We will therefore not try to hide the fact that in pursuing this project we are searching for a strong argument against suicide, one that withstands any existing counterargument. Barriers erected to deter "jumpers" have been shown to be effective in discouraging would-be suicides. Perhaps a philosophical barrier would serve a similar function. Raising the question of suicide in such a frank manner will also help to dispel the silence in which we have encased all open discussion of mental health issues. The toll taken by mental illness is all the more severe when the prevailing norm is to avoid all reference to it. This makes bringing the question its ultimate consequences out in the open all the more essential. To understand the dark night of the soul that is suicidal ideation, we must confront it head-on, without fear. The logic which drives the hand of the suicide—seemingly irrefutable in the moment—can only be disproven through grim and determined analysis on the part of those fortunate enough to be outside its purview. "It is for the sake of those without hope," says Walter Benjamin, "that hope is given to man."

104
Thursday, April 19
Session Two; 1:10-2 p.m.
UC Forum

The Sublimity of Existence: Explanations Regarding Religious Rejection of Scientific Reality

AMBER SHELDON and Brian Clack

This paper serves as a refutation of the belief that science will someday serve as a remedy to religious belief. James Frazer?s The Golden Bough presents the argument which vaunts science as intellectual progress out of religious belief. In contradistinction to Frazer, Ludwig Wittgenstein and Sigmund Freud explain religion's role as a form of wish fulfillment, not as a rational attempt to understand nature. Using assertions of the unpropitious pervasiveness "sublime" and the "uncanny," it will be imparted that human beings are inclined to attach themselves to "illusions" which ameliorate human existential anxiety. Human beings yearn to feel "at home in the unhomely."In finality, the paper concludes with the assertion that advances in science will fail to dethrone religion because scientific discovery amplifies our anxiety with respect to the unhomeliness of the infinite.

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 2018 recipients of the Outstanding Undergraduate Research Mentor Award, Dr. Susannah Stern (Department of Communication Studies, College of Arts and Sciences) and Dr. Divya Sitaraman (Department of Psychological Sciences, College of Arts and Sciences), as well as all the mentors that oversaw the student projects and mentored them through the CC URC submission process.

Special thanks go to Marcy Alyn for the design of the brochure, flyers and signage, Avi Badwal, Bryan Teague & Michael O'Brien for creating the CC URC abstract function in the mySDMobile app, Steffanie Hoie and Christopher Wray for creating the online abstract portal and mySanDiego page, Shahra Meshkaty and Allen Wynar at Instructional Media Services for leading the poster design workshops and providing poster printing, Tonis Manriquez & volunteers for assistance with the set-up and the staff at the Office of Undergraduate Research, Maritza Castellanos, Jacqueline Puga and Megan Holett 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 McCarthy and the Farrell Families, the Doheny Family Foundation, Coca-Cola Scholars Program, ALSAM, Arnold and Mabel Beckman Foundation (Beckman Scholars Program), the National Science Foundation, the Pulitzer Center, and various industry partners including ViaSat, Introtech and Advantageous Systems LLC., Cubic Defense Applications and General Atomics Aeronautical Systems Inc.