17th Annual Undergraduate Symposium for Scholarly and Creative Work

April 15, 2015
## UNDERGRADUATE SYMPOSIUM FOR SCHOLARLY & CREATIVE WORK

### SCHEDULE OF EVENTS

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday, April 14, 2015</td>
<td>Symposium Judging</td>
<td>9:00 am – 5:00 pm</td>
<td>Grand Ballroom at Tutor Campus Center</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Judges only – closed to presenters and general public)</td>
</tr>
<tr>
<td>Wednesday, April 15, 2015</td>
<td>General Presentations, Exhibits, and Displays</td>
<td>11:00 a.m. - 2:00 p.m.</td>
<td>Grand Ballroom, Franklin Suite, and Forum Room at Tutor Campus Center</td>
</tr>
<tr>
<td></td>
<td>Awards Ceremony &amp; Dinner Reception</td>
<td>6:00 p.m. – 7:30 pm</td>
<td>Radisson Hotel</td>
</tr>
</tbody>
</table>
April 15, 2015

Dear Members of the USC Community:

It is my pleasure to welcome you to USC’s 17th Annual Undergraduate Symposium for Scholarly and Creative Work. The Symposium is designed to provide USC undergraduates with the unique opportunity to exhibit and share examples of their significant research, scholarly and creative work with the university community. Although the Symposium is modeled on a professional conference poster session, students may exhibit their work in a variety of ways, such as through posters, art exhibits, and electronic media. All undergraduates are encouraged to participate. An award ceremony recognizing the most outstanding works will take place at the end of the Symposium and includes First Prize awards of $1000 and Second Prize awards of $500 in each of the following categories:

- Arts
- Humanities
- Social Sciences
- Life Sciences
- Physical Sciences, Math & Engineering

A panel of distinguished faculty will judge submissions in each category. After the judging, you are cordially invited to attend the Award Ceremony at the Radisson Hotel at 6:00 p.m. where the winners will be announced.

We hope you enjoy USC’s Undergraduate Symposium, which promises to be a highlight of the semester this year and in many years to come.

Sincerely,

Michael Quick
Provost and Senior Vice President for Academic Affairs
The USC Undergraduate Symposium for Creative and Scholarly Work provides undergraduates with the unique opportunity to exhibit and share examples of their significant research and creativity with the university community. This year, we have received 170 submissions with participation from nearly 260 students. Students present work in a variety of ways, such as through poster/panel sessions, art exhibits, and electronic media. All undergraduates are encouraged to participate. For some students, the symposium serves as a culmination of work they have produced in partial fulfillment of a senior honors project, or a research project with faculty, both individually and as part of a program.

ACKNOWLEDGEMENTS

On behalf of the Office of Undergraduate Programs and the Office of the Provost, we graciously thank USC faculty and graduate judges for volunteering their time. The success of the undergraduate symposium is largely due to the contribution of their expertise in the judging process. We would like to give special thanks to the USC Helenes for their faithful service. Also, we would like to give a warm thanks to the faculty advisors who have sponsored students in this year’s Symposium. Your dedication to embrace teaching through inquiry-based learning has made this event as successful as it has been. And finally, we would like to express our gratitude to the USC Schwarzenegger Institute for State and Global Policy for their time, effort and commitment to this extraordinary event.

THANK YOU!!!
# 17th Annual Undergraduate Symposium for Scholarly and Creative Work

## Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCHEDULE OF EVENTS</td>
<td>ii</td>
</tr>
<tr>
<td>LETTER FROM PROVOST MICHAEL QUICK</td>
<td>iii</td>
</tr>
<tr>
<td>WHAT’S IT ALL ABOUT</td>
<td>iv</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>v</td>
</tr>
<tr>
<td>ARTS</td>
<td>1</td>
</tr>
<tr>
<td>HUMANITIES</td>
<td>14</td>
</tr>
<tr>
<td>LIFE SCIENCES</td>
<td>22</td>
</tr>
<tr>
<td>PHYSICAL SCIENCES, MATH &amp; ENGINEERING</td>
<td>51</td>
</tr>
<tr>
<td>SOCIAL SCIENCES</td>
<td>71</td>
</tr>
<tr>
<td>INDEX OF PARTICIPANTS</td>
<td>105</td>
</tr>
<tr>
<td>INDEX OF PARTICIPANTS BY CATEGORY</td>
<td>111</td>
</tr>
<tr>
<td>MAP OF EXHIBITS</td>
<td>116</td>
</tr>
</tbody>
</table>
Arts

Title: Behind the Times
Name(s): Natalie Gordon, Victoria Gordon
Project Sponsor(s) and Collaborator(s): Joel Parker, Production, School of Cinematic Arts
Submission Type: Group
Category: Arts
Format: Creative Work
Exhibit#: A21

Abstract:
For the Wells family, life is one excellent adventure after another. Of course, even though it’s 2015 in the real world, they live in the non-specific sitcom past. Meet Linda, Ron, Brian, Melissa, and Amy, the family more interested in Oregon Trail than World of Warcraft; the family where dinner means actual conversation instead of five separate texting conversations; and, most of all, the family that lovingly mocks the sitcom structures and tropes of the first 40 years of the medium.

While their neighbors have generally come to accept the ways of the "Weird Wellses," new neighbor Mrs. K, a recently retired FBI agent, can’t wrap her brain around the fact that the family is so happily antiquated. For Mrs. K, the Wells family is a new case to explore post-retirement. Behind the Times is a comedic exploration of the world of sitcom conventions and a look at what it means to be a family.

§§§§

Title: Best Behavior: Stories of the Black Middle Class
Name(s): Carrie Moore
Project Sponsor(s) and Collaborator(s): Dana Johnson, English, Dornsife College of Letters, Arts, & Sciences
Submission Type: Individual
Category: Arts
Format: Creative Work
Exhibit#: A18

Abstract:
Toni Morrison once said, “If there’s a book you want to read, but it hasn’t been written yet, you must write it.” “Best Behavior: Short Stories of the Black Middle Class” represents my attempt to do so. Though I am widely read, I have often had trouble locating novels and stories of contemporary African American middle-class experiences. According to a recent Gawker article titled “The Difficulties of Publishing While Black,” African American employees make up only 1 percent of the publishing industry, which makes it more difficult for writers of color to get their stories published in an overwhelmingly white business. There are not many black authors, but novels about slavery such as Lawrence Hill’s "The Book of Negroes" and Edward P. Jones’ "The Known World" certainly have a renewed market after the success of films like "12 Years a Slave." Working class experiences with blackness can also be found in Ayana Mathis’ "The Twelve Tribes of Hattie" or Sister Souljah’s "Midnight" and "The Coldest Winter Ever." But stories of black middle-class experiences are perhaps even rarer. Terry
McMillan, Percival Everett, Ntozake Shange, Ernessa Carter, and Danielle Evans are some of the few authors to tackle black middle-class issues, and the critical attention many receive is small compared with the fame of their white counterparts. As a result, I have written "Best Behavior" as a way of expressing contemporary black middle-class experiences with race and class. The three stories in this portfolio explore varying degrees of racism and classism, while also arguing that African Americans are greater than the sum of the two. This project also represents the culmination of my work as a creative writing major, and I am grateful to Professor Dana Johnson and the other creative writing faculty for working with me during my time here.

§§§§

Exhibit#: A20
Category: Arts
Name(s): Gus Bendinelli, William Cherry, Miranda Due, Michael Effenberger, Peter Franklin, Stephen Helstad, Jonathan Ho, Sarah Huck, William Ilgen, William Merrick, Amir Mojarradi, Michael Nader

Submission Type: Group
Project Sponsor(s) and Collaborator(s):
Sheldon Larry, Production, School of Cinematic Arts; Michael Peyser, Production, School of Cinematic Arts
Format: Creative Work
Title: Campbell's
Abstract:
Holly Weathers, a prestigious chef, performs charitable work by volunteering to prepare last meals for prisoners on death row. She is called in one evening to prepare a meal for an inmate before she learns his request: a simple can of Campbell's Tomato Soup. Holly refuses the simple order and prepares a professional alternative, only to have it violently rejected. Confused, Holly requests permission to visit the doomed man in solitary confinement and find out why it was refused. Entering further into the prison, Holly meets the prisoner, Waddell, and his anger over her ignorance strikes a chord.

Holly returns to the kitchen and prepares Waddell's meal as specified, and presents it to him on the hour before his death. With his last request fulfilled, Waddell shares his reasoning for the simple, nostalgic request. As he is led off to his fate, Holly is left wondering what she really values.

Campbell's was a collaborative effort between 12 talented film friends. Over an entire semester we wrote, planned, filmed, edited, and finished the ten-minute piece using our minimal budget and resources. Our goal was to tell a story about a woman so caught up in her work that she never stopped to remember what she really valued, and it takes a man’s last words to bring it out.

§§§§

Exhibit#: A15
Category: Arts
Name(s): Yuan Yao

Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Doris Sung, Architecture
Format: Creative Work
Title: Conjoint Mask
Abstract:
The idea of the mask comes from the study of conjoint twins, a circus sideshow character in the early 18th century. The conjoint twins Chang and Eng had part of their livers connected, thus they could not separate from the other. Their conjoint part is especially intricate and interesting because it contains complex structures of tissues, bones, and vessels. The question is how to translate the physical connection in
an abstract way that can inform the design of the masks?

The answer is simply the normal conversation in our daily life. A face to face conversation does not have any physical connections between two people, but when they are talking, they need to look at, listen to, and talk to the other person. The other person needs to respond in the same way. These abstract connections bond two people together. However, some people in the society have abnormal ways of communication. Basically there are three major types. The first type of people wants to listen to other talking and prefer not to talk. The second type wants to talk constantly without listening to others. And the last type doesn’t want to look at other person during the conversation.

Facing these abnormal types of communication, the masks also have three types: the blind mask, the silent mask, and the deaf mask. Each mask inhibits one essential sense in the conversation. Imagine what will happen if a silent people is talking to a deaf people, a deaf people is talking to a blind people, or a blind people is talking to a silent people? Finally, the masks build up the weird and absurd moments in the conversation in a funny way that people can experience the abnormal conversations without being embarrassed and realize the importance of normal conversation.

Contortionists are infamous circus and freak show characters know for their acrobatics and extremely flexible bodies. But more critically, they are what would be called a Spectacle because of their ability to skew the perception of the human body and its function. A contortionist's unique abilities translate into the practice of Architecture by developing a characteristic called “hyper-flexible architecture” as we look towards the future of urbanism. Hyper-flexibility is achieved in architecture when the physicality of a building stretches and contorts, skewing the perception of the image of a building, and generating those same curiosities and interests that are inherent to Spectacles. My research uses this characteristic to interrogate standard building dimensions and develop a response to current urban issues within high-density cities. Through the use of design fiction, the project specifically showcases a prototype of a contorted house as an alternative to current social housing developments. Using the tools of 3D digital modeling, this house is formed to be radically fitted and sustainable in that every inch of space is formed specifically through the guidance of the human body. Filling approximately only 500 cubic ft, there is absolutely no excess space. With that said, each house would be different because every individual has a different shape. This idea questions Architecture’s quick default to standard dimensions, as it praises individuality and suggests an extreme approach to living. The project skews the image of a house and initially will cause discomfort for the spectator. However, because the space is directly correlated to how the human body moves, the individual’s body experience becomes seamless ultimately finding comfort without the limitations of standard door or room sizes.
Exhibit#: A01  
**Category:** Arts  
**Name(s):** Max Pittsley, Deborah Bello, Isabella Marie Benavente, Caroline Chiu, Catherine Chooljian, Norman Chootong, Paula Collins, Michael Duan, Quentin Frere-Carossio, Maracel (Mara) Guevarra, Katherine Hood, Fangli (Simon) Hou, Jonathan (Nathan) Iskandar, Patrick Lancaster, Brendan Lobuglio, Boston Mak, Adrian Mendoza, Alexander Morgan, Luke Patterson, Alexis Russell, Emma Smith, Wai Hwa (Ben) Tan, Christopher (Brady) Thomas, Ilani Fay Umel, Jasmine Ying, Alex Lee, Kial Fukuda (Laguna College of Art and Design)  
**Submission Type:** Group  
**Project Sponsor(s) and Collaborator(s):** Tracy Fullerton, Interactive Entertainment, School of Cinematic Arts; Geoffrey Long, Innovation Lab, Annenberg; Laird Malamed, Interactive Entertainment, School of Cinematic Arts  
**Format:** Creative Work  
**Title:** ElemenTerra  
**Abstract:**

There is a Virtual Reality (VR) renaissance occurring today. Within the next year, over 46 VR head-mounted-displays (HMDs) will be released to the consumer market. If video games are a medium for interaction, and film a medium for story, then VR is a medium for presence (the implications of this are largely unknown). Most VR content available today consists of video games that have simply been retrofitted to work with this new hardware. ElemenTerra instead attempts to stray from convention with holistic ground-up design in order to set canonical precedents for VR.

ElemenTerra was pitched and accepted as a 2014-2015 USC Advanced Games Project. Currently at BETA, the first round of development ends May 15th. ElemenTerra’s authors plan to add accessibility features and additional content thereafter.

Through a narrative veil, players enter into a “nature spirit body.” This transition grounds their shift into the virtual world. They then use an interface only possible through presence for creative personal exploration in a Zen Garden-like environment by sculpting and planting. Immersion is maintained by making as much of the interaction as possible diegetic: E.g. players change their active tool using a simulated brush and palette rather than an abstracted menu. Traversal is made comfortable by utilizing the orientation of the body rather than a joystick: players can fly around a 360 environment using their arms to steer.

One hope is that by making players feel like they can shape a virtual planet, that when they exit the experience and lose their virtual nature-powers, they will be more inclined to understand that they have an affect on and connection to the real world.

The team has already invested several thousand dollars out-of-pocket, and would use any prize money to further ElemenTerra by covering the hardware and legal fees necessary to continue development and exhibition after graduation.

§§§§

Exhibit#: A16  
**Category:** Arts  
**Name(s):** Susana Lopera  
**Submission Type:** Group  
**Project Sponsor(s) and Collaborator(s):** Karen Koblitz, Roski School of Art and Design  
**Format:** Creative Work  
**Title:** ElemenTerra  
**Abstract:**

Lately I have been devoted to pondering the idea of “exocentricity.” Exocentricity means “external center,” meaning that the center is not here, that wherever you are,
meaning is somewhere else. I have encountered this idea everywhere. One of the best examples in literature of exocentricity is the nostalgia for a past that never existed that suffuses The Great Gatsby. The current trend with remakes of movies also shows that we are trapped in the past, and yet movies about dystopian futures show an obsession with the future.

I wanted to explore the exocentricity in my own life by making a self-portrait in clay. Making the piece I realized that when I experience a moment, my focus is usually in my thoughts and not in that moment. I noticed that I stress about the future or think about better times in the past, and do not live in the present. The past and the future only exit in our minds, and I used the faces inside the mind of the head in this piece to represent my past and present.

However, the piece allowed me to escape exocentricity as I focused on moment and the act of creation. Nevertheless, clay is a temporal medium, and as I made the piece I had to worry about keeping the clay from drying out or cracking. Yet I also create clay out of clay because of its seeming a-temporality that allows me to assert to myself that I will leave a permanent mark on the world.

Through making the piece, I also recognized that excentric planning for the future and an awareness of the past are necessary. The world would be a dull place without ambitions, dreams, and memories.

In sum, the piece “exocentricity” is my attempt to capture the intricate nature of exocentricity.

---

Exhibit#: A07  
Category: Arts  
Name(s): Anaka Morris  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s): Stephanie Bower, Dornsife College of Letters, Arts & Sciences  
Format: Creative Work  
Title: Fame: An Ethnographic Research Through Photography  
Abstract:
I am currently shooting musicians behind the scenes in order to illustrate how an artist’s persona parallels with their "true" identity. I have musicians I have varying levels of intimacy with that are finding more and more success, and it has been really interesting seeing how as their fame increases, their persona has to accelerate and become solidified.

To represent two sides of the spectrum, I have an artist Uhlife who prefers to use a mask in order to hide his true identity from his artistic persona. I also shoot an artist Kehlani who got famous after being on a reality show, and has chosen to keep her identity and her persona transparent. However artists lie within this spectrum has reflected a lot about their image as an artist and what they are promoting.

I have been shooting these artists on film in order to give a timeless tone to the photos. Using mainly 35mm and medium format film, I have had access to many green rooms, backstages, and exclusive parties in order to capture emerging artists comfortably in their social element. Fame is a different experience depending on the artist. Although we all see fame as a sole goal most artists work toward, everyone’s perception of success is different.

I am interested in ethnographically researching the experience of fame through my own artistic outlet of photography.
Exhibit#: A24  
Category: Arts  
Name(s): Chi Tse (Jacob) Lin  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s):  
Jim Yoder, Annenberg School for Communication & Journalism  
Format: Creative Work  
Title: Fantasy - red bow tie  
Abstract:  
As an ordinary person, we all have dreams—dreams about our goals, our inspirations, or just simply things that don’t make sense. What is real? What isn’t? How can we tell whether something really exists or not? Maybe life is not supposed to make sense. Maybe magic is just something that we fancy, maybe it does not have to make sense. Starting with a little bow tie, unexpected surprises occur one after another. In this act, I try to create old and ancient techniques with modern elements and themes.

Exhibit#: A09  
Category: Arts  
Name(s): Zara Dickinson  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s):  
Tom Allen, Roski School of Art & Design  
Format: Creative Work  
Title: Freeze  
Abstract:  
“You can’t delete racism. It’s like a cigarette. You can’t stop smoking if you don’t want to, and you can’t stop racism if people don’t want to.” Mario Balotelli addresses the difficulties of dealing with racism, a deeply rooted problem in our country.

This artwork was inspired by the issues that were brought to light by recent events concerning police officers demonstrating blatant racism towards minority victims. I started doing some research into this issue and what I found was a much more complex problem than I had expected. The fact that racism existed in the law enforcement system was clear, but at the same time law enforcement is a dangerous job. I decided to make a piece that would encourage viewers to see the situation from a more open-minded perspective, considering both sides of the conflict. In order to do this, I decided to make two paintings, one representing the minority victims and one representing the law enforcement agents. I placed the paintings facing each other so that they would interact, the cop pointing a gun at the man with his hands up. This way the viewer is directly in the middle of the conflict, forced to stand between the tense parties and become part of the situation. Unable to see both sides at the same time, the viewer must turn to look at each painting, allowing them to see each side from the other side’s perspective.

I can’t fix the problem of racism, but I can do as much as I can to help by making people more aware. Drawing light to the issue to highlight the problem is the first step towards resolving it. My painting aims at doing this by putting people in the middle of the issue so that they can understand the problem.
This visually based project uses drawing as a tool to extract an aesthetic language and create a character. This object is then used to study the mechanism that mediates inside and outside as a tectonic relationship between the icon, figure and image in relation to function, components and interior space.

§§§§

Exhibit#: A11
Category: Arts
Name(s): Elizabeth Phillips
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Jennifer Siegal, Architecture
Format: Creative Work
Title: the in-cube-ator
Abstract:
An upcycled modular tech incubator composed of aerospace parts, the in-cube-ator is made up of three main cubes - the main frame which holds the circulation, plumbing, and electrical aspects as well as the co-working spaces, the connector cube which provides lounge and conference spaces as well as the connection between two main frames, and the unit load devices (ULDs) which function as the actual incubator spaces. With a gantry crane built into the main frame, the incubators are able to move within the center of the frame, allowing for variable levels of privacy, an important aspect for an incubator as start-ups learn a lot from each other and consultants are shared among them, but they also hold private meetings and have proprietary technology. With the modularity of the in-cube-ator, and the freeness of movement of the ULDs within, it is able to expand and contract with start-ups’ demand for space, which often changes with gained investments and project failures.

§§§§

Exhibit#: A03
Category: Arts
Name(s): Anshul Gupta
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Alice Kimm, Architecture
Format: Creative Work
Title: iSpace
Abstract:
This project stems from the notion that the concept of mass customization is creating a new user culture. This in turn is creating a new culture for the designer. Rather than using technology to create static designs, architects should express their creativity by creating systems through emergent designs occur. Current three dimensional modeling programs perpetuate the current state of design. Architects should use these technologies to create dynamic systems of architecture that can adapt to various modes of functionality. This project presents a system of architecture through which static design can emerge.

§§§§

Exhibit#: A17
Category: Arts
Name(s): Kirsten Jakob
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Mark Shepherd, Writing for Screen and Television, Cinematic Arts
Format: Creative Work
Title: It Started on a Plane
Abstract:
Holland Harper gets left at the altar, and embarks on her honeymoon to write her next romance novel. However, the all-inclusive trip requires a husband, which forces her to recruit a starry-eyed stranger she met on the plane to play the part. But as they gallivant through Europe, Holland finds herself falling for him… Will she let her cold heart melt, and put it on the line?
Abstract:
Under the guidance of Dr. Karin Huebner and support of the Sidney Harman Academy for Polymathic Study, part one, titled, “Our Mythic Los Angeles: No Longer There,” explores the relationship between narrative and space in the local Los Angeles communities of MacArthur Park, Bunker Hill, and Chavez Ravine through a series of six paintings. I started this project after being inspired by my classes Los Angeles: A Polymathic Inquiry and Studies in Drawing and Painting: Beyond the Senses. I also used my interdisciplinary interests in fine arts, modernist art theory and urban studies alongside archival history analysis and several observations and interviews with local residents from these communities in order to guide my work.

The second part, "The Dream Weaver Project," uses my major emphasis of creative writing to explore and reclaim memory and spatial homes through fiction and new media.

When I returned to my fiction-writing, I was confronted with my own past and the way fiction has become both a way to rebuild and recreate my memories. Overall, I realized that the recreation of memory ultimately leads to something wholly new, with which outside viewers/readers can also relate and interact. “The Dream Weaver Project” is a new media project that draws from my own childhood memories of growing up in with my grandmother in a small rural town. I strove to merge my interests in fine arts and graphic/web design instead of just writing a short story, hoping for the viewer to also consider the way in which his or her memory can be stretched and pulled. I started with a PowerPoint prototype that is currently being converted into a touch-based interactive narrative project.
Materializing the Transitional Field

Exhibit#: A02
Category: Arts
Name(s): Victoria Fong
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Alice Kimm, Architecture
Format: Senior Honors Thesis
Title: Materializing the Transitional Field
Abstract:
The human experience requires a balance between the individual’s subjective perception and objective reality. With the growing dominance of technology in today’s world, virtual reality is becoming more and more powerful while the importance of physical reality is beginning to diminish. The future implications of this are troubling since the physical nature of our existence is a necessary and inescapable reality of human life. This essay will analyze how architects can shape the physical world to match the ideals achieved by the virtual world.

Understanding and modeling the concept of the “transitional field” can bridge the gap between physical and virtual realms. The transitional field defines the ongoing relationship between physical actions, perception, and understanding as proposed by Psychiatrist D.W. Winnicott. In order to do so, this space would need to be physically engaging and socially inclusive. The space would act as a portal; an interstitial zone between public and private connecting individuals physically the way the Internet connects individuals across the world.

Naturale

Exhibit#: A19
Category: Arts
Name(s): Nicole Flores, Greta Gabriel, Tyler Moore
Submission Type: Group
Project Sponsor(s) and Collaborator(s): Juli Juteau, School of Cinematic Arts; Mark Stratton, School of Cinematic Arts
Format: Creative Work
Title: Naturale
Abstract:
Naturale is a short film about healthy eating. One girl watches television and eats a burger filled with nails and bolts, while another eats a healthy meal and is inspired to get up and get active.

We live in a society that’s growing more and more. In weight. Obesity is an epidemic in America that doesn’t seem like it will stop any time soon. We live unhealthy lives, spending an unhealthy amount of time sitting and looking at screens while eating unhealthy, processed food. And unfortunately, these acts tend to perpetuate each other. You eat a burger, you don’t feel good, so you sit and watch more television, and then you see a commercial for McDonald’s and think, “A burger sounds real good right now.” Eating healthy might seem like a chore and most people say in the long run it will help you. But it’s not just in the long run, it’s also right in the moment. Eating food that’s good for you tends to make you feel better and can inspire you to get on your feet and stay active. Being healthy helps you actually live your life.
Exhibit#: A12  
Category: Arts  
Name(s): Garrett O’Sullivan  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s): Jennifer Siegal, Architecture  
Format: Creative Work  
Title: Santa Monica Airport Tech Park  
Abstract:  
The lease for the 163 acre Santa Monica Airport is up, and it is very exciting opportunity to give the area new use. Our 5th year Architecture topic studio assignment was to create a building on the site for a tech incubator and tech offices. Instead of creating a new building, my solution was to repurpose the existing sheds and hangars for tech and event program and weave them together with a public art park and bike path. This proposal accounts for short and long term changes; the functions of the sheds can change for different needs, events, and expansions of businesses. The larger Barker Hangar, for instance, can be used as part of an outdoor concert venue. There are also designated zones for community farmland, which can be used by locals and for restaurants on the site. There is no car traffic on the site to inspire foot or bike travel from shed to shed, with bike stations and parking lots located on strategic points along the periphery.  

I was inspired by the airport's historical connection to the community in coming up with the idea of a public park as well as tech offices; in the 1940's the McDonnell-Douglas Aircraft company employed the people of Santa Monica, including many women, to help with the war effort. Today, the Airport is a isolated concrete island in a sea of Santa Monica houses. With this proposal, the land will be connected back to the town.  

The project is represented in a unique aesthetic to encapsulate the idea of a bright art park experience that includes relics of the airport to remind users of the history of the site. An attitude of carving, and the intent of expressing the inorganic against the organic, was used as the primary driver of design decisions.

§§§§

Exhibit#: A14  
Category: Arts  
Name(s): Ziwei (Scarlet) Song  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s): Doris Sung, Architecture  
Format: Creative Work  
Title: Selfie mask  
Abstract:  
Cultural Background: The ubiquity of smartphone cameras, selfie apps and social media enables people to take a broad range of photos within the framework of architecture and urban space. The technology advancement of camera features such as iPhone camera lens apps, wide-angle lens, go pro and quick pods brought us an experiential repertoire we never encountered before. The habits of viewing our world through online selfies dramatically shift our social habits, interaction patterns and experience of surrounding space. The perception of space exceeds beyond the static and unified, and brings us to the opposite. People constantly use selfies to project their own interpretation onto the otherwise neutral or pure space condition. Spatial experience is no longer defined and determined by internal realities, such as plan dimensions, materials, form and geometries, but deeply saturated and affected by ever changing external relationships with people, who constantly shapes and redefines the perceptions and characteristics of the space, through cellphone selfies spread on social media.
The selfie mask project embeds itself in this big cultural picture of selfie. Selfies posted online often hide, fake, beautify and exaggerate the original facial features: the skins, the tones and physical contours. They exaggerate it to the extent that only the nuance of emotions are retained.

That emotional translation is therefore the key concept of this mask: at the inside, you saw your true self image from the reflected surface; on the outside, you hide your real self image and respond to people with the specific emoticons you intend. Since the emoticon fully conveys the nuances of your facial expression without revealing your "actual look", it could be the selfie mask for daily interactions.

§§§§

Exhibit#: A22
Category: Arts
Name(s): Audey Shen
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Pablo Frasconi, School of Cinematic Arts
Format: Creative Work
Title: Storytime
Abstract:
When thinking about empathy, I feel like I connect with the person by allowing them to share a story, or multiple stories. For me, stories are a powerful yet fun way to engage with people, and they allow us to express our thoughts and emotions in a carefree style. There are no rules to story telling, which is what I love about it because it feels more genuine that way. Of course, not all stories are fun; there are sad and emotional ones, and there are embarrassing ones as well. Either way, I feel like it says a lot about the person depending on what story they choose to tell me. I hope I get to learn a lot more about those who agree to my request, which would increase my empathy for those people and people in general. I will ask them the question: Who/what in your life do you feel most grateful for? Can you tell me a moment when he/she made you feel this way? (family members, best friend, mentor, etc.). This question also asks them to draw upon experiences of someone they feel very close to, and will therefore inspire a sense of empathy towards the special person that they are talking about. Afterwards, I will create an art piece that represents a main theme or moral of their story through paper silhouettes; I will write their story on the piece as well. If they let me, I will share a lot of the stories I have gathered – and created pieces on – to show to the public. I want people to see that we all have different stories to tell and that everyone can connect with a story, and therefore a person, in one way or another.

§§§§

Exhibit#: A04
Category: Arts
Name(s): Darle Shinsato
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Alice Kimm, Architecture
Format: Creative Work
Title: Terraformed Tower: Grey Water Recycling Terrarium
Abstract:
In California, the water supply relies on 157 million acres of land spanning 8 states. Due to the over-consumption of water in this desert climate, the city of Los Angeles is currently experiencing a massive drought. Every year, California uses 6 million acre feet more than the rivers and aquifers can sustainably provide. Alarmingly, the majority of the water goes towards landscaping. In office buildings alone, the average worker uses 127 gallons per day. Landscaping does not require precious potable water, yet people are still using it to water their gardens. Currently, there is a negative sentiment towards grey water
recycling despite society's need for it. People are afraid of recycled water, for fear of the "unknown" source. However, mother nature naturally purifies water in a very similar cycle. All water on earth has been previous "used" hundreds of thousands of times.

Less than one percent of the water used in Los Angeles comes from recycled grey water. This design aims to exploit the beauty of grey water recycling by providing not just a technical apparatus but a lush community space as well. Because landscaping demands a great portion of the Los Angeles water supply, this design inverts the idea of nature as an absorber and instead aims to use nature as a recycler of water. The circulation in the skyscraper is rethought and terraformed, to mimic the natural water cycle of mother nature. Terrariums are a common decorational piece that serve this function acting as a miniature biosphere. In this skyscraper, the terrarium system is implemented in the circulation core to recycle the greywater used in the building. This creates a self sustained garden that serves as a public entity while, paving the path to a water conservative city.

§§§§

12

Title: There is No Such Thing as Noise
Name(s): Briana Billups
Project Sponsor(s) and Collaborator(s): Philip Allen, Sound Design, School of Dramatic Arts
Submission Type: Individual

Sound design is the process of specifying, acquiring, manipulating or generating audio elements. It is employed in a variety of disciplines including filmmaking, television production, theatre, sound recording and reproduction, live performance, sound art, post-production, and video game software development. Sound Design is not only an important form of art but it's an important part of life. It's as pervasive and unnoticed as the air. It works on large and small scales and somehow or in some way, everyone has been affected or affected it.

The purpose of this presentation is to showcase the often-neglected field of Sound Design. By looking at various examples of sound design within different types of media as well as in nature and everyday life, we will see that despite it's disregarded nature, some form of sound design exists around us. This conclusion, therefore, eliminates the concept of noise in modern society.

§§§§
Transformative Living: Macron Assembly

Project Sponsor(s) and Collaborator(s):
Alice Kimm, USC School of Architecture

Submission Type: Individual
Format: Senior Honors Thesis
Title: Transformative Living: Macron Assembly

Abstract:
The rise of technology has revolutionized lifestyles and transformed concepts of family-life and dwellings. The last century has brought dramatic transformations to the image of the nuclear family and its effect on architectural spatial configuration. Expectations of the house of the future will require the adaptability to sustain and enhance new lifestyle.

By 2100 Macron Assembly will remodel current housing typologies and create a flexible system that maximizes human efficiency and interaction. Macrons, or small magnetic blocks, will become the new “bricks” or building blocks for home construction. These macrons can be configured based on site conditions, financial costs, and family needs to create ideal homes for families.

Houses can then be adapted or reconfigured based on the modifications of family life such as the birth of a new child, or sending a teen off to college. Homes can also be immediately change to accommodate for sporadic needs such as hosting a birthday party or a spontaneous dinner party. Through this scheme, the macrons can instantly reconfigure to create a structure that can allow for an indoor/outdoor community space.

Macron assembly will create a future of home design that focuses on interchangeability, elasticity, spatial fluidity, personal customization, and performativity. The main focus of this strategy is to improve the lives of its inhabitants by giving them the ideal conditions to maximize their productivity and foster family interaction. This futuristic design will grant architecture the customizability to elevate the human spirit.
Humanities

Exhibit#:  H10
Category:  Humanities
Name(s):  Ryan McRee
Submission Type:  Individual
Project Sponsor(s) and Collaborator(s):  Paul Backer, School of Dramatic Arts; William Deverell, History, Dornsife College of Letters, Arts and Sciences
Format:  Analytical Paper
Title:  American Nature And Its Theatre:
Discovering A National Voice Through The American Landscape

Abstract:
Ask the average theatergoer to think of the oldest American play they can, and one will rarely find an answer that predates the twentieth century. Yet, we know that the history of the United States stretches back centuries further, at the latest beginning in the mid-eighteenth century and arguably beginning with the landing of the first Europeans on the North American continent. Theatre is such a prevalent cultural aspect of world history that we can easily assume there was some sort of theatre going on in the United States before the twentieth century. What form did it take, and why does it seem to play such a minimal role in Americans' perception of their own dramatic history? A simplified answer is that, up to a certain point, there is a very unclear designation of what plays in the United States could be truly called "American," and by the time Americans had forged a national identity in the theatre, they had already long discovered a voice in the other major branches of literature. Why the delay in theatre? I will examine and attempt to define the development of an "American" drama, and I will do so by studying a pivotal element of the development of earlier American literature—the young country's relationship to its natural landscape. I will use imagery of American nature as a tracing agent through the history of the American theatre, and demonstrate that the use of these images has a direct relationship with the search for a national theatrical voice and Americans' perception of their own nation as expressed through their dramatic works.

§§§§

Exhibit#:  H11
Category:  Humanities
Name(s):  Rosebud Campion
Submission Type:  Individual
Project Sponsor(s) and Collaborator(s):  Joanna Demers, Thornton School of Music
Format:  Analytical Paper
Title:  Can Western Art Music Be Narrative?

Abstract:
Does Western art music inherently depict a story? In an attempt to answer this question, I studied the scores of Richard Strauss's tone poem Till Eulenspiegel, Georges Bizet's opera Carmen, and the scholarly work surrounding these pieces. I analyzed Till using the various methods Eero Tarasti discusses in A Theory of Musical Semiotics to determine what structures within the music communicate the narrative. Despite the concrete appearance of these constructs, interpretation still relies heavily on the
listener’s context and musical background. Therefore, themes rarely correlate solely to one meaning, which leads to multiple interpretations of a work. The opposing views of Susan McClary and Friedrich Nietzsche regarding Carmen epitomize the potentiality for dichotomic analyses of the same work. The presence of such widely varying interpretations of the same piece confirms the idea that musical figures seldomly represent concrete concepts consistently.

Through studying these two pieces, I propose that extracting meaning from Western art music depends on the complex relationship between syntax and semantics within a piece. The ideal balance between these two structures creates narrative music by strategically violating norms and expectations. However, this equilibrium will never achieve universality due to differences in time, space, backgrounds, and expectations of listeners, which lead to varying interpretations of the same piece. Because of the narrative’s reliance upon predetermined structures, music’s meaning is not absolute, but instead depends on the audience’s expectations and the context of their analysis.

§§§§

**Exhibit#:** H01  
**Category:** Humanities  
**Name(s):** Sanford (Sandy) George, Patrick McDonnell, Atticus  
**Submission Type:** Group  
**Project Sponsor(s) and Collaborator(s):** Eric Hanson, School of Cinematic Arts; Lynn Swartz Dodd, Department of Religion  
**Format:** Laboratory-based Research  
**Title:** Custom Airborne Stereo Pair Imaging Solutions for Archaeological Research  
**Abstract:** To better understand past civilizations, it is critically important to be able to quantify the topography in which these societies lived. One approach is to create 3D landscape models of the interested areas, in order to map waterways, trade routes, buried features, vegetation patterns, inaccessible sites on cliff aides, and settlement patterns. In many places, existing digital elevation terrain models (DEMs) do not have sufficient detail or are not available. when a site is located on a vertical cliff, DEM data is not relevant.

Thus, the goal of this research project is to create an inexpensive, portable archaeological tool which is able to capture 3D landscape imagery. This was done by modifying a stock, off- the- self DJI Phantom 2 Quadcopter, a small unmanned aerial vehicle (UAV) or “drone”, by attaching a motorized camera mount, video streaming system, and computer controlled navigation interface. The system is built around easily obtainable consumer imaging components, and to this we added custom 3D printed GoPro mount which enables the cameras to capture footage in 3D. We pair these lightweight cameras in order to capture 3D stereo imagery as an operator navigates the UAV in the airspace in a grid pattern. The camera can capture detailed, overlapping footage of the landscape below. After the flight, the images are analyzed by a computer program which pixel matches the frames to create an accurate 3D landscape model. This model can then be used for research and landscape visualization.

(You might note how this is similar to or different from what everyone else with a UAV is doing, if you know about others who are doing this.

§§§§
Exhibit#: H07  
Category: Humanities  
Name(s): Cameron Espinoza  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s): Juvenal Cortes, Political Science  
Format: Analytical Paper  
Title: Elements of Substance: An Analysis of Dostoyevsky’s Stylistic Techniques in Crime and Punishment and Brothers Karamazov  
Abstract:  
The two rhetorical techniques Dostoyevsky consistently uses to “give the illusion of logic” (Forsyth 44) and a feeling of substance behind his arguments, are anaphora and anadiplosis. The use of these devices, in place of a critical reasoning that would resemble a logic tree or reflective equilibrium (often used in academic discussions on ethics) gives the inherently unreasonable faith-based arguments a power that the reader feels to be true. A critique of Crime and Punishment submitted by Peter Singer, “does not regard it [Crime and Punishment] as a great novel in terms of its moral message- that Raskolnikov is only redeemed when, through faith, he submits to moral rules he cannot justify through reasoning” (Voorhoeve 49). Whether one agrees with Singer or Dostoyevsky’s message is beyond the scope of this essay. Singer does, however address the weaknesses ‘moral messages’ tend to have. Based on Singer’s conclusion one can realize the necessity of style in place of traditional sense for Dostoyevsky to present his ideology. Both of the literary devices stated above, serve to create a more compelling argument, rather than rational. The two techniques are used by Razumikhin, in his description of logic’s role in controlling human nature...  
§§§§

Exhibit#: H04  
Category: Humanities  
Name(s): Nina Castilla, Alleluia Tyus  
Submission Type: Group  
Project Sponsor(s) and Collaborator(s): Lynn Swartz Dodd, Religion  
Format: Laboratory-based Research  
Title: Hasmonean Prutot: Cast or Struck?  
Abstract:  
The coins in this collection are called “prutot” (singular “prutah”) and are of small value. These coins are small in size (approximately 13mm in diameter on average) and include a range of coins minted with at least three different designs. A problem with studies of these coins is twofold: (1) coin experts disagree or are unclear about the mode of their fabrication and their elemental makeup; (2) large numbers of these coins need to be subjected to technical analysis for statistical viability of results. We separated the coins into groups based on the images and words on both the obverse and reverse sides. We then used a Bruker Tracer III-SD Portable XRay Fluorescence on individual coins to determine their chemical compositions. Coins were placed in the top of the PXRF Gun for 120 seconds each. The spectra gave us data based on the elemental composition of the coin. We used the Bruker system ARTAX for comparing the spectra. We found that all the coins are copper alloys, specifically tin bronze. In order to determine how these coins were made, we performed metallographic analysis on them. We photographed a coin from the collection; polished it with the Buehler Ecomet V Polisher using Monocrystalline Diamond Suspension. Using a Nikon Ephiphot using three levels of magnification (5x, 10x and 20x with polarization). The structures revealed were clearly dendritic and suggestive of the coin having been cast. Additionally, the metallography indicated that it likely was a tin bronze. We have begun training for Reflectance
Transformation Imaging (RTI). RTI is a process by which objects are photographed in a series where light is shined at different angles to create a texture map of the object. In the next few weeks we will begin using RTI to photograph prototypes.

### Title:
Immersive Visualization Research for Interdisciplinary Archaeology

### Name(s):
Aidan Blant, Sanford (Sandy) George, Patrick McDonnell, Atticus Vadera

### Project Sponsor(s) and Collaborator(s):
Eric Hanson, Cinematic Arts; Lynn Swartz Dodd, Interdisciplinary Archaeology

### Submission Type:
Group

### Format:
Creative Work

### Abstract:
Archaeologists originally provided visualization of archaeological sites through artist’s drawings. Books and journal articles were published with accurate depictions of Rome, Greece, Egypt, South America and other locations around the world. Archaeologists still refer to these images to gain insight into locations that have been destroyed or that have changed over time. The invention of photography provided a capability that allowed archaeologists to share visuals with other scientists and the public and moving pictures greatly enhanced that capability. Drawings, photographs and movies do not provide a truly immersive experience. They cannot give the viewer a feeling of actually being at the location and seeing it for themselves. The goal of this project is to find ways to provide the viewer with a realistic immersive visualization.

We researched ways to capture visuals through advances in photography, including photogrammetry, structure from motion, stereoscopy and spherical panoramas. We created photographs with cameras mounted on drones and submarines, tripod mounted stereo camera rails and spherical panorama heads and pole cameras. Research was done to find the best post-production software to transform and render the photography into formats capable of being displayed on giant screens (IMAX), fulldome theaters (planetariums) and virtual reality headsets. We are fortunate to have access to some unique facilities to present the results of our research. The USC Cinema School has provided us with cameras and virtual reality headsets and access to a fulldome screen. We have screened a 3D time-lapse film at the USC IMAX theater in the Zemeckis Center for Digital Arts. We have spherical panoramas that can be viewed in either fulldome or on VR headsets including the Oculus Rift DK2 and the Samsung Gear VR. The results of our research provide a way for archaeologists to record and present their findings in a truly life-like immersive visualization.

### Title:
Mass deportation during early Roman expansion in Polybius’ Histories

### Name(s):
Eun (Sharon) Im

### Project Sponsor(s) and Collaborator(s):
Claudia Moatti, Classics, Dornsife College of Letters, Arts, & Sciences

### Submission Type:
Individual

### Format:
Senior Honors Thesis

### Abstract:
Roman empire witnessed its first greatest expansion during the first and second century BCE through various warfare in the Mediterranean regions. A Greek historian Polybius reports these events in attempt to show how so much of world’s territories came under the dominion of a single city, Rome, in such a short period of time. His
text includes several incidences of mass deportations of Rome’s subjugates. These records of deportations of different populations show some repeated elements, such as common use of vocabulary, procedure, and contexts. This phenomenon suggests that mass deportation in early Roman conquest may have been a regular practice, which followed the basic preset principles and procedures. From this perspective, deportation was the “order” that existed within the chaos of the wartime.

This thesis further investigates on this finding, examining how deportation as a legal practice was employed by the Romans during its early conquest. The first part of this study explores the use of vocabulary in the description of deportations and what it tells about the practice’s legal nature. Next, it focuses on the political and social context around each event of deportation, and the frequency of its occurrences. The last part of this research evaluates the historiography of Polybius as a Greek historian writing about a Roman practice. This last chapter of the thesis provides analysis on the political statement that the author may be presenting on deportation as a way of organizing the conquered people. This suggests that the development of deportation as a customary practice may have paved a way for Rome into becoming an empire within the next century.

---

**Title:** Methods of detecting submarine groundwater discharge and its implications for ancient and contemporary civilizations on Catalina Island

**Name(s):** Amanda Semler

**Project Sponsor(s) and Collaborator(s):** Lynn Swartz Dodd, Archaeology, Dornsife

**Submission Type:** Individual

**Format:** Field Research

**Title:** Methods of detecting submarine groundwater discharge and its implications for ancient and contemporary civilizations on Catalina Island

**Abstract:**

Since the last glacial maximum, rising sea levels have submerged freshwater discharge sites off the Catalina coast with both ecological and archaeological significance. Pinpointing these now underwater sites is imperative in locating ancient settlements on the island, as well as in developing an understanding of current freshwater fluxes. Policy implications related to submarine groundwater discharge (SGD) may result from groundwater that harbors nutrients derived from anthropogenic sources, as SGD can be a significant source of pollution to nearshore waters, with effects such as eutrophication and death of marine organisms. In dry climates like Catalina Island, where surface runoff contributes little to the overall water budget, SGD is especially important to monitor. Despite this, the topic was largely ignored by the scientific community until recently, and a survey of the surrounding literature with an emphasis on the Southern California basin reveals very little information.

To overcome the data shortage and efficiently find sites of freshwater output, thermal images of the northern coast of Catalina Island were first taken by plane. Locally, groundwater is warmer than seawater, so a temperature differential can be used to obtain a broad overview of possible SGD sites. To verify the thermal images, probes measuring temperature and
Results of the surveys will influence further research on the island in the fields of hydrogeology, archaeology, and ecology. Possible future investigations include measuring the rate of freshwater output; determining the effects of lower salinity on plant and animal life; and examining the role of nutrient output on water quality and tourism.

---

**Exhibit#:** H08  
**Category:** Humanities  
**Name(s):** Mazen Loan  
**Submission Type:** Individual  
**Project Sponsor(s) and Collaborator(s):**  
Christopher Muniz, Dornsife College of Letters, Arts, and Sciences / Creative Writing and Literature  
**Format:** Creative Work  
**Title:** Nothing has changed, everything has changed  
**Abstract:**  
Even in the darkness, he could discern the outline of her features - she looked stunning. Brown hair softly tumbled down over her shoulders, her cheeks were bright pink and her lips perfect and full, were closed into a straight line. Her chocolate brown eyes faintly glinted as the light from the street lamps basked his car. He loved looking into those eyes so much, but right now, they were staring straight ahead, not wavering from a seemingly important detail in the distance. The traffic light turned green. Slowly and carefully, he changed gears and drove along the straight road. He did not yet make an attempt at conversation; even after all these years the guilt of his actions had not receded, and so he would often wait until he felt a bit more comfortable before he made small talk.
(mostly Latino/a) communities. Focusing on the murals of one of the movement's prominent leaders, artist Levi Poncé, I analyze the changing Chicano/a mural environment and its various implications on urban aesthetics, political criticism, and art as cultural revolution based in community engagement, which mirrors the evolving Chicano/a and Latino/a experience. Through a comparative analysis of the form and content of Baca's "Great Wall" and Poncé's murals, this project examines how post-Chicano Movement muralism exists as what Marcuse would call a "counter-consciousness" that rejects the oppressive systems in place and creates spaces where these systems can be radically changed.

§§§§

Exhibit#: H13
Category: Humanities
Name(s): Kylie Nicholson
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
DJ Johnson, Media Arts and Practice, School of Cinematic Arts
Format: Field Research
Title: Standards of Self: Disordered Thoughts, Disordered Eating, and Eating Disorders

Abstract:
Anorexia. Bulimia. Students learn about eating disorders in health class as if they were diseases. These disorders come with shame and stigma, yet over 60% of college aged women engage in some sort of disordered eating: such as binging, purging, starvation, and taking laxatives. Where is the line between healthy and unhealthy? At what point does dieting become dangerous? When does disordered eating become an eating disorder?

Rather than focusing on eating disorders as "disorders", this project seeks to unearth and express the mindset behind disordered eating. It explores influences on women's psyches: both external (the media and societal pressures) as well as internal psychological pressures. First-person interviews were conducted and filmed in order to provide accurate stories from women who have struggled with disordered eating. Their words give life to an issue that is often talked about only in extremes or not at all; we hear about a woman who suffers from life-threatening anorexia, but not about the college woman who occasionally binges and purges because she feels she has no other way to handle her stress.

This project breaks through the news articles, statistics and cultural constructs surrounding eating disorders and brings an intimate yet broadly relatable voice to the issue.

§§§§

Exhibit#: H12
Category: Humanities
Name(s): Linda Wang
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Karen Tongson, Gender Studies, Dornsife College of Letters, Arts, & Sciences
Format: Field Research
Title: Transcultural Reformations: History, Identity, and Politics in Dakar Hip-Hop Culture

Abstract:
Hip-hop has been often characterized as a subculture, constructed by and belonging wholly to some factions of a population along lines of race, class, gender, geography, and age. However, with hip-hop’s transmission globally and adaptation to localized cultural practices, perhaps a re-evaluation of hip-hop’s nature is in order. Hip-hop, I argue, is a transculture; that is to say, while there are elements of music, speech, dance, and public art unique to hip-hop born from specific geo-historical circumstances, those elements are
continually reconfigured by global participants and rebranded with new, locally-relevant meaning. Hip-hop, at its birth, linked people of common identity: disenfranchised and dislocated youth in New York. Today, it is itself a marker of identity and a form of global citizenship whereby alternative imagination can be expressed.

If we are to understand that Senegalese hip-hop artists are not just mimicking black Americans—that what is going on in Dakar is not just the “closest thing to hip-hop” and that hip-hop is fundamentally transcultural—it begs the question of how aspects of history, deeper historical practices within the African diaspora, and notions of identity and cultural production have contributed to the transculturation of hip-hop culture in Dakar. This paper examines the social construction of blackness in America and blackness in Africa, as well as the ways that the African diaspora has influenced black American cultural traditions and the ways that black American cultural traditions have influenced today’s African cultural traditions. Furthermore, this project goes on to examine the unique role hip-hop plays in economic development and politics in Senegal.

§§§§

Exhibit#: H03
Category: Humanities
Name(s): Aidan Blant, Patrick McDonnell, Atticus Vadera
Submission Type: Group
Project Sponsor(s) and Collaborator(s):
Lynn Swartz Dodd, Archaeology
Format: Field Research
Title: Use of Underwater ROV in Archeological Research
Abstract:
The goal of this research project is to develop a robust, inexpensive method of using an underwater remotely operated vehicle (ROV) equipped with two Solinst™ “Levelogger” sensors in order to determine locations around Catalina Island where ground water may be leaking into the ocean. The sensors measure the conductivity of the water at multiple points over a given interval, which allows us to differentiate between fresh and salt water. Using these data points we can record and map these streams of fresh water, which may potentially lead us to discover important archaeological sites and which enables us to reconstruct the ancient environment. The ROV is piloted just under the surface of the water where it will take the necessary measurements, which we will then use to create the map in post-field data management. We are currently in the process of building a GPS system that will allow us to map the position of the data points acquired by the Levelogger sensors more accurately as well as allow the ROV to maneuver itself autonomously through the water. Autonomous control of the ROV will allow us to access places we previously could not go, as well as allow the ROV to follow a grid pattern over the desired area. We have also retrofitted the ROV with stronger motors to deal with currents, reconfigured the payload bay to hold necessary sensors and cameras, and modified our tether by threading wire through a rope to lower the chance of it snagging and snapping on a rock. All of these modifications will allow us to more accurately acquire the data we are seeking to further our knowledge of early human settlement on Catalina Island.

§§§§
The Alameda County Study launched in 1965 demonstrated that adherence to seven daily health habits (having never smoked, drinking<5 drinks per sitting, eating breakfast, maintaining a healthy BMI, sleeping 7-8 hours every night, exercising regularly, and avoiding snacks) predicted better health and longevity. The present study examines the practice of these 7 health habits half a century later and the association of such practices with a multi-system allostatic load index of physiological well-being.

Data come from 1,153 participants aged 34-85 in the National Study of Midlife in the US (MIDUS) II Biomarker Study. An index of the number of the 7 daily health habits practiced was constructed; health habit indicators used the original “Alameda 7” operationalizations with the exception of drinking few sugary beverages and consuming limited fast food as substitutes for eating breakfast and avoiding snacks. Physiological well-being was measured with an allostatic load index, representing the number of 24 biomarkers from 7 different physiological systems (sympathetic and parasympathetic nervous systems, hypothalamic-pituitary-adrenal axis, cardiovascular, lipid metabolism, glucose metabolism, inflammatory immune activity) for which participant values fell into the highest risk quartile of biomarker distributions.

Analyses indicate that a small minority of Americans practice all or most of the 7 health-promoting habits; most Americans practice 4 or fewer of the 7 behaviors. Multiple linear regression analysis indicated that practicing more healthy habits predicted lower allostatic load ($\beta = -.18, p<.001$). Analyses also indicated that the association of lower allostatic load in those who practice more healthy habits was stronger in those with higher levels of educational attainment. These findings may help explain the better physical health of those leading healthy lifestyles. Findings also point to the need for future research to understand why those with higher levels of education may benefit more from health behavior.
Adolescent consumption of sugar-sweetened beverages impairs hippocampal function and promotes neuroinflammation

Lilly Taing

Ted Hsu, USC Neuroscience Graduate Program; Scott Kanoski, Biological Sciences, Dornsife College of Letters, Arts, & Sciences; Vaibhav Konanur, Biological Sciences, Dornsife College of Arts, Letters, & Sciences

Laboratory-based Research

Frequent consumption of a Western diet rich in saturated fats and simple carbohydrates is linked to adverse metabolic outcomes and cognitive impairment in the hippocampus, a region associated with spatial learning and memory tasks (Kanoski and Davidson, 2011). In particular, there has been growing evidence demonstrating the negative impact of excess sugar intake on metabolic processes (Bocarsly et al., 2010; Goran et al., 2013). However, the effects of consumption of added sugar on brain function is unknown. Adolescence is a critical developmental period characterized by maturational alterations that shape long-term brain function in humans and rodents. The effects of excessive intake of different sugars during this sensitive period of cognitive development are also poorly understood. The purpose of this study was to investigate whether the harmful effects of overconsumption of different types of sugar-sweetened beverages (SSBs) similar to those found in Western cultures would be amplified during adolescence.

In the study, adolescent and adult male rats were given access to low-fat chow, water and either 11% sucrose solution, 11% high fructose corn syrup (HFCS-55) solution or an additional bottle of water (control) over a 30-day period. Using a Barnes maze paradigm, we observed that adolescent HFCS-55 intake impaired hippocampal function and adolescent sucrose intake moderately impaired cognitive function relative to the control group. Additionally, the HFCS-55 group had increased expression of pro-inflammatory markers interleukin-6 and interleukin-1β in the dorsal hippocampus, whereas the sucrose group showed no change compared to the control group. For both adolescent sugar groups, liver interleukin-1β and plasma insulin levels were elevated. In contrast, intake of SSBs did not negatively affect hippocampal function, glucose tolerance or neuroinflammatory markers in adult rats. Ultimately, these results demonstrate that overconsumption of sugar from SSBs during adolescence impairs hippocampal activity, promotes hippocampal and hepatic inflammation and negatively affects metabolic function.

Adolescent sugar consumption impairs cognitive function later in life

Joanna Liang

Ted Hsu, Neuroscience Graduate Program; Scott Kanoski, Department of Biological Sciences, Human and Evolutionary Biology Section

Senior Honors Thesis

A diet high in levels of saturated fats and sugars (sucrose, fructose) is related to the rise of health problems in Western industrialized countries. The effects of excess fructose consumption in adults have been well researched, but there lacks sufficient data on the long-term effects of high fructose corn syrup (HFCS) exposure
during early development. The present study examined the effect of HFCS exposure during adolescence on cognitive deficit later in life (tested with a novel object in context (NOIC) task) and motivational learning (tested with an operant progressive-ratio schedule of reinforcement task) with rats. Rats were divided into two groups: control and HFCS Washout (given 11% HFCS only during adolescence, access withdrawn after 30-days) and cognitive tests were conducted during adulthood, four months after HFCS removal. The results for the NOIC task of the first experiment showed significant difference of the discrimination index and shift from baseline. The HFCS Washout group spent less time investigating the object in the new context, showing weakened object-contextual recognition memory. This indicated that their hippocampus (brain region responsible for NOIC learning) was compromised as a result of 30-day HFCS intake during adolescence. The second experiment compared the operant responses for sucrose, using a progressive-ratio (PR) schedule as a measure of reward strength and motivation, and effort required to receive a fixed reward increased progressively throughout testing. Reward strength often is identified by break point, the highest ratio completed within a given test session. The results demonstrated that there lacked a significant difference between the breakpoints for sucrose rewards for the two groups because motivated responding for rewards is not hippocampal-dependent. Our findings show that adolescent HFCS consumption can impair learning later in life, but had no impact on motivation to work for sucrose reward.

§§§§

Exhibit#: LS21  
Category: Life Sciences  
Name(s): Sophia Nguyen  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s): Erin Quinn, Health and Sciences, Dornsife College  
Format: Laboratory-based Research  
Title: Algorithm development for simultaneous PET image segmentation and partial volume correction  
Abstract: A positron emission tomography (PET) scanner is an imaging technique that is commonly used in diagnosis and treatment of some diseases such as cancer, heart problems, and brain disorders. Depending on the type of exam, a specific radioactive tracer such as fluorodeoxyglucose (FDG) would be administered through an IV injection. The radioactive tracer produces positrons which collide with surrounding electrons, resulting in the release of two photons. The detectors in the PET scanner measure these photons to quantify the distribution of the tracer (FDG or other) in the body. Despite the promising application of PET with capability of providing quantitative imaging, it does have its limitations. PET has a much lower resolution compared to other imaging instruments such as CT or MRI. Due to this low resolution, the image quality is slightly blurred in PET. As a result, analysis of PET images depends on manual segmentation. This is not only time consuming but it also produces large variability depending on the user’s experience and the analysis tools used. In addition, the low resolution makes the intensity of small objects appear much lower than what it actually should be. This effect is called the partial-volume effect (PVE), which is one of the main issues that PET imaging currently faces.
In order to alleviate issues such as PVE, expensive imaging programs such as a program by Siemens called Inveon Research Workplace has developed various tools and algorithms. However, these tools and algorithms are not completely accurate or precise. Thus, we analyzed the current methods available through Inveon Research Workplace in order to determine which one would be the best to focus on and further improve. With an improved algorithm, this would help expedite how long it takes researchers to obtain their quantitative imaging results, thus helping their research move forward.

§§§§

Exhibit#: LS19  
Category: Life Sciences  
Name(s): Pauline Huynh  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s): Jeanine Hall, Keck School of Medicine  
Format: Laboratory-based Research  
Title: Assessing the Use of Tear Specific Gravity as a Marker of Hydration Status in Pediatric Patients  
Abstract:  
The purpose of the study is to determine if tear specific gravity could be used as a non-invasive marker of hydration status. It is hypothesized that tear specific gravity (TSG) would correlate well with urine specific gravity (USG), a current way to measure hydration status, and could thus serve to assess hydration status in pediatric patients. Patients of 6 months to 4 years of age who are to receive a urinary catheterization are eligible. As the nurse performs the procedure, the patient’s tears (if shed) are collected in a sterile medicine cup. The specific gravity from the tears and urine are respectively measure and compared. Additionally, a standard patient questionnaire was used, and clinicians would rank the patient’s hydration status using a clinical scale. During the initial interim analysis of the study, 14 patients were included in the study. A Wilcoxon Signed Rank Test was performed, and the mean (SD) values for TSG and USG were 1.021 (0.008) and 1.019 (0.007), respectively. Since the p-value was >0.05, this difference is not significant and suggests that TSG correlates well with USG. A second interim analysis will be performed by the first week of April with up to 60 included patients, and an updated abstract will be submitted.

§§§§

Exhibit#: LS05  
Category: Life Sciences  
Name(s): Lauren Stoneburner  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s): Suzanne Edmands, Biological Sciences, Dornsife College  
Format: Laboratory-based Research  
Title: Comparative Analysis of Gut Microbiome Among Populations of the Channel Island Fox, Urocyon littoralis  
Abstract:  
The Channel Island Fox (Urocyon littoralis) has become a species of critical interest because of its unique evolutionary history and recent population decline. Urocyon littoralis live on six of the eight Channel Islands of southern California, and recent population bottlenecks may have implications for those populations’ genetic variability and pathogen prevalence. In particular, we are interested in quantifying the diversity of the island foxes’ gut microbiome, since recent studies have begun to use microbiota diversity as a useful proxy for evaluating health in other animals.

In order to study the health of island fox populations in the wild, we will compare the microbiota diversity among island fox populations. We obtained scat samples
from all six inhabited Channel Islands. We extracted and quantified total genomic DNA from *U. littoralis* scat, and we verified scat samples have canid DNA using canid specific PCR primers and gel electrophoresis. We are currently amplifying the 16S V4 region of available genomes. We will then sequence the amplified genetic material using Illumina MiSeq and quantify the microbial diversity in each individual. First, we hypothesize that more phylogenetically similar populations will have more similar gut microbiomes (share more operational taxonomic units). Second, we hypothesize that fox microbiomes will co-vary with observed individual health status measured by body condition in the field. The results will likely have valuable implications that guide the efforts of restoring the island fox populations by broadening our understanding of the relationship between *U. littoralis* gut microbiota, individuals' health, and strong species-wide evolutionary forces.

---

**Title:** Comparing Neuronal c-Fos Expression in the Periaqueductal Grey Area between Hypoglycemic and Euglycemic Rat Brains

**Name(s):** Sana Azam

**Submission Type:** Individual

**Project Sponsor(s) and Collaborator(s):** Alan Watts, Neuroscience

**Format:** Analytical Paper

**Title:** Comparing Neuronal c-Fos Expression in the Periaqueductal Grey Area between Hypoglycemic and Euglycemic Rat Brains

**Abstract:**

Hypothalamic counter-regulatory mechanisms are critical for stabilizing blood glucose levels during glycemic changes. Studies show that the paraventricular nucleus of the hypothalamus (PVH) and the ventromedial nucleus of the hypothalamus (VMH) are both key players in maintaining glycemic homeostasis. Both regions are glucosensing and are primary influences for the endocrine response to glycemic changes. They also contain many neuronal projections to various brain regions that are involved in counter-regulation. One such region is the periaqueductal grey area (PAG), where multiple hypothalamic projections terminate. Previous evidence from studies regarding glycemic homeostasis support a potential involvement of this area in counter-regulatory mechanisms. The purpose of this study is to compare neuronal c-Fos activity in three subdivisions of the PAG, which have hypothalamic terminals, under euglycemic and hypoglycemic conditions. Immunohistochemical procedures were used to mark c-Fos expressing neurons, which were counted, then analyzed for significance. Using this information I was able to see whether there was a correlation in activity between the PVH, VMH, and the PAG. I found no significant difference in c-Fos expression between the euglycemic and hypoglycemic groups, which led to my conclusion that the PAG has no direct influence on counter-regulation.

---

**Title:** Compounds in Green Tea Aid in Post-Stroke Recovery In Vitro

**Name(s):** Zachary Chen, William Tzeng

**Project Sponsor(s) and Collaborator(s):** Rayudu Gopalakrishna, Cell and Neurobiology, Keck School of Medicine

**Submission Type:** Group

**Format:** Laboratory-based Research

**Title:** Compounds in Green Tea Aid in Post-Stroke Recovery In Vitro

**Abstract:**

Recovery after injury to the central nervous system is hampered by myelin-derived inhibitor proteins, such as Nogo-A. Natural products, such as green tea, which are inexpensive and safe for long-term therapy, would support current approaches to treatment. In this study, using nerve
growth factor treated neuronal-like Neuroscreen-1 cells as our model, we show that extremely low concentrations of unfractionated green tea polyphenol mixture (GTPP) and its active ingredient, epigallocatechin-3-gallate (EGCG), prevent the recovery inhibiting activity of Nogo-A. Furthermore, a synergistic interaction was observed among GTPP constituents. This counter-inhibitory effect was dependent on 67-kDa laminin receptor (67LR) on neuronal cell surfaces to which EGCG binds with high affinity. The antioxidants N-acetylcysteine and cell-permeable catalase abolished the effect of GTPP and EGCG, suggesting the involvement of sublethal levels of hydrogen peroxide in this process. Accordingly, introducing exogenous sublethal concentrations of hydrogen peroxide mimicked GTPP in counteracting the action of Nogo-A. Consequently, these results show for the first time that GTPP and EGCG, through its binding to the 67LR and its subsequent elevation of intracellular sublethal levels of hydrogen peroxide, inhibit the antineuritogenic action of Nogo-A. Our focus on Green tea stems from it being a cheap, naturally occurring substance that is already widely available. The utilization of such an inexpensive product increases the accessibility of the possible treatments that may stem from it, and ultimately would be able to benefit a larger number of people.
Exhibit#: LS15  
Category: Life Sciences  
Name(s): Sneha Swaminathan  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s): Alan Watts, Neurobiology, Department of Biological Sciences  
Format: Laboratory-based Research  
Title: Distribution of Glucokinase Regulatory Protein within Rat Forebrain Neurons  
Abstract: Glucose sensing is pertinent to the body’s ability to properly react to changing energetic needs. This paper focuses on locating neurons related to glucose sensation via the glucokinase regulatory protein (GCKR). The localization of such neurons will lead to a greater understanding of the neural areas related to and the mechanisms underlying glucose regulation. Fluorescent immunohistochemistry, and confocal fluorescent imaging were employed to label the presence of GCKR positive cells.

§§§§

Exhibit#: LS03  
Category: Life Sciences  
Name(s): James Sturges  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s): Suzanne Edmands, Biological Studies, Dornsife College of Letters, Arts, & Science  
Format: Laboratory-based Research  
Title: Do sex and mating status affect the amount of DNA extracted from copepods?  
Abstract: Copepods are crustaceans found in marine and freshwater habitats worldwide. One species, Tigriopus californicus, is commonly found along coastlines from Mexico to Alaska. This species is sexually dimorphic, with males’ antennules modified as claspers used in pre-copulatory mate-guarding. Females only mate once but produce multiple fertilized egg sacs throughout their lifespans because they have the ability to store sperm. Copepods from five populations ranging from Washington to Southern California were cultured as either unmated individuals or in mated pairs to compare the quantities of DNA extracted from mated females, unmated females, mated males and unmated males. We predicted that females would yield higher quantities of DNA than males because that they are generally larger and that copepods from more northern populations would also yield higher quantities of DNA because they tend to be larger than those from more southern populations. Furthermore, we hypothesized that fertilized females would yield greater amounts of DNA compared to their unfertilized counterparts across all five populations due to the presence of stored sperm. Females yielded higher quantities of DNA than males in two of the five populations examined. Populations yielded differing amounts of DNA, but there was no relationship to geography. We found no statistically significant differences in DNA extraction yields from fertilized and unfertilized females and no significant differences between the amounts of DNA extracted from males that had recently mated and those that had not. This information will be beneficial to future studies because it indicates that the amount of DNA extracted is independent of the fertilization status for both males and females and that geography is not a predictor of DNA yield. T. californicus is an emerging model for speciation genetics, and knowledge of the variability in DNA yields across sexes and populations will be key for planning future studies.

§§§§
Title: The effect of positioning devices on the quantity of leg movements in infants with typical development and at risk for developmental delay

Name(s): Crystal Jiang

Project Sponsor(s) and Collaborator(s): Beth Smith, Division of Biokinesiology and Physical Therapy

Submission Type: Individual

Abstract:

Background: Infant movement can be used as an indicator of developmental progress. This study explores infant leg and foot movement, in various environmental contexts, such as when constrained in a bumbo or car seat, or when encouraged to move in a jungle gym. Purpose: We aim to determine if infant positioning devices affect infant movement rates, and if so, whether the effects are similar in infants with typical development (TD) and at risk (AR) or with developmental delay.

Methods: Video data were recorded of 13 infants with TD and 13 AR, placed in supine, a car seat, a bumbo seat, or in supine underneath a jungle gym. Trained behavior coders identified start and stop times for leg and foot movements.

Results: Preliminary analysis for infants with TD showed the average quantity of leg movements in 30 seconds was: 51 in supine, 55 under a jungle gym, 0 in a bumbo seat, and 33 in a car seat. The average number of foot movements in 30 seconds was: 0.33 in supine, 0 under a jungle gym, 21.5 in a bumbo seat, and 6.3 in a car seat. For infants AR, the average quantity of leg movements in 30 seconds was: 43 in supine, 91 under a jungle gym, 5 in a bumbo seat, and 12 in a car seat. The average number of foot movements in 30 seconds was: 0 in supine and under a jungle gym, 5 in a bumbo seat, and 3 in a car seat.

Conclusions: Movement rates were affected by positioning devices. Both groups of infants tended to make more foot movements when constrained compared to when unconstrained, but there was a greater difference for the infants with TD. Both groups of infants tended to make more leg movements when unconstrained compared to when constrained, but there was a greater difference for the infants AR. Future directions of this study will quantify arm movements and statistically test the results, in addition to assessing the movement behavior of infants at risk for developmental delay.

Acknowledgements: USC Undergraduate Research Associates Program (PI: Smith) and K12-HD055929 (PI: Ottenbacher).

USC’s Provost’s Undergraduate Research Fellowship

Title: Effects of Different Rich Media Composition on Mutation Frequencies of Escherichia coli During Long-Term Batch Culture

Name(s): Danny Le

Project Sponsor(s) and Collaborator(s): Steven E. Finkel, Molecular and Computational Biology, Dornsife College of Letters, Arts, and Sciences; Karin Kram, Molecular and Computational Biology, Dornsife College of Letters, Arts, and Sciences

Submission Type: Individual

Abstract:

Bacteria such as Escherichia coli are commonly grown to high density to gain understanding of biological processes and
to produce biomolecules, including plasmids and proteins, for studies in laboratories. To do this, cells can be incubated in rich media that can increase cell yields. However, stresses that are experienced during the short-term growth can affect survival of cells during long-term stationary phase (LTSP).

Whilst many laboratory applications may require relatively short periods of incubation, bacteria such as *Escherichia coli* are usually studied in three phases. These phases include the lag phase, exponential or logarithmic phase, and stationary phase. The focus of this study is to examine the correlation between mutation frequency and the loss of viability after LTSP incubation in four different media: LB, 2xYT, Terrific Broth, and Super Broth.

*E. coli* cultures were examined for a duration of ten days, with viable counts (colony forming units, CFU) measured on days 1, 2, 3, 4, 5, 7, and 10. Depending on which medium was used, cells incubated in batch culture began to lose viability between 3-5 days resulting in the death of ~99.99% of cells. The observed differences suggest that mutation frequency may contribute to death phase and survival in LTSP. Although the specific relationship is unknown, it is evident that the different rich media composition has an important role.

The observed relationship of mutation frequency on death phase and survival in LTSP when cultured in commonly used rich media suggests that the quality and homogeneity of bacteria and therefore biomolecules that are produced in large quantities in laboratories may be affected.

---

**Title:** Effects of Glycation on the Long-Term Survival of *Escherichia coli*

**Name(s):** Dalton Banh

**Project Sponsor(s) and Collaborator(s):** Steven E. Finkel, Molecular and Computational Biology

**Submission Type:** Individual

**Format:** Senior Honors Thesis

**Abstract:**

Senescence, or biological aging, is an inevitable process for nearly all organisms and is often characterized by degeneration and dysfunction. The study of aging is important because a fundamental understanding of the biochemical mechanisms governing cellular senescence is crucial to developing treatments for age-related disorders such as diabetes, atherosclerosis, and Alzheimer’s. Diet and nutrition have major impacts on aging through a poorly regulated process called glycation (non-enzymatic glycosylation), which occurs when reactive carbonyl-containing compounds such as reducing sugars cross-link with amino-containing biomolecules such as proteins and DNA, destroying their functionality. Glycation leads to the formation and accumulation of advanced glycation end products (AGEs), which also contribute to the slow degradation of biomolecules and are often used as biomarkers for aging.

Although most studies of glycation have been conducted in humans and eukaryotic model systems, the process is universal. Here, we characterize the effects of glycation in various growth medium conditions on the *E. coli* life cycle and seek to understand the extent to which glycation contributes to the stationary and death phases. Using anti-glycation compounds such as carnosine to rescue cell viability and anti-AGE enzyme-linked immunosorbent assays (ELISA) to quantify glycation levels, we provide evidence that
glycation can be induced in the absence of reducing sugars in nutrient-rich growth media. Mechanistic insights into the biochemical process of glycation gained using our bacterial model system are of major clinical relevance. For example, our microbiome, which has been shown to directly and profoundly impact our health, is heavily dependent on our diet. Hence, it is important to understand how differences in our dietary composition correlate with environments in our gut, and how processes like glycation and aging affect the long-term survival and fitness of microbial populations.

§§§§

Exhibit#: LS33
Category: Life Sciences
Name(s): Emmeline Kim, Jung-Gi Min, Kathleen Tor
Submission Type: Group
Project Sponsor(s) and Collaborator(s): Changhan Lee, Davis School of Gerontology
Format: Laboratory-based Research
Title: Elucidating the Mechanisms of MOTS-c: A Novel Perspective in Cancer Modification

Abstract:
In the early 1920s, Nobel laureate Otto Warburg hypothesized that cancer is a metabolic disease, specifically a mitochondrial dysfunction, based on his observation that cancer cells consume significantly more glucose. Since then, cancer has become steadily recognized as a metabolic disease, as the malignant cell must reprogram its metabolism to support unrestrained growth by producing enough structural components and energy for replication. Mitochondria are the keystone of metabolism and are highly implicated in cancer metabolism, but the exact mechanistic details of its involvement is unclear. Here we examine the role of MOTS-c, a recently discovered peptide encoded in the mitochondrial genome, in cancer regulation. MOTS-c is a potent regulator of metabolic homeostasis. Within the cell, MOTS-c targets the folate-purine cycle that consequently activates the master energy regulator AMPK, molecular pathways that have previously been targeted for treatment of both diabetes and cancer. In previous studies, we have shown that MOTS-c significantly retards tumor growth both in vitro and in vivo, with levels of MOTS-c correlated with the malignancy of cancer cell type. Based on these observations, the current study further extrapolates on MOTS-c as a mitochondrial-encoded tumor suppressor that inhibits cancer proliferation, examining the mechanistic details MOTS-c’s effect on cancer cells. Unveiling the role of MOTS-c in cancer presents a paradigm-shifting mitochondrial biology that could significantly expand our understanding of cancer metabolism, and also introduce an entirely novel target for therapy that focuses on signals from the mitochondria itself.

§§§§

Exhibit#: LS08
Category: Life Sciences
Name(s): Archana Bettadapur, Clara Hua, Gio (Kevin) Suh
Submission Type: Group
Project Sponsor(s) and Collaborator(s): Megan McCain, Viterbi School of Engineering
Format: Laboratory-based Research
Title: Engineering the Extracellular Matrix for Regulation of Skeletal Muscle Growth and Differentiation

Abstract:
Skeletal muscle is vital for movement and survival in our environment. Skeletal muscle is derived from satellite cells, which differentiate into precursor cells, called myoblasts. Myoblasts fuse and differentiate into striated muscle fibers that generate
force in response to neural or electrical stimulation. The objective of this project is to determine if the mechanical properties of the extracellular matrix (ECM), a network of macromolecules that surrounds cells in tissues and organs, regulates skeletal muscle differentiation. To test this, we cultured and differentiated skeletal myoblasts on two types of engineered substrates with different elastic moduli: polydimethylsiloxane (PDMS) substrates, which are stiffer than native muscle, and gelatin hydrogels, which mimic the natural stiffness of skeletal muscle. PDMS stamps were coated with fibronectin, a glycoprotein found in the ECM that provides binding sites for matrix proteins and integrins, and stamped onto PDMS coated coverslips. Gelatin hydrogels were cross-linked with transglutaminase, adhered to glass coverslips with glutaraldehyde, and micromolded with PDMS stamps. Both PDMS and hydrogel substrates were seeded with C2C12 myoblasts, a commercial mouse skeletal myoblast cell line. The cells were cultured in two different types of media to promote differentiation into myofibers. Cells were examined for differentiation into myofibers and then fixed and immunostained for sarcomeres, a feature that indicates muscle maturation and differentiation, and nuclei. Myoblast differentiation was quantified by counting the number of nuclei and the number of differentiated cells. We successfully established protocols for skeletal muscle differentiation and found that delamination and maturation was improved on hydrogels (gelatin) that mimicked the mechanical properties of native muscle compared to rigid polymers (PDMS), indicating that the ECM plays a role in regulating the differentiation of skeletal muscle. Our results also suggest that hydrogels are advantageous substrates for engineering new skeletal muscle constructs with potential applications in regenerative medicine.

Exhibit#: LS02
Category: Life Sciences
Name(s): Brandon So
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Patrick Sun, Earth Sciences, Dornsife College
Format: Laboratory-based Research
Title: Evolved tolerance to pollution has a fitness cost in absence of the polluted condition in marine copepod, Tigriopus californicus
Abstract:
The ability for an organism to evolve to its environment is an important trait for its survival. Sometimes, however, there is a cost to such an adaptation. The marine copepod Tigriopus californicus has been previously known to become tolerant to the pollutants copper and tributyltin oxide over a few generations of exposure. In this experiment, copper and tributyltin oxide exposed and tolerant copepod, Tigriopus californicus, under the heat stress of 28°C for 1 generation, had higher fitness only in their own polluted environment. This would suggest that the evolved tolerance to a pollutant had caused a reduced ability for the copepod to survive and reproduce in a non-polluted environment under heat stress. This could have large implications in the remediation of polluted sites. If pollutants in a temperature rising environment are removed too quickly or drastically, it could have negative effects on the site’s inhabitants.
Exercise mediates neuroplasticity by altering D1- and D2-like dopamine receptor expression in the prefrontal cortex of the MPTP-mouse model of Parkinson’s disease

Title: Exercise mediates neuroplasticity by altering D1- and D2-like dopamine receptor expression in the prefrontal cortex of the MPTP-mouse model of Parkinson's disease

Category: Life Sciences

Name(s): James Tavornwattana

Submission Type: Individual

Project Sponsor(s) and Collaborator(s):
Mike Jakowec, Keck School of Medicine of USC, Department of Neurology; Natalie Kintz, Keck School of Medicine of USC, Department of Neurology; Giselle Petzinger, Keck School of Medicine of USC, Department of Neurology

Abstract:
The prefrontal cortex (PFC) is a region of brain important for a number of executive functions including, working memory, attentional processes, rule learning, decision-making and other cognitive abilities. Deficits in PFC function have been linked to a number of neurological disorders including Parkinson’s disease (PD). However, there remains a significant gap in knowledge regarding the underlying mechanisms and the treatment strategies that best address PFC disturbances in PD. The PFC receives widespread dopaminergic and glutamatergic input from cortical and subcortical areas, and abnormalities in these signaling pathways in the PFC may underlie disease pathophysiology in neurological disorders such as PD. Exercise is a promising therapeutic strategy that may exert beneficial effects on PFC function in PD. Substantial research suggests exercise exerts beneficial effects on cognitive function in healthy individuals. However, little is known about the role of exercise in modulating PFC function, particularly DA in the DA-depleted brain, as observed in PD. The goal of this project is to examine changes in DA and receptor expression within the PFC of MPTP-lesioned mice subjected to intensive treadmill exercise. For these studies, 8-10 week old male C57/BL6 mice were randomly assigned to one of four experimental groups: Saline; MPTP; Saline plus Exercise; MPTP plus Exercise. Treadmill exercise was initiated 5 days after MPTP or saline administration, and continued 5 days/week for a total of 28 days of exercise. Changes in DA levels, and DA receptor expression, was assessed by HPLC and western immunoblotting respectively at an early (two weeks after lesion, one week after the start of exercise) and late (seven weeks after lesion, six weeks after the start of exercise) time point. Understanding the relationship between DA and PFC function in the DA-depleted brain may provide key insight into new therapeutic targets for the improved treatment of PD.

Exercise training reinstates cortico-cortical sensorimotor functional connectivity following striatal lesioning

Title: Exercise training reinstates cortico-cortical sensorimotor functional connectivity following striatal lesioning

Category: Life Sciences

Name(s): Ryan Heintz

Submission Type: Individual

Project Sponsor(s) and Collaborator(s):
Dr. Daniel Holschneider, Behavioral Sciences; Dr. Jean-Michel Maarek, Biomedical Engineering; Dr. Zhuo Wang, Psychiatry & The Behavioral Sciences; Yu-Hao Peng, Biomedical Engineering; Yumei Guo, Psychiatry & The Behavioral Sciences

Abstract:
Current rodent connectome projects are revealing brain structural connectivity with unprecedented resolution and completeness. How subregional structural connectivity relates to subregional functional interactions is an emerging research topic. We describe a method for standardized, mesoscopic-level data sampling from autoradiographic coronal...
sections of the rat brain, and for correlation-based analysis and intuitive display of cortico-cortical functional connectivity (FC) on a flattened cortical map. A graphic user interface “Cx-2D” allows for the display of significant correlations of individual regions-of-interest, as well as graph theoretical metrics across the cortex. Cx-2D was tested on a autoradiographic data set of cerebral blood flow (CBF) of rats that had undergone bilateral striatal lesions, followed by 4 weeks of aerobic exercise training or no exercise. Effects of lesioning and exercise on cortico-cortical FC were examined during a locomotor challenge in this rat model of Parkinsonism. Subregional FC analysis revealed a rich functional reorganization of the brain in response to lesioning and exercise that was not apparent in a standard analysis focused on CBF of isolated brain regions. Lesioned rats showed diminished degree centrality of lateral primary motor cortex, as well as neighboring somatosensory cortex—changes that were substantially reversed in lesioned rats following exercise training. Seed analysis revealed that exercise increased positive correlations in motor and somatosensory cortex, with little effect in non-sensorimotor regions such as visual, auditory, and piniform cortex. The current analysis revealed that exercise partially reinstated sensorimotor FC lost following dopaminergic deafferentation. Cx-2D allows for standardized data sampling from images of brain slices, as well as analysis and display of cortico-cortical FC in the rat cerebral cortex with potential applications in a variety of autoradiographic and histologic studies.

---

**Exhibit#:** LS41  
**Category:** Life Sciences  
**Name(s):** Yael Freiberg  
**Submission Type:** Individual  
**Project Sponsor(s) and Collaborator(s):**  
Susan Forsburg, Molecular and Computational Biology, Biological Sciences, Dornsife College; Ruben Petreaca, Molecular and Computational Biology, Biological Sciences, Dornsife College; Ji-Ping Yuan, Molecular and Computational Biology, Biological Sciences,  
**Format:** Laboratory-based Research  
**Title:** A Four-Chromosome Yeast Model for Robertsonian Translocation  
**Abstract:**  
Robertsonian translocation (ROB) is a chromosome rearrangement characterized by a translocation between two acrocentric chromosomes (which have centromeres located close to one end of the chromosomes) to form a single metacentric chromosome (with a centromere in the middle). ROBs occur at a frequency of 1 in 1000 people and have clinical effects including infertility and Down syndrome. We have established a model genetic system to study the formation and segregation of ROB chromosomes. Schizosaccharomyces pombe is a three-chromosome yeast model for human genetics, and our lab isolated four-chromosome (4-chr) strains in which chromosome 3 (Chr3) has split into two acrocentric chromosomes. If these fuse together again to reconstitute Chr3, that is a ROB event. These occur through the centromere, a point of constriction on the chromosome flanked by repetitive heterochromatin domains. Its stability is essential for proper chromosome segregation during cell division. We are using this system to investigate the genetic pathways that contribute to ROB formation. Thus far, we have identified genes with roles in replication fork stability, centromeric chromatin, and recombination as contributing to ROB formation. In
parallel with this, we are also investigating the structures ROB chromosomes form with their constituent homologs during meiosis. These studies will help elucidate the molecular mechanism associated with a common human genome instability, as well as identify risk factors for these events.

§§§

Exhibit#: LS30
Category: Life Sciences
Name(s): Lu Tian, Jessica Tran
Submission Type: Group
Project Sponsor(s) and Collaborator(s): Rayudu Gopalakrishna, Cell and Neurobiology
Format: Laboratory-based Research
Title: Green tea polyphenols potentiate the neurite outgrowth stimulating activity of brain derived neurotrophic factor by a receptor-mediated specific mechanism
Abstract: Recovery from neuronal injuries and neurodegenerative diseases requires the delivery of brain-derived neurotrophic factor (BDNF) to affected brain region. Systemic administration of BDNF helps repair damaged axons by promoting neuronal differentiation and axonal growth. However, clinical administration of BDNF has drawback because BDNF does not readily cross the blood-brain barrier and have short half-life. Therefore, exogenous potentiators are needed to enhance BDNF’s neuritogenic ability. We hypothesized that green tea polyphenols are the potential potentiators of BDNF. To evaluate this hypothesis, we conducted a series of experiments using PC12 (TrkB) neuronal cells, which express TrkB, a receptor for BDNF on the cell surface and induce neurite outgrowth when exposed to BDNF. We found that extremely low concentrations of green tea polyphenols and their active ingredient epigallocatechin-3-gallate bind to a 67kDa-laminin receptor present on the cell surface. This binding subsequently induces sublethal levels of intracellular reactive oxygen species (ROS), such as hydrogen peroxide. While high levels of ROS contribute to cell death, low levels of ROS can induce cell signaling. We consequently found that ROS induced by green tea polyphenols playing a crucial role in the action of these agents. Collectively, our results support the fact that the green tea polyphenols can potentiate neuritogenic ability of BDNF and suggest a potential application for these inexpensive and safe natural products in treating neuronal injuries and neurodegenerative diseases.

§§§

Exhibit#: LS36
Category: Life Sciences
Name(s): Zhiyin Qin
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Richard W. Roberts, Mork Family Department of Chemical Engineering and Materials Science, USC Women in Science and Engineering
Format: Laboratory-based Research
Title: High Affinity Peptide Ligands Targeting Activated RAS
Abstract: The approach of designing high affinity and highly specific ligands for proteins has many potential applications in biotechnology. The RAS gene is a common oncogene which is mutated in 9-30% of human tumors. Therefore, targeting and inhibiting RAS signaling activity has been a common goal in many cancer therapy approaches. Although ligands that bind to RAS have been identified, to date, no state selective RAS binders capable of in vivo function have been discovered. Here, we use mRNA display to select for peptide ligands which bind to the active form of RAS with high affinity. We found low molecular weight state selective ligands
In non-small cell lung cancer (NSCLC), tumor cells harboring activating mutations in the epidermal growth factor receptor (EGFR) kinase domain are particularly responsive to tyrosine kinase inhibitors (TKIs) such as erlotinib or gefitinib. However, these tumors eventually become resistant to TKIs with continued treatment; a majority of resistant cells are due to a second site mutation at codon 790 (T790M) of EGFR. Current in vitro studies of drug resistance are carried out under laboratory conditions that differ greatly from the tumor microenvironment in vivo.

In this study we sought to understand the impact of both dosing strategies and the tumor microenvironment on the development of drug resistance in a high throughput manner. 96 erlotinib resistant cell lines were derived from sensitive HCC827 parental cells in vitro under standard and low glucose culture conditions using three different dosing strategies: dose escalation, continuous high dosing, and pulse high dosing. Cell morphology, growth rate, protein expression, and the frequency of the T790M mutation were compared for each dosing strategy and environmental condition. Dosing strategy was shown to influence the mean time to resistance in both standard and low glucose conditions. Further, cells grown under identical conditions show different mechanisms of resistance to erlotinib, which may be due to the stochasticity of resistance.
or APOE4-FAD transgenic mice were bred and maintained on a normal (10% fat) or western diet (45% fat) for a 3-month treatment period. Metabolic outcomes were determined, brains were hemisected and stained for Aβ using immunohistochemistry methods, and the percentages of Aβ in the entorhinal cortex, cortex, and hippocampus were quantified. Our results demonstrated that the APOE4 genotype and a western diet independently worsen metabolic outcomes and Aβ pathology in the entorhinal cortex and hippocampus. We determined a non-significant pattern where obesity and APOE4 genetics cooperatively exacerbated Aβ accumulation in the brain. These results demonstrate that obesity only exacerbates the amyloid beta pathology when coupled with APOE4 genetics. Together our results suggest that non-genetic and genetic factors independently and cooperatively regulate Aβ pathology in the brain, which may be valuable to understanding the pathogenesis of Alzheimer’s disease.

§§§§

Exhibit#: LS35
Category: Life Sciences
Name(s): William Liao, Joanne Lin
Submission Type: Group
Project Sponsor(s) and Collaborator(s):
Joseph Landolph, Microbiology and Immunology, Keck School of Medicine
Format: Laboratory-based Research
Title: Induction of Cytotoxicity and Morphological Transformation by Soluble Cr(VI) Compounds in Cultured C3H10T1/2C18 Mouse Embryo Cells: Enhancement by Ascorbate and Dehydroascorbate

Abstract:
Compounds containing hexavalent chromium [Cr(VI)] are well-documented human carcinogens that cause cancers in the respiratory system when inhaled, and that cause stomach cancers and other internal cancers when humans ingest them. Furthermore, the genotoxicity of soluble and insoluble hexavalent chromium compounds has been studied in mammalian cell mutagenesis assays, which showed that Cr(VI) compounds induced base substitution, deletion, addition, and frameshift mutations. Cr(VI) compounds also induce DNA-DNA cross links and DNA-protein cross-links in mammalian cells. The present study examined the ability of the soluble chromium compounds, sodium chromate (Na₂CrO₄), calcium chromate (CaCrO₄) and potassium dichromate (K₂CrO₄) to induce cytotoxicity of C3H/10T½ Cl 8 mouse embryo cells. This study sought to test the hypothesis that intracellular reductants, such as ascorbate and dehydro-ascorbate, can reduce Cr(VI) to Cr(V), Cr(IV), and Cr(III) intracellularly, thereby making it a strong cytotoxin in mammalian cells. We realized that ascorbate is present in serum at concentrations in the millimolar range under physiological conditions in humans, but that ascorbate is only present in the micromolar range in cultures of mammalian cells. We postulated that the relatively weak responses for induction of morphological transformation of 10T1/2 cells we previously published by Cr(VI) compounds in culture (weak but dose-dependent induction of foci by lead chromate, and no induction of foci by calcium chromate, potassium chromate, or sodium chromate) might be due to the small and insufficient amounts of ascorbate in cultures of mammalian cells. Therefore, we investigated the cytotoxic effects of ascorbate on 10T½ mouse embryo cells, and the effects of the highest non-cytotoxic concentrations of ascorbate on Cr(VI)-induced cytotoxicity in 10T½ cells. This information is important for our future experiments, when we design a protocol to incorporate ascorbate into our cell transformation assays assessing the cytotoxicity and cell transforming activity of Cr(VI) compounds.
Investigating the Physiological Effects of Oxidative Damage in Escherichia Coli

Tristan Jordan

Dr. Steven E. Finkel, Molecular and Computational Biology

Laboratory-based Research

Oxidative reactions in E. coli are known to cause cellular deterioration through protein damage. Using an in situ immunological technique and density gradient centrifugation, subpopulations of cells with higher oxidative damage in the form of protein carbonylation were shown to exhibit a higher buoyant density (Desnues 2003). In addition, stress response genes in this subpopulation such as RpoS, RpoH, and SoxRS were shown to be more highly expressed concurrent with the low expression of superoxide dismutase genes (Desnues 2003). Although these previous studies have assessed the possible biochemical and genetic origins of protein oxidation, we have limited knowledge about the physiological effects of oxidative damage. Time-lapse experiments of E. coli cells demonstrated slower growth for daughter cells originating from older poles of dividing parent cells in which the cellular “debris” from oxidative damage are asymmetrically allocated, indicating the generational differences in growth due to oxidative damage (Stewart et al., 2005). To further assess the physiological effects of oxidative damage as E. coli age, we performed density-gradient centrifugation to separate one- and five-day old batch cultures of E. coli, where cells are expected to possess different buoyant densities. We then assessed the competitive fitness of the cellular fractions with respect to each other. In the centrifugation experiments, two different banding patterns for the one-day and five day fractions were observed. Based on the competition experiments, it was found that all five-day-old fractions outcompeted the one-day-old fractions. These studies suggest that aging of E. coli in batch culture generate a greater degree of oxidative damage, and that favorable genetic changes that might occur during long-term stationary phase contribute to greater fitness.

Investigating the Role of Cartilage in Bone Repair

Helen Chou

Francesca Mariani, Keck School of Medicine

Laboratory-based Research

Bone is a highly dynamic organ, with the ability to break down and regrow through the process of bone remodeling. We wanted to look at the various components that take part in this process to find therapeutic implications for bone repair. This project was divided into two parts: bone regeneration and bone induction.

The first part uses CD1 mice to observe the process of bone regeneration, including whether variation in resected bone length affects regeneration. We resected ribs in CD1 mice of lengths varying from 5 to 8 mm long and allowed them to rehabilitate for different periods of time, after which we isolated the rib cages and stained them to visualize regrowth of the resected area. Histological stainings were done to visualize and analyze bone markers at various time points during regrowth.

The second component of this project
looked at bone induction from cartilage progenitors. We used ATDC5 cells, derived from ATDC5 cells, which are derived from mouse teratocarcinoma cells and shown to be a promising model for chondrogenesis. We conducted trials with varying concentrations of Smoothened agonist, which acts on a receptor in the hedgehog signaling pathway, one that has been implicated in bone formation. After a seven to 14-day cell culture, we used RTPCR to analyze various bone and cartilage markers, including osteocalcin, RUNX2, Col1 and Col10. Ultimately, our goal is to determine whether cartilage can potentially be used to facilitate bone repair.

§§§§

Exhibit#: LS28
Category: Life Sciences
Name(s): Mehul Trivedi
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Ted Hsu, Neuroscience; Scott Kanoski, Biological Sciences
Format: Laboratory-based Research
Title: Investigation of the neural circuits through which glucagon-like peptide-1 receptor signaling reduces food intake.

Abstract:
Glucagon-like peptide-1 (GLP-1) is a metabolic hormone produced in the small intestines and the neurons in the nucleus tractus solitaries (NTS) of the hindbrain. GLP-1 receptors are found in the ventral subregion of the hippocampus (vHPC), a brain region that is involved in motivated behaviors such as feeding. As we’ve been able to show recently, activation of the GLP-1 receptors cause a reduction in food intake, body weight and effort to work for palatable food (Hsu et al., Neuropsychopharmacology, In Press). The next step is to investigate the downstream neural circuitry involved in the anorexic effects of vHPC GLP-1 receptor signaling. The medial prefrontal cortex (mPFC) is responsible for food related reward behavior and has monosynaptic projections from the vHPC. Because of these projections, the mPFC is a logical downstream target. To demonstrate the importance of this connection to the reduction of food intake, we utilized designer receptors exclusively activated by designer drugs (DREADDs), a viral technique that allows for the synaptic silencing of pathways. Inhibitory DREADDs paired with viral vectors transfected the vHPC (CA1 pyramidal area) neurons. Clozapine-N oxide (CNO) is the otherwise physiologically inert DREADDs ligand and the delivery of it activates DREADDs on the vHPC, temporarily silencing synaptic communication between the vHPC and the mPFC. We inject GLP-1 receptor agonist exendin-4 to the vHPC immediately following the CNO injections and measure food intake 24 hours later. Our results show a dulled GLP-1 anorexic effect following the vHPC →mPFC disconnection suggesting that this connection is required for the anorexic effects of GLP-1 signaling. These results suggest a novel neural pathway where GLP-1 receptor signaling reduces food intake and body weight.

§§§

Exhibit#: LS26
Category: Life Sciences
Name(s): Joanne Jiang, Katherine Young
Submission Type: Group
Project Sponsor(s) and Collaborator(s): Christian Pike, Davis School of Gerontology
Format: Field Research
Title: Is the Female Brain Inherently More Vulnerable to Alzheimer’s Disease?

Abstract:
Sex steroid hormones have effects in both early development (called organizational effects), and later in adult life (activational effects). Studies show that these hormones may be protective against Alzheimer’s disease. In this study, we investigated whether there are sex differences in the vulnerability to Alzheimer’s disease. We used a transgenic mouse model of Alzheimer’s disease, the APP/PS1 mouse, which develops amyloid plaques and neurofibrillary tangles. We injected the mouse model with an intracerebroventricular injection of Aβ to exacerbate the disease. We then measured the levels of Aβ and the expression of presenilin-1 in the hippocampus of male and female mice. Our results showed that female mice had higher levels of Aβ and lower levels of presenilin-1 than male mice. This suggests that female mice may be more vulnerable to Alzheimer’s disease.
disease in adulthood, and that the normal age-related loss of these hormones increases risks for AD in women and men. Although aging is a significant factor in the development of AD, the higher incidence of AD in women indicates that the organizational effects of sex steroid hormones may also come into play. Our study focuses on organizational effects of testosterone. Studies have shown that early life exposure to testosterone makes both male and female brains relatively less feminine and more masculine. We are exploring the possibility that low testosterone exposure – and thus, a more “feminine” brain – can serve as an indicator for increased risk of AD. In order to gauge testosterone’s effect on AD development, we measured the 2nd digit to 4th digit (2D:4D) ratios of our subjects: Los Angeles area men and women over the age of 65, both with and without significant memory impairment, a characteristic of AD and related dementias. Higher 2D:4D ratios, which reflect elevated testosterone levels during prenatal development, are maintained throughout the lifespan. This is supported by clinical and experimental evidence—the genes for testosterone release and finger length belong to the same DNA sequence. Importantly for our research, analyses of these ratios show differences both within and between sexes. Although we are still in the process of analyzing our data, we hypothesize that we will see an inverse correlation between testosterone exposure and Alzheimer’s diagnosis. These results have the potential provide an additional predictive tool for Alzheimer’s development, as well as provide more insight into an underlying cause of and care for the disease.

§§§

Exhibit#: LS22
Category: Life Sciences
Name(s): Bronte Ficek
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Assal Habibi, Brain and Creativity Institute
Format: Creative Work
Title: A Lecture Recital on the Brain and Music

Abstract:
In February, 2015, I presented a benefit lecture recital on the brain and music, in which I intertwined mini-lectures on how the brain processes music with performances of music I have learned at USC. Purposes for the recital were to present an oral review of current research on the brain and music in a format easy to understand, share my favorite classical and jazz music and use the music to demonstrate the neuroscience concepts I address, and raise funds for a foundation in the Philippines that provides for the medical needs of impoverished people. My submission is the lecture recital itself, in the form of video recordings.

The music portion of my recital represents my musical journey through college, emphasizing collaboration with others because I believe music is communication and provides a powerful way to connect with others. I begin by playing violin in a violin-cello duet, as well as in a Filipino folk song; later I sing jazz in a guitar-voice duo, used later in my discussion about sad music. In the second half I conduct a choir of friends, as well as perform one vocal classical piece and present my own composition for voice and piano to demonstrate musical synesthesia; I end with a capella jazz ensemble tunes.

Nestled between musical performances are lectures addressing the following questions, among others: How is music processed by the brain? Why do we like sad music? Why does music trigger chills? Can music
training make us more intelligent? More empathetic? These questions I answer with about three years’ worth of research in the Brain and Creativity Institute, in the form of literature searches and my own projects.

My hope is that the information imparted will guide musicians’ approaches to and appreciation of the complexity of music in their own musical endeavors.

§§§§

Exhibit#: LS01
Category: Life Sciences
Name(s): Emily Kopania
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Matt Dean, Molecular and Computational Biology, Dornsife College of Letters, Arts, and Sciences; Dennis Hedgecock, Marine and Environmental Biology, Dornsife College of Letters, Arts, and Sciences; Alberto Arias Perez, (Postdoctoral Fellow), Marine and En
Format: Laboratory-based Research
Title: Mapping the Genes Responsible for Variations in Oyster Shell Morphology
Abstract:
Oyster shells exhibit observable variations in shape and size, which are important traits in the aquaculture industry because they correspond to oyster quality. Prior studies have shown that these variations are influenced by genetics rather than environmental factors. Thus, it is of great benefit to the aquaculture industry to be able to quantify shell morphology in order to map the genes responsible for variations in shape. For this project, over 200 Crassostrea gigas shells from an F2 family were scanned to generate a 3D data file for each shell. Usually, morphometric analyses are performed using landmarks to compare shapes, but this does not work on oyster shells due to high variation in shell shape and lack of consistent landmarks across all specimens. Dr. Matt Dean and I worked to develop a new method of morphometric analysis by generating minimum bounding rectangles around each shell. Principle component analyses were performed on the length, width, and length-width ratio data for these rectangles, and the first two principle components were plotted against each other and against oyster mass. These data were analyzed based on oyster sex, and it was found that males tend to have less mass and smaller shells than females. It was also found that shell size is responsible for most of the variation among shells. Dr. Hedgecock’s lab has genotyped the oysters. So far, I have analyzed 614 SNPs (short nucleotide polymorphisms) and identified 31 SNPs with significant phenotype effects. I will eventually analyze over 10,000 SNPs to complete the process of mapping the genes responsible for variations in shell morphology.

§§§§

Exhibit#: LS34
Category: Life Sciences
Name(s): Christopher Sulistio
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Stacey Finley, Biomedical Engineering
Format: Laboratory-based Research
Title: Modeling the anti-angiogenic actions of thrombospondin-1 in tumor cells and blood
Abstract:
Angiogenesis is the formation of new blood vessels from pre-existing vessels and is one area of research that could produce viable treatment options for slowing or stopping the growth and spread of tumors. Restricting the angiogenic process would help in preventing tumor cells from proliferating and initiating metastases by moving to other locations throughout the body. We have created a computational model to simulate the reactions of thrombospondin-1, an anti-angiogenic
factor, with various receptors and signaling molecules. Thrombospondin-1 works by inhibiting the action of growth factors such as VEGF, a strong promoter of angiogenesis, and affecting a pathway leading to cell apoptosis. We are modeling these interactions to further understand the effects thrombospondin-1 has on tumor angiogenesis.

To model the thrombospondin-1 reactions, we wrote 242 differential equations with 105 species using the SimBiology toolbox in MATLAB based on interactions found in literature. Many of the kinetic and geometric parameters used are taken from previous computational studies and experimental research involving components relevant to our model. The model currently contains two compartments representing tumor cells and blood. We are working to add a third compartment for normal tissue to more completely reflect in vivo conditions. We simulated the concentration of the angiogenic factors over time and tuned the model to match known steady state concentrations. For parameter values that are disputed or unknown, we ran sensitivity analyses in MATLAB to determine the impact of those components. Specifically, we examined how the number of cell surface receptors present in each compartment influence the predicted concentrations of thrombospondin-1 and other angiogenic factors. By creating a comprehensive model, we hope to gain a better understanding of how the anti-angiogenic effects of thrombospondin-1 can be utilized to restrict tumor growth.

Title: Negative Urgency Predicts Heightened Negative Affect and Urge During Tobacco Abstinence in Regular Smokers

Name(s): Layla Farrahi, Annie Park

Project Sponsor(s) and Collaborator(s): Adam Leventhal, Preventive Medicine

Submission Type: Group

Category: Life Sciences

Format: Laboratory-based Research

Exhibit#: LS13

Abstract:

BACKGROUND: Negative urgency--the disposition to act rashly during periods of extreme negative emotional states has been implicated in the etiology of smoking. However, the mechanisms linking negative urgency and smoking motivation are unclear. This study tested the hypothesis that negative urgency amplifies negative emotions experienced during acute tobacco abstinence, which in turn increases the urge to smoke to suppress negative emotions as part of a mediational pathway that ultimately maintain smoking behavior in urgent individuals.

METHOD: Adult smokers (n=180, >10 cig/day) attended a baseline session at which self-report measures of negative urgency and other co-factors were administered and then two counterbalanced experimental sessions involving either 16 h of smoking abstinence or smoking as usual. At both experimental sessions, nicotine withdrawal symptoms, affect, and smoking urge were assessed.

RESULTS: Negative urgency predicted larger abstinence-induced increases in withdrawal symptoms, negative affect, and urge to smoke to alleviate negative affect with and without controlling for baseline anxiety, depression, and sensation seeking (betas > .21, ps < .006). The predictive influence of urgency on abstinence-induced increases in urge to smoke to alleviate negative affect was mediated by greater...
abstinence-induced increases in negative affect (betas > .066, p< .003). Negative urgency did not significantly predict abstinence-induced changes in positive affect or the urge to smoke for pleasure (ps > .13).

CONCLUSION: These findings suggest a potential risk pathway whereby smokers with higher (vs. lower) negative urgency are prone to more severe negative affect states upon smoking abstinence, which in turn promotes an urge to smoke to suppress these negative emotions. These results also suggest affective specificity to aversive (vs. appetitive) mechanisms underlying the link between negative urgency and abstinence-provoked smoking motivation. Extending these findings to clinical populations and outcomes, such as relapse propensity and dependence, is warranted.

§§§§

Exhibit#: LS06
Category: Life Sciences
Name(s): Cassandra Tran
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Biren Patel, Keck SOM (Cell and Neurobiology Deparment)
Format: Analytical Paper
Title: A new anthropoid first metatarsal from the early Miocene site of Songhor, Kenya
Abstract:
Songhor is an early Miocene fossil locality in Kenya that is known for its diverse mammals including several catarrhine primate species: Limnopithecus evansi, Kalepithecus songhorensis, Dendropithecus macinnesi, Proconsul major, and Rangwapithecus gordoni. Of these, Proconsul major was the largest known primate at Songhor, and Rangwapithecus was the most common taxon (based on the number of recovered fossils). Songhor is the type locality for both taxa.

Dentognathic material is relatively abundant and often attributable to specific taxa, but postcranial remains from Songhor are few and difficult to allocate to any one species. In this study we describe KNM-SO 31233, a complete left anthropoid first metatarsal (Mt1) and addressed two questions: 1) Which, if any, fossil primate species currently recognized at Songhor can KNM-SO 31233 be attributed to? 2) How does the morphology of KNM-SO 31233 compare with other known stem-catarrhine or stem-ape Mt1s? We compare this specimen to a large number of extant anthropoids including New and Old World monkeys and apes (n>520), and several fossils attributed to stem catarrhines (Catopithecus; Aegyptopithecus), proconsuloids (Proconsul; Afropithecus), and pliopithecoids (Epipliopithecus). Morphometric data was obtained from 3D surface renderings derived from CT and micro-CT scans. Univariate and multivariate analyses were performed to assess phenetic affinity with the comparative sample. Regression analyses were performed to estimate lower second molar dimensions from Mt1 size variables in order to possibly associate this specimen with fossil dental remains found at Songhor. Overall, KNM-SO 31233 is similar in size to Mt1s of extant gibbons and spider monkeys, while its shape is most similar to extant pithecine monkeys, spider monkeys and gibbons. Among fossil Mt1s, it looks most like Catopithecus from the latest Eocene, and does not resemble any other Miocene primate currently known. Based on its size, it likely can be attributed to Limnopithecus.

§§§§
Optimization of in vitro translation and fusion formation

Abstract:
mRNA display is an in-vitro selection technique, widely used to generate proteins (ligands) capable of binding other proteins (targets) with high affinity and specificity. This process begins by screening a pool of over a trillion unique proteins and narrowing the list to mere thousands of potential binders. An important step in mRNA display is “fusion formation.” Fusion formation happens during translation, where the mRNA coding for a protein is covalently linked to the newly synthesized protein. Unfortunately, this is one of the least efficient steps of mRNA display, greatly reducing the total number of molecules that mRNA display can screen. Here, we plan on increasing the efficiency of fusion formation by optimizing the sequence upstream of the start codon, called the untranslated region (UTR). It is our hope that by optimizing the UTR region, we will increase the efficiency of translation as well as fusion formation. The current UTR used for in vitro translation and fusion formation is derived from the tobacco mosaic virus. Using mRNA display, we have identified up to five candidate sequences to increase the fusion formation efficiency. Our sequences show a high degree of similarity with sequences discovered by other researchers looking to optimize translation. We hope to test these sequences to determine the improvement of fusion formation and to explore other applications of enhanced in-vitro translational efficiency.

Exhibit#: LS07
Category: Life Sciences
Name(s): Saumya (Sam) Copparam
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Lorraine Turcotte, Biological Sciences, Dornsife College of Letters, Arts, & Sciences
Format: Senior Honors Thesis
Title: Potassium Channel Expression in Contracting Skeletal Muscle
Abstract:
Regulation of potassium homeostasis is critical for optimal exercise performance. During muscle contraction, potassium effluxes from the muscle cell into the extracellular fluid (ECF). This leads to an increase in ECF (and blood) potassium levels. To rectify this, potassium must be pumped back into the muscle by a variety of channels and transporter proteins. Due to this, it has been hypothesized that the activity and/or content of the transporter proteins that regulate potassium re-uptake into muscle should be higher during muscle contraction. However, we know very little about the changes in the muscle content of the various potassium channel proteins that regulate potassium fluxes during muscle contraction.

The purpose of this study was to determine whether moderate-intensity muscle contraction would affect the expression of the ATP-sensitive inward rectifying potassium channel (Kir6.2), the calcium-activated potassium channel (KCNMA1), the inward rectifier potassium channel (Kir2.1), and the sodium-potassium-chloride cotransporter (NKCC1) in contracting muscle. These channel proteins are plausible regulators of the re-uptake of potassium with muscle contraction because they have been shown to be important potassium flux regulators in other physiological conditions.
Western blotting was used to separate proteins from homogenate samples prepared from rat hindlimbs that were perfused at rest or during muscle contraction. The proteins were probed with antibodies against the regular and phosphorylated channels. The resulting gel bands were visualized using enhanced chemiluminescence and gel density was quantified using the NIH ImageJ program.

The big picture of this project is to gain a better understanding of the cause and regulation of muscle fatigue, a full understanding of which is still unknown. A better understanding of muscle fatigue could lead to treatments and applications in the real world to reduce it (for example, in athletes) or to relieve it (for example, in senior citizens).

§§§§

Exhibit#: LS11
Category: Life Sciences
Name(s): Farid Zeineddine
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Tara Gruenewald, Davis School of Gerontology; Diana Wang, Davis School of Gerontology
Format: Laboratory-based Research
Title: Practicing the “Alameda 7” daily health habits predicts better cardiovascular and autonomic function and recovery from stress

Abstract:
A half century ago, the practice of 7 health habits was identified in the Alameda County Study to predict physical health and longevity. These habits included: never having smoked, drinking less than five drinks at a time, sleeping 7-8 hours a night, maintaining a desirable weight for height, exercising, not snacking, and eating breakfast daily. Subsequent research has independently linked the practice of each of these behaviors to better health, but little research has examined the health correlates of the collective practice of these behaviors. We also know relatively little about the physiological pathways through which engagement in these behaviors leads to better health. Given the high prevalence of cardiovascular disease in the U.S., the current study investigated autonomic and cardiovascular correlates of the practice of the Alameda 7.

Analyses utilized data from the Biomarker Substudy of the National Survey of Midlife in the U.S. (MIDUS). An aggregate index representing the number of the 7 health habits regularly practiced was examined as a predictor of multiple indicators of autonomic (high frequency heart rate variability (HRV)) and cardiovascular(heart rate) function under both resting and challenge conditions (cognitive lab stressors). Multiple regression analyses controlling for menopausal status, medication intake, and socio-demographics factors were used to investigate whether greater healthy habit engagement predicted healthier autonomic and cardiovascular activity.

Participants that reported practicing a greater number of the seven healthy habits demonstrated greater high frequency heart rate variability ($\beta = .091, p < .05$) and heart rate ($\beta =0.081, p < .01$) stress recovery. Those who practiced more health habits also exhibited a more favorable basal profile of autonomic health, as indicated by higher heart rate variability ($\beta = .073, p < .05$). These findings indicate that greater practice of the 7 health habits may confer better daily physiological function and greater physiological stress resistance.

§§§§
Exhibit#:  LS14  
Category:  Life Sciences  
Name(s):  Jamie Thuy  
Submission Type:  Individual  
Project Sponsor(s) and Collaborator(s):  
Daryl Davies, Pharmacology and Pharmaceutical Sciences; Liana Asatryan, Clinical Pharmacy and Pharmaceutical Economics & Policy  
Format:  Laboratory-based Research  
Title:  Preclinical Development of Moxidectin as a Novel Therapeutic for Alcohol Use Disorder  

Abstract:  
Alcohol use disorder (AUD) poses a major socio-economic issue with current therapies having limited success. Previously, the Davies laboratory has focused on the repurposing of ivermectin (IVM), as a novel pharmacotherapy for AUD. Our investigations have shown that IVM can significantly reduce ethanol intake acutely and chronically in both male and female mice, and IVM was recently tested in 10 alcoholic patients where no safety events were reported. However, IVM’s poor blood brain barrier (BBB) penetration may limit its utility as a long-term treatment. The current study extends our investigation to moxidectin (MOX), an avermectin-related compound with superior BBB penetration as established by earlier preclinical reports. Recent electrophysiological findings from our laboratory have shown MOX antagonizes ethanol-induced inhibition activity on P2X4Rs, ion-receptors in the dopamine reward system relates to ethanol intake.  

Our preliminary investigations found that acute intraperitoneal injection of MOX (5 mg/kg) significantly reduced 10% ethanol (10E) v/v solution intake in both male and female mice using a 24-hr-two-bottle paradigm, where the mice had continuous access to both 10E and water during the testing period. Extending this work, administration of MOX (5mg/kg), 4 hours prior to ethanol access resulted in a significant reduction in 20E intake in female mice with the Drinking in the Dark paradigm, where the mice had 4 hour limited access to ethanol starting 3 hours into the dark phase. Our hourly study further established that the effects on alcohol intake were significantly reduced at 4 hours after administration, compared to 9 hours with IVM. Importantly, we observed no signs of overt toxicities during these investigations. Collectively, these findings support the development of MOX as a novel therapeutic for AUD with a promising long-term safety profile.

§§§§

Exhibit#:  LS25  
Category:  Life Sciences  
Name(s):  Rachel Rosales  
Submission Type:  Individual  
Project Sponsor(s) and Collaborator(s):  
Suraiya Rasheed, Keck School of Medicine  
Format:  Laboratory-based Research  
Title:  Proteomics of HIV Associated Dementia  

Abstract:  
HIV Associated Dementia (HAD) is one of the leading causes of neurologic deficits among a younger population group of HIV-infected individuals (McArthur, Sacktor & Selnes, 1999). HAD has the typical conditions of Dementia of impaired cognitive functioning that can interfere with one’s daily activities. A key difference is that HIV Dementia results from HIV-infection and is a rapidly progressive form of dementia while the typical form of Dementia is usually a gradual onset (Potocnik 2013). Because the disease is so debilitating, it is important to understand the disease’s pathway and how the disease progresses.  

About ¼ of patients with AIDS will develop HIV Associated Dementia in the course of their illness (Pandey et al., 2009). An HIV
patient usually does not present symptoms of HAD until later in the course of the disease or before the onset of AIDS; however, HIV affects the brain at an early stage of infection. The brain serves as an important reservoir for the virus that allows the disease to manifest itself in the person later on (Ances & Ellis 2007). One reason why HAD rarely occurs before the onset of advanced HIV disease is that a vicious cycle of immune dysregulation and Blood-Brain Barrier dysfunction is required to achieve sufficient entry of infected or activated immune cells into the brain to cause neuronal injury (Kaul et al. 2001).

HIV proteins can infect the Blood-Brain Barrier and enter the brain by infecting macrophages and microglia causing neuronal damage. In other cases, due to their solubility, the HIV proteins can enter the Blood-Brain Barrier causing neuronal damage. These proteins were the basis of my research.

§§§§

Exhibit#: LS39
Category: Life Sciences
Name(s): Sina Torabi
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Norman Arnheim, Molecular Biology and Biochemistry; Peter Calabrese, Biological Sciences; Soo-Kung Choi, Molecular Biology and Biochemistry; Song-Ro Yoon, Molecular Biology and Biochemistry
Format: Laboratory-based Research
Title: Reducing Error in Next-Generation Sequencing of Rare Mutations
Abstract:
Next-Generation Sequencing (NGS) is a ground-breaking method that allows investigators to sequence DNA in order to find and quantify the number of molecules with rare mutations, among other uses. However, the downfall of Next-Generation Sequencing (NGS) in this context is its high error rate. Normal human DNA has a ~ one in 100 million rate of substituting an incorrect DNA base for the correct one, yet NGS sequencing can introduce errors at rates as high as one in 1000 bases, an increase of ~ five orders of magnitude. The most common error introduced is a substitution of the base thymine in place of a cytosine. This is due to a deamination of the cytosine to a uracil in some NGS preparation step, such as during the Polymerase Chain Reaction (PCR). Though it is commonly believed that uracil cannot be copied by the commonly used DNA Polymerase Phusion (which would prevent the mutation from being detected), we have contrary evidence that this assumption is not true. Based on this observation, our ultimate goal is to be able to run the PCR reaction for studies on rare mutations in the presence of enzymes that would eliminate DNA strands containing uracil and effectively suppressing the “noise” produced during NGS. Our preliminary trials on potential DNA glycosylases show promise, as many can function well in conditions very different from that inside a living cell. We are also investigating the possibility of adding other enzymes to reduce additional false mutations produced by the NGS process itself.

§§§§

Exhibit#: LS32
Category: Life Sciences
Name(s): Karthik Vasan
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Shou-Jiang Gao, Molecular Microbiology and Immunology
Format: Laboratory-based Research
Title: The Role of Class III HDACs in the Growth and Survival of Acute Lymphoblastic Leukemia (ALL)
Abstract:
Class III histone deacetylases (HDACs), also
known as SirTuins (SIRTs), consist of seven HDACs that control gene expression in response to intra- and extra-cellular signals by regulating both histone proteins to mediate epigenetic modifications and non-histone proteins to affect their functions. SirTuins use NAD+ as a cofactor for their activity. However, the catalytic product of NAD+, nictotinamide (NAM), which is the amide of nicotinic acid (vitamin B3), is a feedback inhibitor of sirtuins. Because the activity of SIRTs depends on NAD+, which reflects the cellular energy status, they are commonly thought to be metabolic sensors of the cell. In this study, we have shown that SIRT1, 3, 4, and 7 are upregulated in Acute Lymphoblastic Leukemia (ALL), an acute cancer of white blood cells that inhibits normal hematopoiesis. Significantly, inhibition of SIRTs using NAM, and a specific small molecule inhibitor of SIRT1, 2, and 3, Tenovin-6, reduced cell proliferation, induced apoptosis, and caused G1/S phase cell cycle arrest in ALL cells. Mechanistically, NAM induced DNA damage whereas Tenovin-6 induced autophagy, suggesting that different SIRTs might mediate the effects of the inhibitors on ALL cells through distinct pathways. These results allude to the therapeutic potential of SIRT inhibition for treating ALL.

Our internal representation of the external world is based on patterns of neural activity in our cortex. These patterns are profoundly influenced by inhibitory neurons. The most numerous class of inhibitory neurons in the cortex express parvalbumin (PV+). The function of these neurons during active sensation is unknown. We sought to determine the role PV+ interneurons play in the cortical processing of the sense of touch in the mouse whisker system. Mice sweep their whiskers back-and-forth to detect, locate and identify objects, much like humans use their fingers. Furthermore, many aspects of cortical circuits that process touch are conserved across mammalian species, including mice and humans. We addressed how PV+ neuron activity shapes the activity patterns in primary somatosensory cortex (S1) associated with whisker-object contact and whisker-mediated object localization. We recorded whisker motion and object contact with 1ms precision, calculated sensory input, and correlated these variables spiking patterns in S1 neurons. We then optogentically silenced PV+ interneuron activity in the whisker representation of S1 during object localization and compared how the encoding of sensory and motor variables differed between these two states. Finally, we linked these changes in neural activity to shifts in perception of object location. This revealed underlying computational mechanisms by which object location is perceptually constructed from neural activity in S1.
Understand Protease Resistance Using mRNA Display

Chenyu Wang

Richard W. Roberts, Viterbi School of Engineering

Submission Type: Individual

Category: Life Sciences

Format: Laboratory-based Research

Exhibit#: LS40

Abstract:
Peptides (small proteins, generally less than 30 amino acids) have several therapeutic advantages over common antibodies: they are cheaper, faster, and easier to produce and purify, and they generally do not require cold temperatures for storage. However, their current applications have been limited due to their instability in the presence of proteases and peptidases, naturally present in the human body. These enzymes can degrade peptides in a matter of minutes, leaving the peptides unable to reach their target to be effective. Understanding the rules governing the cleavage process of proteases and peptidases can significantly advance the field of peptide therapeutics. Previous studies of protease and peptidase activity required each peptide to be individually synthesized, purified, and tested. By combining high-throughput sequencing with mRNA display, we were able to simultaneously analyze the stability of millions of peptides against common proteases. We studied the cleavage patterns of chymotrypsin, trypsin, and proteinase K, proteases commonly used in biological research. Our preliminary results show clear cleavage activity bias of each protease, and we are able to identify particularly effective and ineffective substrates for each protease. Furthermore, our model successfully predicts the relative stabilities for peptides found in the literature. We plan to continue this project by using a larger randomized peptide library to further refine our analysis model, as well as by studying the cleavage activity of human serum.

Visualization of DNA Double Strand Break Repair in Heterochromatin Through In Vivo Fluorescent Imaging

Devika Das

Irene Chiolo, Biological Sciences, Dornsife College of Letters, Arts, & Sciences; Laetitia Delabaere, Postdoctoral Scholar; Taehyun Ryu, Molecular & Computational Biology; Brett Spatola, Molecular & Computational Biology

Submission Type: Individual

Category: Life Sciences

Format: Laboratory-based Research

Exhibit#: LS38

Abstract:
Heterochromatin is a large nuclear domain characterized by repetitive sequences. The abundance of repeated sequences can trigger massive ectopic recombination, and genomic instability during double-strand break (DSB) repair. These outcomes are leading causes of human diseases such as cancer, fertility disorders, and developmental defects. However, little is known about the mechanisms of DSB repair in heterochromatin. Chiolo et al. (Cell, 2011) previously discovered that heterochromatic double strand breaks (DSBs) start repair inside the heterochromatic domain but relocalize to the euchromatic space to complete repair by homologous recombination (HR). Most recent studies from the Chiolo lab revealed that these sites eventually relocalize to the nuclear periphery to continue repair (Ryu et al, submitted). In these studies, the heterochromatin-associated HP1a protein was used as a live marker for the heterochromatic region as opposed to heterochromatic DNA sequences. Furthermore, DSBs were induced by ionizing radiation, which introduce DSBs at
both euchromatic and heterochromatic sites. My work aims to generate more specific tools for studying heterochromatin repair by: 1) fluorescently labeling repeated DNA sequence in heterochromatin with the recently developed TALEN sequences (359-2 TALE-light) and 2) inducing a DSB in a specific heterochromatic sequence with site-specific endonucleases. With these new tools, we will be able to characterize repair in heterochromatic regions more specificity, using powerful live imaging techniques. Using these tools, we will visualize and track heterochromatic repair foci as the heterochromatin becomes more dynamic and repair sites reach the nuclear periphery to undergo successful repair.

§§§§
Abstract:

While large earthquakes play important roles in the geodynamic and topographic evolution of active mountain belts, the links between earthquakes and the carbon cycle remain unclear. Occurring in the steep Longmen Shan range at the eastern Tibetan Plateau margin, the 2008 Mw7.9 Wenchuan earthquake triggered over 60,000 co-seismic and post-seismic landslides. These landslides mobilized large amounts of organic carbon from vegetation, soil and bedrock, and provides a natural experiment that allows us to examine the influence of seismic events on the organic carbon cycle. This project aims to characterize organic carbon transport after the Wenchuan earthquake, in the context of the steep Longmen Shan topography and the earthquake-triggered landslides. Following a source-to-sink sampling strategy, we collected samples from landslide deposits, river bedload, and a downstream reservoir, capturing the route of organic carbon from landslides to the reservoir. For characterizing the compositions of the organic carbon, we decarbonated samples and analyzed for δ13C, %Corg, and %N. To constrain the potential variation of organic carbon across different grain sizes, we also analyzed grain size-separated samples. Here we report the preliminary results on the organic carbon compositions and sources, providing initial insights into links between earthquakes and the carbon cycle.

Citizen Science with the EPIcenter and Quake-Catcher Networks: Promoting Seismology Research and Activities in Free-Choice Learning Venues

Abstract:

The Quake-Catcher Network (QCN) is a collaborative initiative for developing the world’s largest, low-cost strong motion seismic network by utilizing sensors in and attached to internet-connected computers. Managed by Stanford University and the United States Geological Survey (USGS) Pasadena Field Office, the Quake-Catcher...
Network (QCN) seeks to form the world’s largest strong-motion seismic network by empowering individuals with software to improve earthquake monitoring, earthquake awareness, and the science of earthquakes. QCN uses low-cost seismic sensors to record data in real-time on volunteer computers and engages participants in authentic science. The primary goal of this project was to develop a pilot program to facilitate the installation and marketing of the QCN sensors for research and broader impacts activities in venues that provide free-choice learning opportunities. To facilitate this, members of the Earthquake Country Alliance (ECA) Education and Public Information Center (EPIcenter) Network – whose commitment is to encouraging earthquake and tsunami preparedness by demonstrating leadership in risk-reduction and education – have taken part in this endeavor, thus forming the joint QCN-EPIcenter Seismic Network. As of now, there are more than 130 free-choice learning institutions participating in the QCN-EPIcenter Seismic Network, including museums, schools, and universities throughout California, Oregon, Washington, and Alaska. With the growing number of participants, a higher resolution of earthquake seismicity can be analyzed. Various promotional and informational products have been developed to encourage the growth of the Network, including flyers, stickers, installation guides, activity guides, and a website in the works.

Title: Cobalt Dithiolene-like Metal Organic Surfaces for Efficient Hydrogen Evolution

Name(s): Joseph Yoo

Project Sponsor(s) and Collaborator(s): Andrew Clough, Chemistry, Dornsife College; Courtney Downes, Chemistry, Dornsife College; Smaranda Marinescu, Chemistry, Dornsife College

Submission Type: Individual

Category: Physical Sciences & Engineering

Format: Laboratory-based Research

Exhibit#: PS17

Abstract:
Cobalt dithiolene species, among the most efficient catalysts for hydrogen evolution reactions, were synthesized into metal-organic surfaces using trinucleating conjugated ligands. Benzenehexathiol and triphenylenehexathiol were reacted with cobalt (II) at a liquid-liquid interphase in order to produce a stable film, which upon analysis via powder x-ray diffraction (PXRD) and x-ray photoelectron spectroscopy (XPS), supported the presence of cobalt bisdithiolene complexes.

Electrochemical studies, via cyclic voltammograms, showed a separation of oxidation and reductive peaks, which is indicative of surface level redox reactions. This current steadily increased as the pH of the solution was lowered, and was confirmed to be solely from the film by repeating the experiments on bare electrodes and obtaining negligible current. These complexes do not tend to decompose to form active heterogeneous materials as experiments in pH 1.3 solutions of H₂SO₄ and 0.1 M KNO₃ did not lead to significant current after being rinsed and transferred to a clean solution.

The current development is to synthesize one-dimensional metal-organic wires, which would be done via dinucleating conjugated ligands such as 1,4 diamino 2,3,5,6 tetrathiophene and 4,5,9,10...
tetrathiol pyrene. These species are desirable to study for the open positions that may be further modified to alter ligand environments, allowing for the optimization of overpotential and the possibility of functionalization to align wires via a condensation reaction, or possibly add a photosensitizer to directly couple photocatalysis.

§§§§

Exhibit#: PS27
Category: Physical Sciences & Engineering
Name(s): Francisco Romero
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): James Gibson, Ming Hsieh Department of Electrical Engineering; Shrikanth Narayanan, Ming Hsieh Department of Electrical Engineering
Format: Laboratory-based Research
Title: Computational Methods for Predicting Therapist Empathy in Motivational Interviews

Abstract:
In the United States alone, over 10 million people are treated for psychotherapy each year; however, the treatment methodology and state of the art has remained unchanged for several years. We are interested in developing and evaluating methods for quantifying the language use of mental health experts to determine how it affects their perceived efficacy. One measure for determining therapist efficacy is empathy. This construct attempts to capture the degree to which the therapist understands the patient’s perspective. We hope to gain novel insights into this domain by developing computational methods for evaluating empathy from therapist language use. We compare two methodologies for this task. The first, term frequency-inverse document frequency (tf-idf), is a numerical method that estimates the most salient words in the conversational transcripts. We use these features to classify high versus low levels of empathy in each session with a support vector machine (SVM) classifier. Second, we used n-gram language models (LMs) built by the SRI language modeling toolkit (SRILM) to obtain probability distributions for each word used in the conversation. We then evaluate the level of therapist empathy in each session by computing the probability that the therapist language was generated from either the high or low empathy LM. Our results show the tf-idf technique to be more accurate for empathy classification than the n-gram models. We further improved the n-gram’s classification accuracy by increasing the n-gram order. Beyond classification, the conversational transcript feature extraction gives indication of the language related to empathy and the word choice used in empathy-rich conversations.

§§§§

Exhibit#: PS07
Category: Physical Sciences & Engineering
Name(s): Taylor Clarkin
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Stacey Finley, Biomedical Engineering
Format: Laboratory-based Research
Title: Computational Modeling of the Fibroblast Growth Factor 2 Signaling Pathway

Abstract:
Fibroblast growth factor 2 (FGF2) induces angiogenesis via binding to its receptors and initiating intracellular signaling. Angiogenesis is the formation of new blood vessels from pre-existing vessels, and is vital for processes in the body such as wound healing. However, when uncontrolled, it also plays a role in deadly diseases, particularly cancer. Potential exits to control angiogenesis via promoting or interrupting the binding of FGF2 to its receptors; however, the details involving FGF2 interactions are not well understood.
We have created a computational model of FGF2 signaling to better understand the dynamics of FGF2 binding, and the impact of inhibiting this factor on angiogenesis.

The model includes interactions between FGF2 and its receptors, as well as promoters and inhibitors of FGF2-receptor binding. Six promoters exist in the model that increase and strengthen binding of FGF2 to its receptors. In addition, there are three inhibitors included in the model that block binding of FGF2 to its receptors. The balance of these promoters and inhibitors is what ultimately controls the amount of angiogenesis. The model was written using the Simbiology toolbox in MATLAB, based on biochemical reactions and parameter values from experimental data.

The model predicts the concentrations of 74 species. We are particularly interested in the levels of free (unbound) FGF2 and other soluble species. Given the lack of data regarding the secretion rates of FGF2 and its inhibitors and activators, we performed parameter sensitivity studies to match experimentally determined concentration values. Our model accurately predicts the concentration of free FGF2 in normal tissue and blood. The model provides more detailed insight into the interactions between FGF2 and other soluble factors and the impact on FGF2 receptor binding. We can apply the model to study ways of enhancing or diminishing FGF2 binding beyond normal ranges to thus increase or decrease angiogenesis.

---

Exhibit#: PS20  
Category: Physical Sciences & Engineering  
Name(s): Natalia DaSilva  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s): Lynn Swartz Dodd, Archaeology and Religion, Dornsife College  
Format: Laboratory-based Research  
Title: Conservation of Native American Sacred Sites: Analysis of Damage to Rock by Laser Removal of Graffiti  
Abstract:

Laser ablation is a method—internationally accepted by art conservators—used to clean rock surfaces, which includes the removal of graffiti paint from Native American sites in the USA. My research focuses on the damage that laser ablation can cause.

Eight years ago, USC students used a Nd:YAG laser in the first harmonic to ablate graffiti paint from local California rocks. They did so to better understand if laser ablation was the best way to clean local Native American sacred sites that were being vandalized.

It is my job to assess whether the lasers left any physical or chemical damage to the rock. Knowing this is important; many tribes allow this method of conservation to be used mainly because they have been told that ablation does not damage the natural rock surface.

I am testing for damage using a SEM and EDAX. Together, I use them to look for abnormalities and changes in the rock both before and after ablation. Likewise, I focus on areas of rock that were discolored by the laser to see what kind of damage—if any—was done.

This work is important because it provides documentation of the efficacy and limitations of a technique that could potentially cause irreparable harm to
heritage resources around the world. Not only would that be detrimental to preservation efforts, but also to the people groups who still revere the objects as sacred.

§§§

Exhibit#: PS29  
Category: Physical Sciences & Engineering  
Name(s): Xinyu Yi  
Submission Type: Individual

Project Sponsor(s) and Collaborator(s):  
Massoud Pedram, Ming Hsieh Department of Electrical Engineering; Yanzhi Wang, Ming Hsieh Department of Electrical Engineering  
Format: Laboratory-based Research  
Title: D Flip-flop Design Exploration Using 7nm Deeply-scaled FinFET Devices

Abstract:  
Moore’s law has forecasted the scaling trend of integrated circuit design for about 40 years and research is now focused on driving the smallest possible transistor size with each new technology generation. The new multi-gate device technology, known as FinFET technology, is preferable to bulk CMOS counterparts due to their enhanced energy efficiency, better ON/OFF current ratio and voltage scalability, the reduction of short-channel effects that limit scalability, and the elimination of random dopant fluctuation due to the absence of channel doping. It is generally perceived by major semiconductor vendors (e.g., Intel, IBM, TSMC) that the FinFET technology will replace conventional CMOS at 14nm technology node and beyond.

Flip-flops are the main building blocks of the sequential logic of a state-of-the-art microprocessor. Therefore, designing robust FinFET-based flip-flops with high performance and low power consumption is of crucial interests for future computer systems. The performance of a flip-flop is characterized by several important timing parameters, such as setup time, hold time, clock-to-Q delay, etc. For instance, the setup time is the minimum time the input data must be valid before the clock triggering edge, and the hold time is the minimum time the input data should be held steady after the clock triggering edge. It is desirable that a flip-flop has both small setup and hold times, so that the pipelined processor would be more resilient to process variations and stage timing violations.

In this investigation, I have characterized and analyzed the above-mentioned timing parameters using HSPICE, an accurate circuit simulation engine, for five representative flip-flops designed with 7nm FinFET technology by varying the data input slew rate and the clock slew rate. The most suitable flip-flop structure has been determined through this investigation process.

§§§

Exhibit#: PS11  
Category: Physical Sciences & Engineering  
Name(s): Karl Heyer  
Submission Type: Individual

Project Sponsor(s) and Collaborator(s):  
Farzad Jalali-Yazdi, Chemical Engineering; Richard W. Roberts, Chemical Engineering  
Format: Laboratory-based Research  
Title: Developing the Next Generation of Cancer Diagnostics

Abstract:  
Over the last three decades, the field of cancer diagnostics and therapeutics has advanced significantly, in no small part due to the development of antibody reagents. Antibodies are able to recognize their target of interest with a high level of specificity and affinity. Peptide ligand can mimic antibodies, while offering several advantages over them such as cost or ease of generation and storage. Here, our goal is to develop a peptide ligand to use in an
antibody-free diagnostic assay for HDM2, a protein implicated in many cancers such as non-small cell lung cancer, breast cancer, esophageal cancer, leukemia, and melanoma. We used mRNA display, an in vitro peptide evolution technique, to select peptide ligands against HDM2. We used a two-step selection process to create an enriched library of ultra-high affinity peptides with sub-nanomolar dissociation constants (Kd). First a randomized short peptide library (9 amino acids) was enriched for binding to HDM2. The enriched library was then extended on either end by another 9 random amino acids and further selected for HDM2 binding, creating ultra-high affinity 18 amino-acid ligands. We have characterized the ultra-high affinity peptide library and are currently testing individual members of the library, identified by high-throughput DNA sequencing, for affinity and specificity. We hope to combine our peptide ligand with a peptide ligand already identified for this molecule in order to develop a selective and highly sensitive immunoassay for HDM2.

§§§§

Exhibit#: PS16
Category: Physical Sciences & Engineering
Name(s): Elyse Kedzie
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Travis J. Williams, Chemistry; Jeff Celaje, Chemistry; Yao Lu, Chemistry
Format: Laboratory-based Research
Title: Development of Reusable Catalyst for Hydrogen Generation from Neat Formic Acid
Abstract:
In this project we have introduced a new iridium catalyst for the dehydrogenation of formic acid, a prospective hydrogen storage medium. Formic acid is an inexpensive, nontoxic, easily handled liquid that can be generated from carbon dioxide, making it a feasible carbon-neutral storage method. Our iridium-based system is the first example of formic acid dehydrogenation without the use of other solvents or formic acid-amine adducts. It proceeds with near perfect selectivity and can be re-used without regeneration through multiple cycles. Because of its reusability and its ability to dehydrogenate formic acid with an unprecedented turnover number of 2,000,000, this catalyst proves to be incredibly robust. While many solutions are known for formic acid dehydrogenation, this is the only one with the mild conditions, high selectivity, and tolerance of high formic acid concentrations with low catalyst loading. This research has involved characterizing the reactivity of the catalyst and identifying the mechanism through which it works. The group will continue researching the potentials of this system, including improving the catalyst’s reactivity and addressing broader applications, such as use of the catalyst for converting carbon dioxide to methanol, acetyl compounds, and acetone. These applications would make this catalyst system carbon-neutral and, therefore, very attractive both economically and environmentally.

§§§§

Exhibit#: PS03
Category: Physical Sciences & Engineering
Name(s): Heidi Homma, Kim Luong
Submission Type: Group
Project Sponsor(s) and Collaborator(s):
Orlando Delpino Gonzales, Mechanical Engineering, Viterbi School of Engineering; Veronica Eliasson, Mechanical Engineering, Viterbi School of Engineering
Format: Laboratory-based Research
Title: Effect of Solid-Fluid Interaction on Crack Propagation of PMMA
Abstract:
The purpose of this project is to analyze the crack propagation of PMMA due to transferred stress waves in a water
environment by fluid-solid interactions due to impedance mismatch between the impacting solid and water. PMMA samples with cutouts of varying shapes such as rectangular and logarithmic spiral, will be impacted by a projectile launched from a pressurized air gun to examine the transferred stress waves from the water to PMMA. Previous experiments studied projectile impact onto a water-filled pipe where the resulting pipe deformation due to the wave generated by impact and the pipe was studied. However, there is not much detailed analysis on the dynamic behavior of fluid-filled cracks subjected to impulsive loading.

The samples will be submerged in water, where a projectile from the air gun will impact a piston inside the water-filled aquarium. This project will determine whether this form of fluid-solid interaction will be able to transfer stress waves into the samples to cause fracture with the presence of a notch. For the cut-outs, a logarithmic spiral shape and rectangular shape will compare the correlation between the shapes and the amount of energy transferred to cause fracture.

The experimental setup consists of a pressurized air gun, PMMA samples, and a high-speed visualization system. We will use high-speed photography to capture the crack propagation. When the bullet impacts the material, a crack advances down the sample and deflects the light which forms a caustic, or a dark spot where light in the plane is deflected around the crack tip. By measuring the size and speed of the caustic, along with strain gauge verification, we can interpret some characteristics of the crack growth such as its speed and stress intensity.

---

**Exhibit#:**  PS21  
**Category:**  Physical Sciences & Engineering  
**Name(s):**  Richelle Tanner  
**Submission Type:**  Individual  
**Project Sponsor(s) and Collaborator(s):**  Lisa Collins, Environmental Studies, Dornsife College of Letters, Arts and Sciences  
**Format:**  Analytical Paper  
**Title:**  The Effects of Urban Heat Island and Climate Change in California Cities  
**Abstract:**  
With its temperate climate and water availability, California plays a disproportionality important role in food production for the US. Agriculture output in California generated $44.7 billion dollars in 2012 and supplied 40% of US fruits, nuts, and table foods. Climate change and the urban heat island effect threaten to destabilize California climate, thus impacting food security for the nation. The impacts of urbanization on climate are realized as the urban heat island (UHI) effect and measured by comparing temperatures in metropolitan areas with temperatures in rural areas in close proximity. With such megalopolises as the Greater Los Angeles and the Bay Areas, the UHI effect was expected to play a large role in the change in California climate over the last century. Instead, the UHI effect was not present in the majority of CA cities surveyed (37.5%). Instead, climate change was present in 100% of the significant samples. Samples were divided into four climatic regions: coast, desert, mountain, and valley. Mountainous cities experienced the least change in overall climate, reflecting the findings of the most recent IPCC report detailing the effects of altitude and topography on temperature ranges. Valley cities experienced the fewest instances of UHI (17%), which is often associated with rapid population change and development. Additional measurements indicate that the seasonality of heat days has not changed significantly.
over the last century; however, the frequency of heat days has increased in a majority of the sampled cities. As expected, cold days have declined with time (62.5% of the sample size). While findings from this study may seem intuitive, the effects of climate change in California for average and extreme temperatures are increasingly apparent and will influence CA agribusiness significantly.

§§§§

Title: Experimental Investigation of Passive Shock Wave Mitigation using Solid Obstacle Arrangements
Name(s): Jane Hong, Monica Nguyen, Robert (Bryce) Welborn, Dillon Wessing
Project Sponsor(s) and Collaborator(s): Veronica Eliasson, Aerospace and Mechanical Engineering
Submission Type: Group
Category: Physical Sciences & Engineering
Format: Laboratory-based Research
Exhibit#: PS04
Abstract: With its vast range in applications, especially in the defense industry, shock wave mitigation is an ongoing research area of interest to the shock dynamics community. Passive shock wave mitigation methods range from forcing the shock wave to abruptly change its direction to introduction of barriers or obstacles of various shapes and materials in the path of the shock wave. Obstacles provide attenuation through complicated shock wave interactions and reflections. In this work, we have performed shock tube experiments to investigate shock wave mitigation due to solid obstacles placed along the curve of a logarithmic spiral. Different shapes (cylindrical and square) of solid obstacles have been used. High-speed schlieren optics and background oriented schlieren techniques have been used together with pressure measurements to quantify the effects of mitigation. Results have also been compared to numeral simulations, and show good agreement.

§§§§

Exhibit#: PS13
Category: Physical Sciences & Engineering
Name(s): Lesley Chan
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Jongseung Yoon, Chemical Engineering
Format: Laboratory-based Research
Title: Fabrication of Bifacially Nanostructured Ultrathin Silicon for Enhanced Optical Absorption
Abstract: Precise control of light-matter interaction is critically important for many optical and optoelectronic devices. The ability to implement and engineer nanoscale structures on both surfaces of ultrathin semiconductor materials can be useful for numerous applications including solar cells, batteries, photodetectors, and others. In the present work, we developed a novel fabrication pathway to independently control nanostructured morphologies and optical properties of ultrathin silicon with the thickness of ~1.2 and 3.0 um at both front- and rear-surfaces. We used procedures of transfer printing to expose the bottom surface of ultrathin silicon membrane derived from silicon-on-insulator wafer, where hexagonally periodic nanohole arrays were formed by nanosphere lithography and dry etching. For front surface nanostructures, soft imprint lithography has been used. Optical properties of resulting bifacially nanostructured ultrathin silicon were also studied by the numerical modeling, where optimal designs of front- and rear-surface nanostructures to maximize the photon absorption were obtained.

§§§§
Exhibit#:  PS28  
Category:  Physical Sciences & Engineering  
Name(s):  Evan Brown  
Submission Type:  Individual  
Project Sponsor(s) and Collaborator(s):  
Aiichiro Nakano, Computer Science, Physics & Astronomy, and Chemical Engineering & Materials Science; Pankaj Rajak, Chemical Engineering & Materials Science; Chunyang Sheng, Chemical Engineering & Materials Science  
Format:  Laboratory-based Research  
Title:  Genetic Algorithm Optimization of Reactive Force Field Parameters in Molecular Dynamics Simulations  
Abstract:  
In the USC Collaboratory for Advanced Computing and Simulations, we run molecular dynamics simulations that yield new knowledge of the microscopic properties of materials with applications including solar cell and battery technologies. We use both classical and quantum mechanics based simulations because they excel in different areas. Classical simulations are less computationally intensive, and the largest simulations can have trillions of atoms while the kind of quantum simulations that we run can have a maximum of thousands of atoms. Quantum simulations are much more accurate, however, because individual electrons are modelled as opposed to individual atoms in the classical version. In Reactive Force Field (ReaxFF) classical simulations, the forces are calculated using force field parameters, and in this project, we sought to optimize these parameters to match the results of quantum mechanics based simulations. In order to do this, we used a genetic optimization algorithm where the “population” consisted of sets of parameters and the objectives were to match the numbers of different types of bonds in a “ground truth” quantum mechanics simulation. A “generation” in this genetic optimization consists of many ReaxFF simulations being run in parallel on different sets of parameters, and the sets of parameters evolve through the generations in order to more closely match the results of the quantum simulation. In this way, we attempt to improve the accuracy of classical simulations as much as is possible given their simple approximation of atoms. Future directions may include exploring methods of optimization other than genetic algorithms and running optimizations with much larger population sizes.

§§§§

Exhibit#:  PS02  
Category:  Physical Sciences & Engineering  
Name(s):  Jacob Beaudin, Alfredo (Freddy) Ramirez, Alejandro Schugurensky, Mathew Walsh  
Submission Type:  Group  
Project Sponsor(s) and Collaborator(s):  Najmedin Meshkat, Viterbi  
Format:  Analytical Paper  
Title:  Health, Safety, and Environment in Hydraulic Fracturing: Lessons from Recent Accidents  
Abstract:  
Accidents, incidents and unintended negative consequences attributed to the hydraulic fracturing (fracking) operation can cause financial and environmental damages, can harm the reputation of the operating company and sully the image of the entire industry. The (hydraulic fracturing) industry occupational fatality rate is 2.5 times higher than the construction industry and 7 times higher than general industry. There is a shared concern that the result of the November 4, 2014 referendum in Denton, TX, which banned fracturing primarily because of its adverse safety and environmental consequences, can transcend well beyond Denton’s city limits, can become a precedent-setter and affect the future of the entire unconventional oil and gas industry in the United States. In order to alleviate public concerns and again their
acceptance, sustainable shale industry in the US must operate in the safest and most environmentally conscious manner, using a proactive systems-oriented approach towards Health, Safety and Environmental (HSE) considerations.

In this project, thorough scrutiny of the hydraulic fracturing process has been used to decompose a typical fracking operation into steps. Simultaneously, we conducted a thorough literature search to examine recent fracking accidents and determined their respective stages of occurrence in the fracking process. By understanding when and how accidents occur on a hydraulic fracturing site through root cause analysis, we can determine where fracking operators need to strengthen their focus. This will make fracking safer for both people and the environment.

§§§§

Exhibit#: PS12
Category: Physical Sciences & Engineering
Name(s): Leah Tsui
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Andrea Armani, Mork Family Dept of Chemical Engineering and Materials Science; Victoria Sun, Mork Family Dept of Chemical Engineering and Materials Science
Format: Laboratory-based Research
Title: Lipid Bilayer Tethering Via a Protein-Ligand Bond
Abstract:
The lipid bilayer is the universal basis for cell-membrane structure. Lipid molecules in cell membranes are amphipathic and phospholipids are the most abundant membrane lipids, where they have a polar head group and two hydrophobic hydrocarbon tails. In the Armani Research group, an optical sensor was developed in 2012 which allows study of the behavior of lipid membranes as they self-assemble and diffuse on the sensor's microscopic silica ring. Eventually this would allow for the development of a microlaser sensor that detects transport through passive channels. These self-supported lipid bilayers can be analyzed in real-time, by excitation of fluorescently labeled molecules. Investigation towards a protein-ligand bond that is expected to provide the necessary spacer between the substrate and a lipid bilayer is performed, thus allowing for sufficient space to have a protein be introduced to the lipid bilayer. This will be investigated through the following tasks: development of a multi-modal detection system, verifying adhesion of a tethered lipid bilayer via biotin-streptavidin linkers, and incorporating different types of proteins and analyzing passive versus active transport.

Bilayer fluidity with single-molecule diffusivity measurement will be confirmed using Total Internal Reflection Fluorescence Microscopy (TIRFM). In addition, resonant cavity excitation will be employed to generate an evanescent field, which is performed by coupling a tunable 633 nm laser to the sensor using a tapered optical fiber. There will be biotinylation of the substrate (which is the solid surface to which a bilayer is adhered to) followed by a wash in streptavidin. Then our prepared liposomes will be incubated with the substrate and FRET/FRAP measurements taken. Tethered lipid bilayers have been shown to facilitate lipid fluidity and allow sufficient space for protein insertion in the membrane. Various proteins can be incorporated into the lipid bilayer, which could allow for an analysis of passive versus active transport.

§§§§
Abstract:
There is a great deal of data on the internet but it is difficult for a person sort through all of it to find the most relevant and interesting information about a topic. To address this problem, we have developed an application called LODStories that allows people to explore the semantic web in a more human-friendly way. We focus specifically on the data in the Linked Open Data cloud, using databases such as DBpedia and information from the Smithsonian Art Museum which has been mapped to a similar ontology. The application allows people to learn about various topics and their connections while also constructing interactive multimedia stories. LODStories uses text from DBpedia, images from the Google Search API, and videos from the YouTube API to allow users to create an educational video that can then be saved and shared. A machine learning algorithm that was applied to rank the most interesting connected topics and natural language processing techniques are used to ensure the data collected about the topics are in a human-readable format. LODStories helps turn the great deal of information on the internet into an easily accessible, shareable, and interactive format to engage and educate users. By turning information into multimedia stories, LODStories makes the semantic web a source for a variety of educational uses.

§§§§

Exhibit#: PS23
Category: Physical Sciences & Engineering
Name(s): Krista McPherson, Ryan Meier
Submission Type: Group
Project Sponsor(s) and Collaborator(s):
Thomas Jordan, Earth Sciences, Dornsife College
Format: Laboratory-based Research
Title: Loma Prieta Near You Earthquake Simulations

Abstract:
The 2014 Class of the Undergraduate Studies in Earthquake Information Technology (UseIT) program at the Southern California Earthquake Center (SCEC) created visualizations using the Southern California Earthquake Center Virtual Display of Objects (SCEC-VDO), an object-oriented, open source, visualization software for demonstrating complex earthquake science concepts. This team of undergraduates created eighteen visualizations of possible seismic events between a magnitude of 6.9 and 7.1 in the Northern California region that could be similar to the magnitude 6.9 Loma Prieta earthquake of 1989. These visualizations were created using the Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3) fault model. For the selected earthquake scenarios, the team computed ShakeMaps displaying peak ground acceleration (PGA) utilizing the Open Source Seismic Hazard Analysis (OpenSHA), an earthquake software application Scenario ShakeMap, and displayed them in SCEC-VDO. This provided insight as to which faults posed the greatest hazard in particular regions. Earthquake scenario data from ShakeMap was then implemented into Hazard United States (Hazus), which allowed the generation of population and building exposure models utilizing the capabilities of ArcGIS spatial data analysis. The visualizations were developed in conjugation with the Northern California United States Geological Survey (USGS) and can now be
viewed publicly on their website along with downloadable ShakeMaps and Hazus calculations for each scenario. These products are a demonstration of the capabilities of the UCERF3 model as well as a tool, which can be used to educate the public about local earthquake hazards.

§§§§

**Exhibit#:** PS14  
**Category:** Physical Sciences & Engineering  
**Name(s):** Samuel Kushner-Lenhoff  
**Submission Type:** Individual  
**Project Sponsor(s) and Collaborator(s):** Andrea Armani, Chemical Engineering and Materials Science  
**Format:** Laboratory-based Research  
**Title:** Low-threshold integrated red microlaser from samarium-doped silica  
**Abstract:**  
The development of a silica microtoroid with close to unprecedented circulating photon lifetimes laid the groundwork for low threshold micro-lasers integrated on a silicon chip. These devices are able to build up optical circulating powers approaching 100 Watts. The present work uses this ability to achieve microwatt lasing thresholds for samarium rare-earth ions doped in silica. Using a pump wavelength of 409nm, narrow linewidth lasing peaks were observed at 552nm, 590nm, and 636nm. The ultra-low thresholds achieved for samarium lasing in silica are unprecedented. This project is part of a larger series of works aimed towards developing the background necessary for achieving ultraviolet (UV) lasing in silica.

Previously, UV lasing capabilities were explored for cerium ions doped in silica, and attempts were made to pump this rare earth dopant with thulium ions through an upconversion process. However, no UV lasing was observed. Another potential upconversion lasing candidate that was identified was praseodymium. Several different sol-gel combinations with praseodymium were made including samples doped with different concentrations of pure praseodymium, samples co-doped with praseodymium and thulium and samples doped with praseodymium and aluminum isopropoxide (AIP). Problems in making the AIP doped sol-gels due to contamination from atmospheric water were present initially, but eventually were overcome by keeping the samples in an isolated environment (a glove box). Fourier Transform Infra-red (FTIR) spectroscopy was used to ensure that silica matrices were still being formed in the presence of various dopants.

Altogether, this project is pushing the boundaries of lasing microdevices and pioneering new ground in the field of microlasers which will make cost effective integrated microlasers a reality for the future.

§§§§

**Exhibit#:** PS08  
**Category:** Physical Sciences & Engineering  
**Name(s):** Libanos (Libby) Redda  
**Submission Type:** Individual  
**Project Sponsor(s) and Collaborator(s):** Stacey Finley, Biomedical Engineering  
**Format:** Laboratory-based Research  
**Title:** Mechanistic computational model of promoters and inhibitors of muscle mass in prostate cancer  
**Abstract:**  
PGC1α4 is a transcriptional coactivator that regulates the muscle growth promoter IGF1, while also inhibiting the muscle growth inhibitor myostatin. Due to these effects, there is a largely positive net impact on boosting muscle growth. Thus, PGC1α4 is an ideal target for therapies aiming to reverse muscle loss. Androgen Deprivation Therapy (ADT) is widely used in the treatment of prostate cancer patients, and
approximately 45% of men are given this therapy within the first year of diagnosis. ADT is effective in terms of decreasing tumor growth that is fueled by testosterone, but decreasing testosterone levels also has significant consequences, namely in the form of cachexia. Cachexia, the loss of skeletal muscle mass, is experienced by 80% of patients with advanced cancer, leading to death in 20% of the cases. Our group seeks to investigate this prevalent issue with a comprehensive computational model that includes important targets for protein synthesis and degradation. We will use the model to quantify changes in muscle growth in response to PGC1α4-induced modulation of IGF1 and myostatin.

The present model contains 115 species and 171 reactions and builds upon existing computational models. The novelty of our work is the great mechanistic detail encompassing a wide breadth of chemical reactions involving both IGF1 and myostatin. Previous models only include fragments of the larger pathway that we have created, but by assembling smaller models and utilizing additional kinetic data, we have constructed an unparalleled model of muscle regulation pathways. The model predicts the concentrations of extracellular factors and intracellular signaling species.

In summary, the unprecedented scope of our model will allow for an enhanced understanding of muscle growth mechanisms that can boost the quality of life and improve the prognosis for patients battling cancer and many other illnesses.

§§§§

**Exhibit#:** PS25  
**Category:** Physical Sciences & Engineering  
**Name(s):** Ziyu Ouyang, Yu Chuan Shan  
**Submission Type:** Group  
**Project Sponsor(s) and Collaborator(s):** Kyohyouk Kim, Spatial Sciences Institute; John Wilson, Spatial Sciences Institute  
**Format:** Creative Work  
**Title:** Modeling 3D Campus And Visualizing Indoor Routing  
**Abstract:**

The purpose of this project is to help people make better routing decisions by providing a reality-based 3D model of USC University Park campus. Geospatial technology developed rapidly since it entered the public eye in the late 20th century, as it has brought revolutionary influence on everyday transportation. Nowadays the demand for assistance to travel indoor is also becoming more and more significant due to the increased complexity of building structures. However traditional applications for geospatial technologies such as GPS and GIS can only provide environment visualization in 2D, which is insufficient for indoor traveling that often involves navigations between different surfaces. Therefore we are combining GIS software with CityEngine, a modeling application that can generate large-scale building models and virtual cities, so as to transform 2D data into 3D models. This project involves three phases. The first is the data collecting period. We collected building footprint data (CAD) from USC Facility Management Services and took photos for the visible exterior of every building on Campus. Then geographic information values are assigned to the CAD files of each construction in ArcGIS in order to align them on the location. Then among those closed-polyline features in every CAD file, relevant polylines are selected as geometry for the building. During the last phase georeferenced CAD file is imported into CityEngine, where the built-in
programming language CGA (Computer Generated Architectures shape grammar) will be applied to generate basic 3D models. And then we will add textures cropped from the photos we took to the building and make it identical with the real construction as much as possible.

§§§§

Exhibit#: PS30
Category: Physical Sciences & Engineering
Name(s): Xinkai (Casey) Chen, Cesar Hernandez, April Nishinaka, Shawn Rhoads, Sophia Singh, Yifei (Luke) Yang
Submission Type: Group
Project Sponsor(s) and Collaborator(s): Stephen Pinkerton, Physics and Astronomy, Dornsife College of Letters, Arts, & Sciences; Edward Rhodes, Physics and Astronomy, Dornsife College of Letters, Arts, & Sciences
Format: Analytical Paper
Title: New Estimates of the Speed of Sound in the Outer Solar Interior
Abstract:
We present new estimates of the speed of sound in the outer portion of the interior of the Sun that are systematically different than the predicted sound speeds in the so-called “standard model” of the Sun. We will demonstrate that these new sound-speed estimates are closer to the predictions of a non-standard solar model over much of the solar convection zone than they are to the predictions of the standard model. We have obtained these new sound speed estimates using the techniques of global helioseismology. Specifically, we have inverted a new table of the frequencies of the solar p-mode oscillations that we computed from a new set of averaged solar power spectra. This new set of power spectra was based upon 72 consecutive days of observations obtained using the Helioseismic and Magnetic Imager experiment on NASA’s Solar Dynamics Observatory spacecraft during mid-2010. We generated this table by applying a new version of our program that fits the peaks in averaged power spectra. We also used this new program to simultaneously estimate the formal uncertainties in these frequencies. We went on to identify the outlying frequencies in our new table and we replaced these outliers with re-fitted frequencies. We then employed a helioseismic inversion program to convert these frequencies and their uncertainties into estimates of the solar internal sound speed. The fact that our sound-speed estimates agree better with a theoretical solar model that includes turbulent pressure throughout the solar convection zone suggests that an improved standard solar model needs to be generated that includes this pressure in a more-systematic manner in order to reduce the discrepancies we have found with the current standard solar model.

§§§§

Exhibit#: PS10
Category: Physical Sciences & Engineering
Name(s): Forrest Zhang
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Travis J. Williams, Department of Chemistry
Format: Laboratory-based Research
Title: Orally Available "Sticky" MRI T1 Contrast Agent for Diagnosis of Gastric Motility Disorders
Abstract:
The aim of our research is an “MRI Pill” consisting of an orally available MRI T1 contrast agent for the stomach, which will visualize GERD (gastroesophageal reflux) and gastroparesis (delayed gastric emptying). These diseases affect tens of millions of Americans. Our solution provides value through a fast, high resolution, and simple diagnostic tool for gastrointestinal primary care physicians and surgeons. Unlike current diagnostic
methods, our solution avoids the use of radioactive technetium and thus the associated availability issues. The pills contain a gadolinium-based MRI contrast agent that is masked within the pill until it is delivered into the stomach. Once arrived, the pill casing degrades in the low pH of the stomach, thus releasing and activating the gadolinium contents. MRI imaging will then indicate the motion of the contrast agent through the GI and indicate the exact degree of GERD while revealing anatomical details of the GI track. Preliminary data collected in the Williams (Dornsife) and Chang (Keck/CHLA) groups has shown the utility of the MRI pill for gastric emptying in a rat model.

The contrast agent used in the pill will be functionalized to allow selective and reversible cross-linkage to the mucosal membranes of the larynx and esophagus. This modification will enable membrane retention and thus enhanced sensitivity for the detection of gastroesophageal reflux. We believe that this will have utility both as an improved approach to characterizing gastroparesis, whereas the MRI pill surpasses existing nuclear medicine technology both in anatomical resolution and safety, and in the rapid identification of GERD, whereas it can enable rapid, initial screening at the level of the general practitioner.

§§§§

Exhibit#:  PS18  
Category:  Physical Sciences & Engineering  
Name(s):  Thomas Do  
Submission Type:  Individual  
Project Sponsor(s) and Collaborator(s):  
Alon Chapovetsky, Chemistry; Smaranda Marinescu, Chemistry, Dornsife College of Letters, Arts & Sciences  
Format:  Laboratory-based Research  
Title:  Proton Assisted Reduction of CO\textsubscript{2} by Cobalt Pyridine Amino Macrocycles  
Abstract:  

A series of amine bridged calix[4]pyridine cobalt complexes (CoPy\textsubscript{4}(NR)\textsubscript{4}\textsuperscript{2+}, where R = H, Me, Allyl) were synthesized and studied for catalytic activity for the reduction of CO\textsubscript{2}. Single Crystal X-Ray diffraction shows a saddle-like geometry, with the bridging amine groups pointing outwards. This geometry has been noted to be suitable for CO\textsubscript{2} reduction, because CO\textsubscript{2} is within hydrogen bonding distance from the amines. These secondary sphere elements are thought to stimulate enzyme like pendant proton relays to be used to capture CO\textsubscript{2} and assist with proton coupled electron transfer during its reduction. These complexes were studied using cyclic voltammetry, under inert atmosphere and CO\textsubscript{2}, in the presence and absence of protons. All complexes showed reactivity towards CO\textsubscript{2} reduction. CoPy\textsubscript{4}(NH)\textsubscript{4}\textsuperscript{2+} was determined to be the more active catalyst of the complexes, with bulk electrolysis showing a Faradaic Efficiency of $\eta_{CO2} = 100\% \pm 10\%$ with high TOF. CoPy\textsubscript{4}(NMe)\textsubscript{4}\textsuperscript{2+} and CoPy\textsubscript{4}(NALlyl)\textsubscript{4}\textsuperscript{2+}, however, were found to be less active towards CO\textsubscript{2} reduction and more prone to decomposition, due to exo-protonation of the ligand to the metal.

§§§§

Exhibit#:  PS05  
Category:  Physical Sciences & Engineering  
Name(s):  Christopher Dougherty, Ryan Miller  
Submission Type:  Group  
Project Sponsor(s) and Collaborator(s):  
Veronica Eliasson, Aerospace and Mechanical Engineering, Viterbi School of Engineering; Gauri Khanolkar, Graduate Collaborator  
Format:  Laboratory-based Research  
Title:  The recreation of a unique shrimp’s mechanically induced cavitation bubble  
Abstract:  

...
The Alpheus heterochaelis, appropriately nicknamed the “pistol shrimp”, possesses an oversized claw that creates a cavitation bubble upon rapid closure. The implosion of this bubble results in a shock wave that can stun or even kill the shrimp’s prey (Versluis et al., 2000). Additionally, the implosion is so violent that sonoluminescence may occur. This light implies extreme temperatures, which have been recorded to reach as high as 10,000 K (Roach, 2001). By developing an analogous mechanism to the oversized claw, the goal of this experiment is to verify that cavitation can be produced similar to that of the pistol shrimp in nature as well as to analyze the resulting shock wave and sonoluminescence. High-speed schlieren imaging was used to observe the shock dynamics. Furthermore, results on cavitation collapse and light emission will be presented.

---

**Title:** Self-Intersection Number for Closed Loops on the 3-Punctured Sphere

**Name(s):** Cameron Thieme

**Project Sponsor(s) and Collaborator(s):** David Crombecque, Mathematics, Dornsife College of Letters, Arts, & Sciences

**Submission Type:** Individual

**Format:** Analytical Paper

**Exhibit#:** PS31

**Category:** Physical Sciences & Engineering

**Abstract:**
The homotopy classes of closed curves on a topological space form a group called the fundamental group. The fundamental group of the 2-punctured plane is free on two generators where each generator is a simple closed loop around a puncture; we will denote these generators by a and b. In this project, we address the problem of finding the minimum number of self-intersections of closed curves of a free homotopy class in the 2-punctured plane.

In 2010, Chas, M., & Phillips, A. provided a bound for the minimum possible number of self-intersections of any element in the group. Although this bound is powerful because of its generality, often it is also very wide. In this research project, I constructed algorithms that establish tighter upper bounds for two types of elements of the fundamental group:

1) For elements composed of only the two generators (and not their inverses), all of which take the form $a^{a_1}b^{b_1}a^{a_2}b^{b_2}...a^{a_n}b^{b_n}$, the self intersection number is bounded by

$$\Sigma_{i=1}^{n}((2i - 1)(a_i + b_i - 2) + n - 1).$$

2) For elements of the form $(a^sb^t)^n$ the self intersection number is bounded by $$(1/2)(s + t)(n^2 + n) - n^2 + n - 1.$$ where $n, s, t$, and all $a_i$ and $b_i$ are positive integers.

Additionally, for elements of type (2), I provide a proof that the bound is tight; that is, the algorithm provides a curve with minimal self-intersection.

---

**Title:** Standardized Organic Carbon Analysis for Geological and Modern Timescales

**Name(s):** Renée Wang

**Project Sponsor(s) and Collaborator(s):** Joshua West, Earth Sciences, Dornsife College

**Submission Type:** Individual

**Format:** Laboratory-based Research

**Exhibit#:** PS19

**Category:** Physical Sciences & Engineering

**Abstract:**
I tested and refined a method for measuring organic carbon concentration (%OC) and the stable isotope ratio ($\delta^{13}$C) of OC in sedimentary rocks. Organic carbon in sediments plays an important role in carbon cycle mass transfer, and OC preserved in sediments deposited in the
past records information about the carbon cycle throughout Earth’s history (from 100s to millions of years). Despite vital information to be gained from measuring %OC and $\delta^{13}C$, existing methods are known to have shortcomings and alternative methods have not been carefully defined. In general terms, there are three main analytical difficulties: 1) Total carbon content in sediment samples is a sum of organic carbon plus carbon in carbonate minerals (C_{carbonate}). C_{carbonate} must be removed prior to $\delta^{13}C$ analysis (a process called “decarbonation”). 2) C_{carbonate} can be removed by acid dissolution, but if conditions are too strong, OC itself usually starts dissolving, biasing results. 3) The preparation process can unintentionally add carbon to our samples, i.e., contribute a methodological blank that also will bias results. Liquid-phase decarbonation with weak acid (e.g., 1M HCl) has been used previously but is known to lead to OC loss in solution. I chose an alternative method based on heated vapor-phase acidification. This method has been used in some prior studies but not widely tested. I designed a blank test and initially found high C blanks levels. I refined the method to reduce blanks and then tested the refined method on a large sample set of river sediment from the Andes. I found good agreement with prior results using liquid decarbonation. These results show that vapor phase treatment is a viable technique that may lead to less OC loss than liquid phase treatment, though the length of vapor phase treatment can affect the amount of OC loss and must be carefully considered.

§§§§

Exhibit#: PS01
Category: Physical Sciences & Engineering
Name(s): Matthew Austin, Howard Gil, Marina Robson
Submission Type: Group
Project Sponsor(s) and Collaborator(s):
Woonhoe Kim, Sonny Astani Department of Civil and Environmental Engineering; Pirbazari, Sonny Astani Department of Civil and Environmental Engineering; Xinyuan Zheng, Sonny Astani Department of Civil and Environmental Engineering
Format: Laboratory-based Research
Title: Sustainable Power Generation Using Integrated Wetland Sediment and Microbial Fuel Bioreactor (WS-MFC) Technology
Abstract:
The purpose of this research was to observe and monitor the power production of microbial fuel cells under varying chemical and biological configurations. Sediment samples for all of the microbial fuel cells constructed during research were taken from the Sepulveda Basin Wildlife Reserve and the Ballona Wetlands Marsh. A total of eight bioreactors were prepared and examined in pairs in order to determine the maximum power production, with one serving as the control and the other having the experimental variable. The first bioreactor pair examined the effect of adding E. coli cultures to the native microbial population. Another pair of reactors examined the effect of the addition of powdered activated carbon to the anode graphite electrode. The next bioreactor pair was designed to observe the difference between using an activated carbon anode and a carbon felt anode. The last bioreactor pair compared the effects of added cultures of Geobacter and Shewanella strains and its effect on energy output. All resulted in favorable voltage output, which would be enough to power various low voltage temperature sensors and data transmissions.
The simplicity of this project means it will lend itself well to deployment in both developing and developed countries. The Democratic Republic of Congo (DRC) is an ideal candidate because of the vast availability of wetlands along the Congo River. The WS-MFB is a low cost, low maintenance device that will continue generating energy as long as the microbial colony continues to thrive. The materials required to establish the WS-MFB are cheap and easily accessible, another reason why it would be well suited for a developing country like the DRC.

§§§§

Exhibit#: PS06
Category: Physical Sciences & Engineering
Name(s): Ruben Espana, Alaina George, Marissa Gustavson, Troy Herrera-Rice, Samantha Minnich, Alyssa Naritoku
Submission Type: Group
Project Sponsor(s) and Collaborator(s): Jill McNitt-Gray, Biological Sciences and Biomedical Engineering; Travis Peterson, Biomedical Engineering; Grace Privett, Biomechanics Garage Project; Chris Ramos, Biomedical Engineering; Antonia Zaferiou, Biomedical Engineering
Format: Field Research
Title: Techniques used by Uni- and Bi-lateral Amputee Paralympic Sprinters to Generate Horizontal Impulse and Regulate Balance during Sprint Starts

Abstract:
Maintaining balance while generating force is an essential concern for populations with balance impairments—especially for people with lower limb amputations. Elite level Paralympic athletes must regulate reaction forces in a balanced position during the extremely demanding task of leaving the blocks in the sprint start. Being in a position to exert a horizontal force on the ground is a priority in this task. In this study, we compared and contrasted techniques used by uni- and bi-lateral Paralympic athletes to generate horizontal impulse during the sprint start. These results served as the basis for providing feedback to Paralympians during a training camp at the Olympic Training Center in Chula Vista, CA. Data was collected on the first steps of Paralympic sprinters with force plates (1000 Hz) and side video (240 Hz). Uni- (n = 3) and bi-lateral (n = 2) lower limb Paralympic sprinters participated. Magnitude and direction of the reaction forces (RFs) were analyzed during the first three steps of the sprint start. Video was analyzed (Kinovea) and combined with resultant RF data in a custom Matlab program to link kinetics and kinematics. Bi-lateral amputees had longer contact time with the ground on each step. Unilateral amputees averaged ~0.155 seconds of ground contact duration, while bi-lateral athletes had ~0.25 seconds of ground contact duration. The peak RF for bi-lateral amputees occurred at ~ 0.16 seconds, whereas the peak RF for unilateral amputees occurred at ~0.08 seconds. The time from peak force to last contact in all sprinters is similar. The bi-lateral amputees had a longer contact time, leading us to believe they are spending more time coordinating the balance than their unilateral amputee counterparts. Understanding balance and techniques in the sprint start task will improve athletic performance as well as provide insight for all populations aiming to improve balance.

§§§§

Exhibit#: PS15
Category: Physical Sciences & Engineering
Name(s): Connie Li
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Jonathan Kuo, Biomedical Engineering; Ellis Meng, Biomedical Engineering; Kee Scholten, Biomedical Engineering
Format: Laboratory-based Research
Title: Thermocompressive Bonding of Parylene C and SU-8
Abstract:
The use of Parylene C and SU-8 photoresist is prominent in the fabrication of microfluidic devices. Current uses of the bonding of such polymers include the creation of SU-8 and Parylene microchannels as well as wafer level packaging of integrated circuits. The aforementioned processes exclusively utilize Parylene to Parylene bonding or SU-8 to SU-8 bonding. While there exists literature addressing such bonding between the same polymer, scarce to no literature addresses the bonding of Parylene to SU-8. Through this project, we propose to characterize the novel idea of SU-8 to Parylene bonding using thermocompression techniques that lead to polymer entanglement at the interface, resulting in a bond. The proposed method to bond the two polymers, Parlyene C and SU-8 is a hybrid of protocols adapted from the bonding process of Parylene to Parylene and SU-8 to SU-8. Testing parameters will be at the cross section of the ideal parameters known to work for same-polymer bonding. Through preliminary testing, we have established a general trend regarding the temperature and pressure at which the bond is formed, in addition to characterization of a lower limit for possible bond strengths relative to the surface area of bonding. With a successful characterization of SU-8 to Parylene bonding, these techniques may be accessible and exploitable for those working on micromachining and the development of microfluidic devices.

Exhibit#: PS09
Category: Physical Sciences & Engineering
Name(s): Brian Shaw
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Paul Macklin, USC Center of Applied Molecular Medicine - Department of Medicine
Format: Analytical Paper
Title: Using a Branch Growth Algorithm to Generate Virtual Hepatic Lobules

Abstract:
Colorectal cancer metastases that grow in the liver are poorly understood, which impedes the treatment and prevention of further metastases. To increase our knowledge, in silico experiments of metastases can be simulated in digitally modeled liver tissue. However, developing anatomically accurate models generally requires high-resolution imaging and sophisticated image processing, both of which are difficult, costly, tedious, and sometimes impossible.

We developed a branching algorithm with a simpler alternative: we manually annotate gross macroscopic structures in the liver histology—central veins, portal veins, portal arteries—and then use an agent-based model to computationally “grow” a sinusoid network that mimics the anatomic structures. Over the past year, we refined and simplified the model until it could create complex vascular structures quickly on a laptop or desktop computer. By reducing the complexity of agent behaviors, gradient calculations, and image processing, the newest model can simulate the entire vasculature at faster computational times and higher resolutions.

After defining rules for agent behaviors, the algorithm seeds agents in an oxygen gradient predetermined by a given lobule histology. Next, these agents trace out sinusoid branches based on interactions
with oxygen, suppressor signal, and repellent signal gradients. Rules governing the agents include agent chemotaxis plus the proliferation, activation, and inactivation of migrating agents. We use a generalized reaction-diffusion solver to calculate all substrate gradients and their release in the network. The current branching algorithm can now simulate hundreds of thousands of agents within 10 minutes of computational time.

We present several typical networks that emerge from varying rules and parameters, including patterns that qualitatively match liver lobules. This work is an important step towards building anatomically realistic liver tissues without using other expensive imaging and image processing techniques. Future directions for this work include adding hepatocytes and using a mechanics-based model to update the cells’ positions.

§§§§
Title: The Association Between Impulsivity and Willingness to Smoke is Mediated by Current Behavioral Addictions in Never Smoking Adolescents

Abstract:
BACKGROUND: Previous literature indicates that impulsivity increases risk of smoking and engagement in non-drug addictive behaviors in adolescents. Here we further investigated the potential relationship between impulsivity, engagement in behavioral addictions (e.g., problematic gambling, online and offline gaming, exercise), and willingness to smoke in adolescent non-smokers. METHOD: In this cross-sectional study, high school students in the Los Angeles area (N=2045; 55% Female; Mean age=14.1) who reported no prior history of smoking experimentation completed self-report surveys measuring impulsivity, willingness to try cigarettes given the opportunity, and a range of non-substance behavioral addictions. We conducted mediation analyses to test the hypothesis that adolescents with greater self-reported impulsivity would report greater willingness to smoke, and that this relationship would be mediated by the number of non-substance behavioral addictions. RESULTS: As predicted, there was a significant total effect association from impulsivity scores to willingness to smoke (β=0.087, p < 0.001, CI [0.057, 0.117]), indicating that more impulsive adolescents reported greater willingness to smoke cigarettes if given the opportunity. Additionally, this association was mediated by the number of self-reported behavioral addictions (significant indirect effect: β=0.003, p = 0.12, CI [0.001, 0.007]). DISCUSSION: Non-smoking adolescents with higher levels of impulsivity reported greater willingness to smoke and this was mediated by non-substance related behavioral addictions. These findings suggest that non-substance related behavioral addictions may account the risk of tobacco use initiation in the future carried by impulsivity, perhaps because behavioral addictions may be a marker of general addiction propensity that is yet to extend to substances of abuse until after early adolescence. Given that behavioral addictions could manifest during adolescence well before smoking initiation, behavioral addictions should be considered as a potential early indicator of future tobacco use and should be addressed in tobacco use prevention in impulsive teenagers.
Abstract:
Objective: Using a Latent Semantic Analysis of course syllabi to identify educational outcomes associated with the course.

Methods: A search algorithm was applied to 30 syllabi for the USC School of Pharmacy 2014-2015 academic year. The algorithm determined which of 235 ACPE outcomes a course covered. We determined appropriate thresholds for outcome identification based on comparing the results with a faculty survey.

Results: The specific thresholds identified outcomes as introductory, reinforcing, and proficient. A reinforcing outcome was a key subject matter of a course. The search algorithm reproduced the faculty survey data for outcomes with 63.3% sensitivity and 62.6% specificity. A similar analysis at the standards (a group of outcomes) level yielded 58.1% sensitivity and 51.6% specificity.

Conclusions: The LSA may potentially replace faculty survey data for curriculum mapping. This saves faculty time, provides real time updates on the curriculum and allows finer control in delivery of the curriculum.

§§§§

Exhibit#: SS37
Category: Social Sciences
Name(s): Alexa Smith, John (Andrew) Clark, Margaret (Magalie) Carey
Submission Type: Group
Project Sponsor(s) and Collaborator(s):
David Black, Keck School of Medicine Department of Preventive Medicine
Format: Field Research
Title: Benefits of the Use of Wellness Resources by USC Students
Abstract:
Stress is the #1 impediment to academic success at USC. This is evident every year in the NCHA/ACHA survey distributed among students by the Office for Wellness and Health Promotion (OWHP). However, there are an abundance of resources including the Engemann Student Health Center—OWHP, Counseling Services, Center for Women & Men, Residential Life, Academic Support Services, USC Libraries and so many more to help students cope with this stress. The question is: do students know about and use these resources appropriately? If used wisely, these resources could change the face of stress at USC. Students in HP 300 tackled this problem with help from their peer research assistant for their topic coming up with many ways to change the climate of stress and anxiety on this campus. Many groups surveyed students in order to understand perceptions of various health behaviors, came up with solutions through creating a specific health intervention, and were connected with numerous resources to work with in order to ensure plausibility of their ideas. This resulted in many ideas to increase student wellness by exploring the benefits of student resource utilization.

§§§§
The United States Census Bureau (2014) reports that the population of older Americans will grow at an unprecedented pace over the next forty years, increasing from 40 million to 84 million. While the burgeoning population of older adults in the US has enormous contributory potential as volunteers, mentors, and grandparent caregivers, many pundits argue that older individuals have no social value. Unfortunately, the popular media abounds with negative portrayals of older adults as a societal burden. An important but as yet unexplored empirical question in gerontology is whether negative versus positive messages regarding older adults’ social value can impact health and well-being. The present experiment tested the effects of negative versus positive social value priming on older adults’ cognitive and physical functioning. A pilot sample of 51 participants (ages 55—85) were randomly exposed to a mock news article containing a portrayal of older adults as either a societal resource (positive prime) or a societal burden (negative prime). Participants were then asked to complete post-exposure assessments of verbal memory performance and gait speed in order to evaluate the respective impact of the priming manipulation on cognitive and physical performance. Standard ordinary least squares multiple regression and analysis of variance tests were used to evaluate these effects. Results revealed that those exposed to the negative prime recalled 3 fewer words on average than those exposed to the positive prime ($B = -2.978; \beta = -0.289; p = 0.013; d = 0.54$). There were no significant differences in gait speed between those exposed to the negative versus positive primes. These pilot results suggest that exposure to negative messages regarding older adults’ social value may be particularly damaging for cognitive function. The public health significance of this finding is underscored by the profound impending growth of the older adult population in the US.
the Los Angeles Family Case Management Gang Intervention programs. The clients are either active gang members, affiliated gang members or at risk youth who are associates of gang groups. This study examined the relationship between self-differentiation, gang identity and violent behavior among participants these intervention programs in Los Angeles over a twelve-month period. These gang desistance programs are part of a comprehensive Gang Reduction And Youth Development Program in the city of Los Angeles. This study asked two questions: 1) How is self-differentiation related to gang social identity (defined as emotional and behavioral commitment to the gang)? 2) How is self-differentiation related to involvement in violent and criminal activities? We predict that self-differentiation, a concept borrowed from family systems theory, will prove to be a powerful influence on both of these.

§§§§

Title: Cognitive-Affective Correlates of Generative Activity: Potential for a Giver’s High?

Name(s): Cristina Gago

Project Sponsor(s) and Collaborator(s): Molli Grossman, Davis School of Gerontology; Tara Gruenewald, Davis School of Gerontology

Submission Type: Individual

Format: Analytical Paper

Abstract:

Generativity is defined by positive, socially contributive actions, and has been shown to be associated with better physical and psychological well-being over time. While previous research has demonstrated this link between generative activity (or self-perceptions of generativity) and improved well-being, the mechanisms linking these factors remain relatively unknown. Theories of prosocial behavior suggest social connectedness, self-enhancement (e.g. pride, and confidence), and general positive emotionality pathways may serve as mechanisms underlying these associations; however, there has been little empirical examination of these proposed associations.

The current study utilizes daily data collected through the National Study of Daily Experiences, a sub-study of the National Survey of Midlife Development in the U.S. (MIDUS), to investigate the cognitive-affective correlates of generative activity. Additionally, the study explores whether an individual’s perceived level of generativity has the potential to moderate the strength of the proposed well-being outcomes.

Individuals with greater average levels of volunteering experienced higher daily levels of social connectedness (B=.381, p=.000) and positive affect (B=.303, p=.000). On volunteer days, they also reported greater social connectedness (B=.038) and self-enhancement (B=.036). Similarly, on days when individuals gave unpaid assistance, they felt greater social connectedness (B=.051, p=.002) and self-enhancement (B=.036, p=.018), compared to their average. Individuals’ self-perceived levels of generativity were not found to significantly moderate these relationships.

Greater daily generative engagement, in the form of volunteering and unpaid assistance, is associated with enhancements in daily positive affect, self-enhancement, and social connectedness states. Findings suggest potential mechanisms through which generative activities may hold the potential to positively influence well-being over time.

§§§§
Research illustrates that parenting styles play a significant role in how family members process community violence exposure. Despite widespread acceptance of the benefits of effective parenting, little research has been conducted to investigate the predictive factors of parenting behaviors. Therefore, this study explores the relation between community violence exposure and parenting style, as defined by parental monitoring and emotional attunement. This study also investigates the idea that spousal support of one's partner's parenting style, or an effective coparenting alliance, could moderate the negative relation between community violence exposure and parenting style.

162 ethnically and racially diverse families completed surveys as part of a larger longitudinal study. Exposure to community violence was assessed by parent responses to a modified version of the Survey of Children's Exposure to Community Violence (Richters & Saltzman, 1990). A 14-item coparenting questionnaire was used to measure three aspects of coparenting: cooperation, conflict, and triangulation (Margolin et al., 2001). Children completed an 85-item questionnaire and parents completed a 35-item questionnaire that assessed parenting style.

A negative main effect relationship did not exist between community violence exposure and parenting style. However, father's overall coparenting score moderated the relation between mother's community violence exposure and mother's monitoring, $\beta = -.208, p < .01$. Father's overall coparenting score also moderated the relation between mother's community violence exposure and mother's attunement, $\beta = -.246, p < .01$. A direct relationship was observed between mother's monitoring levels and father's coparenting scores within low violence communities. Conversely, an inverse relationship was observed between mother's monitoring levels and father's coparenting scores within high violence communities. The same interaction effect existed when mother's attunement levels was the outcome variable.

Future research should explore the relation between child outcomes and parenting techniques as impacted by perceived levels of coparenting within high and low violence communities.

Burnout is a negative consequence of high workload in a stress-filled environment. The purpose of this research was to clarify the self-protective implications of the structural relations among burnout, empathy, and social and organizational support.

Burnout is a negative consequence of high workload in a stress-filled environment. The purpose of this research was to clarify the self-protective implications of the structural relations among burnout, empathy, and social and organizational support.
A research study. The data was obtained through self-reports from health professionals via an Internet-delivered questionnaire on burnout, neuroticism, empathy, and social and organizational support. The Maslach Burnout Inventory was used to assess the dimensions of burnout. Primarily, the study was focused on testing the moderating effects of neuroticism and empathy on the relations between burnout and social support. Lethargy was identified as the fourth component of burnout, in addition to the three Maslach dimensions of emotional exhaustion, depersonalization, and reduced sense of personal accomplishment. Health professionals with higher levels of perceived organizational support report less burnout. Social support conclusions were mixed and inconclusive. The interactions with dimensions of social support from a significant other, family, and friends and empathic concern reveal significance in predicting the dimensions of burnout. This current study extended the previous understanding of the relationship between social and organizational support and empathy. The study offers opportunity to intervene and mitigate burnout in health professionals.

§§§§

Title: Coping Among Military Adolescents: Effects of Mother-Adolescent Communication and Deployment-Related Stressors

Name(s): Corey Pettit

Project Sponsor(s) and Collaborator(s): Gayla Margolin, Psychology; Aubrey Rodriguez, Psychology

Submission Type: Individual

Category: Social Sciences II

Exhibit#: SS08

Format: Laboratory-based Research

Abstract: Adolescents in military families often manage situations specific to the military, such as the absence of a parent or frequent household moves, as well as normative stressors, such as cognitive and emotional developmental changes, that lead to elevated stress. The current study assesses the influence of military youths’ perceptions of military family life stress (MFLS), a possible stressor, and mother-youth communication, a possible resource, on their coping abilities. We hypothesized that increased MFLS would be associated with less constructive (i.e. active) coping. We also predicted that better mother-youth communication would be associated with more social support coping.

70 youth and their mothers participated in a home interview, in which they discussed their fathers’ service history and family experiences over the past five years and completed surveys about family relationships and coping. MFLS was assessed in two ways: (a) total duration of the service member’s deployment absences, and (b) number of important family life events the service member missed during deployments. Both mother-youth communication and coping were assessed through youth self-report measures.

Length of deployments and missed events were both negatively associated with youths’ active coping, and mother-youth communication quality was positively associated with social support coping.

Military adolescents report less active coping at higher levels of MFLS, perhaps because they perceive MFLS as a type of stress they are unable to cope with in a problem-focused way. Further research should assess whether reduced active coping with MFLS is associated with maladaptive outcomes for military youth, and should explore resources beyond the family that encourage military adolescents to use positive coping strategies.

§§§
Criminalization, Racialization, and Informality: Mexican Immigrant Labor Participation in the South Central and Compton Pallet Industry

Roxana Ontiveros

Pierrette Hondagneu-Sotelo, Sociology

Senior Honors Thesis

Abstract:
My research focuses on Mexican immigrant labor in the informal economy, with a case study of the pallet industry in South Central and Compton. First, it aims to describe the social organization of the pallet industry, as it has been under-researched. Secondly, it attempts to provide new insights on the relationship between Mexican immigrant labor and the informal economy, the latter which is defined as a part of the economy that occurs outside of government regulation and taxation (Richardson and Pisani 2012). I intend on explaining why and how it occurs through a series of 10 semi-structured interviews with pallet business owners and employees selected through judgment sampling.

Developmental Math and English Programs in Community Colleges

Haley Demian, Anoush Djrbashian

Tatiana Melguizo, Rossier School of Education; Federick Ngo, Rossier School of Education

Analytical Paper

Abstract:
Our study looked into the structures of developmental math and English programs in community colleges in California. We found that they varied significantly from college to college, with varying levels and requirements. Data was collected on the progression of students through these programs, again with great variance in terms of success rates.

Does spousal support provision exact a physiological toll in those with lower socioeconomic resources?

Adwight Risbud

Tara Gruenewald, Davis School of Gerontology; Diana Wang, Davis School of Gerontology

Laboratory-based Research

Abstract:
A substantial literature documents the benefits of receiving support for mental and physical health. A growing body of research also suggests benefits of providing support. However, caregiving research suggests that support provision may impair health. The health correlates of providing support may also depend on other individual and contextual factors, such as the resource level of the giver. The current project is designed to examine whether level of physiological dysregulation across multiple physiological systems in the body is linked to the provision of social support to a spouse and whether this hypothesized link varies in those with varying levels of socioeconomic status, as measured by educational attainment.

Analyses utilized data from the Biomarker Substudy of the second wave of data collection in the National Survey of Midlife Development in the U.S. (MIDUS). Social support provision was measured by a
survey of perceptions of giving support to one’s spouse among married participants. Multi-system physiological dysregulation, or allostatic load, was assessed as the level of physiological dysregulation in seven different physiological systems (sympathetic and parasympathetic nervous systems, hypothalamic-pituitary-adrenal axis, cardiovascular, lipid metabolism, glucose metabolism, and inflammatory immune activity) measured as the proportion of biomarker indicators for each system for which participant values fell into the highest risk quartiles of biomarker distributions. A multiple regression analysis controlling for age, sex, race, and health condition burden indicated no significant main effect of spousal support provision on level of allostatic load. However, education interacted with support provision in predicting level of allostatic load, such that greater support provision predicted higher allostatic load among individuals with lower educational attainment, while support provision did not predict allostatic load in the higher educated. The findings suggest that due to a lack of resources, lower SES individuals may be more burdened by giving social support to their spouses.

§§§§

Exhibit#: SS18
Category: Social Sciences II
Name(s): Steven Childress
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Jo Ann Farver, Psychology, Dornsife
College of Letters, Arts, & Sciences;
William Breland, Psychology, Dornsife
College of Letters, Arts, & Sciences
Format: Senior Honors Thesis
Title: Drinking to Create: The Creative
Benefits of Self-Enhancing Drinking
and Perceived Intoxication
Abstract:
Creativity has a positive impact on everyday life, including business, social life, and even the academic success of college students. Previous literature indicates that perceived intoxication may enhance creativity. The present study measured types of drinking styles and how those styles impact the effects of intoxication on creativity. The Alcohol Use Inventory (AUI) measured types of drinking styles. The study used two verbal creativity tests: the Remote Associates Test (RAT) measured convergent creative thinking and the Alternative Uses Task (AUT) measured divergent creative thinking. Thirty-six participants were randomly assigned to either a non-alcohol or alcohol-deception condition. The respective beverages were mixed in plain view and served before participants performed the creativity tasks. No drink (non-alcohol or alcohol-deception) contained alcohol. Participants in the alcohol-deception condition scored higher on average than those in the non-alcohol condition for every dimension of divergent creativity, although no difference was statistically significant. These findings, limited by the study’s small sample size, indicate perceived intoxication may reduce inhibitions, thereby facilitating creative expression. The study also found perceived drink strength and perceived social benefit of drinking significantly predicted each divergent creativity dimension, as those who drink for social benefits likely do so to reduce their inhibitions.

§§§§

Exhibit#: SS35
Category: Social Sciences II
Name(s): Caitlin Wilhelm
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Elsi Kaiser, Linguistics
Format: Laboratory-based Research
Title: Effects of Emotional and Cognitive Empathy: Boosting people’s perspective-taking abilities
Abstract:
When people speak of “empathy,” they often mean affective or emotional empathy - the ability to understand and feel another’s emotions. But there is also cognitive empathy, dealing with attribution of knowledge states to others. Given previous findings that these subtypes can be impaired or enhanced independently (e.g., autism generally correlates to a deficiency in cognitive empathy with no effect on affective empathy), it appears that these subtypes are underlyingly distinct (e.g., Rogers et al 2006; Blair 2007).

The current work builds on previous research in the USC Language Processing Lab, which investigated Free Indirect Discourse (FID) and how comprehenders engage in linguistically-motivated perspective-taking. Crucially, because FID shifts perspective from narrator to character without quotes or embedding (e.g. Mary looked at Lisa. Poor girl, she was sick), we manipulated comprehenders’ perspective-taking by using particular kinds of adverbs and adjectives. The current research extends this work by asking how non-linguistic perspective-taking can influence perspective-taking in a language-based task: Can priming with stories based around second-hand embarrassment (affective empathy) or lies/double bluffs (cognitive empathy) increase participants' likelihood of taking characters' perspectives?

Participants completed a perspective-taking task where they were first primed with a story that promoted affective empathy, cognitive empathy, or was neutral. In the testing phase, participants were asked to perform a perspective check, and then asked to answer questions about whether FID-cued sentences had affected their interpretations of ambiguous pronouns or choice of narrator-based or character-based perspective.

Our data suggest that, while cognitive primes are more likely to trigger FID perspective-taking than affective primes, both primes tend to have noticeable effects in non-linguistic perspective tasks. These results help to answer how empathy primes affect linguistic perspective, indicating that cognitive empathy may be more influential than affective empathy in determining how people will respond in linguistic perspective-taking tasks.

§§§§

Exhibit#: SS13
Category: Social Sciences II
Name(s): Angelica (Angie) Fullerton
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Laura Baker, Psychology, Dornsife College of Letters, Arts, & Sciences; Nicholas Jackson, Psychology, Dornsife College of Letters, Arts, & Sciences; Catherine Tuvblad, Psychology, Dornsife College of Letters, Arts, & Sciences
Format: Analytical Paper
Title: Effects of Head Injuries on the Developmental Trajectory of Impulsivity
Abstract:

Head injuries are the leading cause of death and disability for children and adolescents (Andrews, Rose, & Johnson, 1998; Rosenthal et al., 1998). There is a particular vulnerability to head injuries during development such that head injuries in childhood have been associated with cognitive, emotional, and behavioral impairments in adulthood. Specifically, head injury has been associated with behavioral changes such as impulsivity and antisocial behavior (Konrad et al., 2000; O’Keeffe et al., 2007). In fact, children and adults with head injuries have significantly higher levels of loneliness and antisocial behavior coupled with lower self-esteem and levels of adaptive behavior (Andrews, Rose, & Johnson, 1998; Taylor et al., 2002; Hanks et al., 1999). The current sample was drawn from participants in the
University of Southern California (USC) Risk Factors for Antisocial Behavior (RFAB) twin study. Impulsivity was measured by the errors of commission on a Go/NoGo behavioral task. Measures were taken at Wave 1 (ages 9-10), Wave 3 (ages 14-15), Wave 4 (ages 16-18), and Wave 5 (ages 19-20) of this longitudinal study. Self-reported head injury history was taken at Waves 3 and 5. Mixed effects linear regression models were used to examine the effects of head injuries in early childhood on the developmental trajectory of impulsivity. It was seen that those with and without head injuries showed decreases in impulsivity over time on the Go/NoGo task. However, those with early head injuries (prior to age 10) had significantly less of a decline in impulsivity relative to those without head injuries. Our findings indicate that early head injury may play a significant role in blunting the decline in impulsivity across development, perhaps exposing an additional risk factor for antisocial behavior.

§§§§

Title: Environmental Cues and Food Consumption
Name(s): Jennifer Chang
Project Sponsor(s) and Collaborator(s): Andrew Larsen, Psychology; Wendy Wood, Psychology
Submission Type: Individual
Category: Social Sciences II
Format: Senior Honors Thesis
Exhibit#: SS26

Abstract:
The need for an efficient dietary strategy has increased with the prevalence of overconsumption and obesity. Examining the environment, specifically controlling for plate size, has been commonly suggested as a dieting strategy, using smaller plates claimed to decrease consumption and aid in weight loss. The study examined plate size as a moderating environmental cue on snack food consumption, and how awareness of plate size effects and differences in the sizes of plates available will influence consumption at two different time points. The hypotheses for the study were: (1) large plates will lead to more consumption of snack foods than small plates at time 1, (2) there will be an interaction between plate size and awareness influencing consumption during time 2; those unaware of the conditions will show compensation at a subsequent time and for those aware, the effects of plate size will be enhanced, and (3) using a scale for externality to examine how participants are generally affected by the environment, those that have a higher externality score are predicted to be more influenced by plate size. Results were insignificant.

§§§§

Exhibit#: SS36
Category: Social Sciences
Name(s): Margaret (Magalie) Carey, John (Andrew) Clark, Alexa Smith
Submission Type: Group
Project Sponsor(s) and Collaborator(s):
David Black, Department of Preventative Medicine, Keck School of Medicine; Michael Li, Department of Preventative Medicine, Keck School of Medicine
Format: Field Research
Title: Evaluating a Sexual Consent Educational Intervention in a College Setting

Abstract:
Understanding sexual consent its complexities and what drives consensual behavior is currently evolving among young adults. The University of Southern California's Office for Wellness and Health Promotion (OWHP) has established a curriculum to augment students’ understanding of this topic to build sexual communication skills. The purpose of this study is to evaluate this intervention and to
assess current campus climate regarding student perceptions of what entails sexual consent and acceptable modes of establishing consent. Univariate analyses tested associations between sexual consent constructs at baseline and changes from pre to post intervention. Findings indicated that significant changes in attitudes and preferences for verbal consent were found immediately after the intervention. Our findings shed light on key components to address in college-based interventions for sexual consent promotion.

§§§§

Exhibit#: SS14
Category: Social Sciences II
Name(s): Lillie Moffett
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Henrike Moll, Psychology
Format: Laboratory-based Research
Title: Four Year Olds Recover Referents in an Ambiguous Communication Task
Abstract:
Little is still known about the development of referential communication in young children. In this study, 3 and 4 year olds were presented with a communication task in which two of four compartments in a shelf were visually occluded from the experimenter but not the child. Similar objects were placed in the compartments, differing only in size (i.e. big, middle, small; short, middle, tall etc.). There were three conditions; first, a pragmatic condition where the experimenter entered the room and told the child that they needed the X-est (i.e. biggest/smallest) object. Second, a prior engagement condition where the experimenter set up the objects with the child, then told the child that they wanted a X (big/small) object. And third, a visual condition where the experimenter told the child that they wanted them to pick the X-est object they, the experimenter, could see. Both age groups performed above chance in the pragmatic and prior engagement conditions suggesting that children can successfully consider an agent’s “need” as well as experiential knowledge during communication. However, both age groups performed worse in the visual condition although the four year olds’ performed significantly better than the three year olds. This illustrates that despite robust performance in visual perspective taking skills at this age, children fail to consider another’s visual perspective during ambiguous referential communication. The trend at age four suggests that this ability does begin to emerge around this age but further investigation is needed.

§§§

Exhibit#: SS01
Category: Social Sciences II
Name(s): Ariadne Lyon
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Karen Hennigan, Psychology, Dornsife College of Letters, Arts, & Sciences
Format: Senior Honors Thesis
Title: Friends or Family: A Study of Gang Identity and Criminal Behaviors
Abstract:
This research examined the connection between identity and behavior in adolescent Los Angeles gang members. Gang affiliation leads to adolescents increasing their participation in violent crime and dropping out of school at higher rates than adolescents not affiliated with gangs. Gang affiliation detrimentally affects the social development of adolescents and even after leaving the gang former members struggle with economic instability and continuing criminal involvement. The dimensions of gang identity and emotional ties (gang identity) and family emotional ties were measured using a survey created by Hennigan (2013) and administered to gang-involved youth as part of the Gang
Reduction and Youth Development Program (GRYD). The strength of gang versus family emotional ties, and the mediating variable of family involvement in a gang, were measured and hypothesized to have an effect on level of violent criminal acts committed by the gang member. It was expected that gang identity would be associated with higher levels of violent crime, while emotional ties to family would be associated with lower levels of violent crime. If the participant had family members who were in a gang, it was expected that a high level of family emotional ties would lead to high levels of violent crime. The hypotheses were only partially supported. Results showed that gang identification was correlated with higher reported levels of violent crime, and family involvement in a gang was correlated with higher levels of violent crime, as predicted. However, family emotional ties was also correlated with high reported levels of violent crime. Exploratory analyses found that family organization led to lower reported levels of violent crime, even when participants had family members involved in a gang. This research has applications for gang reduction and prevention.

### Abstract:
The success of performing a goal directed behavior can have serious implications. In some cases, like losing weight to reduce one’s risk of heart attack, success might be the difference between life and death. For this reason, previous research has focused on better understanding self-control, an essential component of long-term goal pursuit. Two pilot studies suggest that performing habitual behaviors do not require self-control and may actually increase it. To test this effect, the present study required participants to exert self-control on an initial task and then measured the effect of performing habits (vs. control or rest) on self-reported self-control and a stroop task. Results indicated increased state self-control for habit performance, rest, and no habit learning conditions after initial exertion of self-control, supporting the initial hypothesis. However, the control condition did not show the hypothesized self-control change pattern, preventing the attribution of increased self-control to habit performance or another factor. These findings indicate that further research should examine possible explanations for a positive increase in self-control following habit performance, but not through the use of this study’s initial self-control exertion task.
The prevalence of cell phones makes it difficult not to be distracted by others' conversations. In such 'halfalogues,' where only one side of a dialogue is overheard, how does the mind process the missing information? Or do we ignore it? Imagine that you overhear someone saying “I heard that Bob helped Tim move into his new apartment.” After someone responds (inaudible to you), the speaker says, “Oh wow, he did?” Would the overhearer try to guess who “he” is, and what the inaudible response was? Investigating these questions can shed light on debates regarding deep vs. shallow language processing.

Our halfalogues (like the example) mentioned two characters (e.g. Bob, Tim), so the pronoun ('he') was ambiguous. On some trials, there were two additional sentences about the subject (e.g. Bob) before the inaudible response, signaling that Bob is central/topical.

The study had three variants: The “neutral” group listened to halfalogues and answered a question probing who the final sentence was about, to measure pronoun interpretation. The “Guess” group guessed at the inaudible response, before answering the same questions. The “Recall+Guess” group did the same, and also had to retain a new letter sequence in memory during each halfalogue.

Results: The Neutral and Guess groups pattern alike: Both tend to interpret the pronoun as referring to the subject (e.g. Bob), especially when Bob is topical. This suggests people fill in the missing turn even if not required to do so. Strikingly, the Recall+Guess group show mostly chance-level performance in pronoun interpretation -- suggesting that the memory task impairs ability to attend to halfalogues.

It seems that the mind has a strong impulse to ‘fill in’ missing information. However, the memory-load results suggest this carries a cognitive cost, and may not occur if resources are limited.

§§§§

Title: Hispanic Scholarship Fund Consultation

Name(s): Jordan Furlong

Project Sponsor(s) and Collaborator(s): Marion Philadelphia, Marshall

Submission Type: Individual

Format: Field Research

Exhibit#: SS42

Category: Social Sciences

Title: Hispanic Scholarship Fund Consultation

Abstract:
Today, effective marketing requires depth and breadth of knowledge of digital media. The world is becoming more and more globalized to the point where the most cost efficient and instantaneous media of communication are through digital media. Whether these channels are through social media platforms (Facebook, Twitter, LinkedIn, etc.), TV, or even advertising campaigns in mobile apps, digital marketing has come and it is here to stay.

An organization like the Hispanic Scholarship Fund whose mission is to provide academic and professional finances and resources to the Latino community needs to carefully find what effective marketing looks like in their day to day marketing strategies. After an in depth analysis of their philosophy, budget, and practices in regards to marketing, my team and I determined more effective means for them to spread their altruistic message and resources.

§§§§
Exhibit#: SS30  
Category: Social Sciences II  
Name(s): Carolyn Windler  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s): Jesse Graham, Psychology, Dornsife College of Letters, Arts & Sciences  
Format: Senior Honors Thesis  
Title: How Purity Beliefs Impact Moral Judgments Regarding Vaccines  
Abstract: Vaccines require breaking the skin’s natural barrier to inject some form of unnatural or foreign antigen into the human body, a seemingly inherent purity transgression. However, little research has been done to examine moral implications on people’s beliefs about vaccines. This project investigates purity beliefs as predictive factors for vaccine ideology. Recruited from Amazon Mechanical Turk, 337 participants completed the purity subscale of the Moral Foundations Questionnaire and either read obituaries describing deaths due to vaccine complications, deaths due to vaccine-preventable diseases without vaccine reception, or natural deaths. Participants then self-reported the extent to which each death was morally wrong and disgusting. It was hypothesized that participants with high purity beliefs would perceive deaths due to vaccine complications as more morally wrong and more disgusting than participants with low purity beliefs, and the opposite would be true with deaths due to vaccine preventable diseases. It was expected that there would be no difference between individuals with high and low purity beliefs when reading about natural deaths. A MANCOVA revealed a significant effect of type of death on ratings of disgust when using purity as a covariate. Furthermore, correlational analysis revealed that high purity beliefs were significantly related to higher ratings of both moral wrongfulness disgust in the vaccine complications condition compared to the vaccine omission condition. Because of the importance of vaccinating children, and the lack of success of previous vaccine promotion interventions, this study is important in revealing possible moral underpinnings of vaccine ideology and providing background knowledge that can be used to create future interventions.

Exhibit#: SS43  
Category: Social Sciences  
Name(s): Luna White  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s): Pierrette Hondagneu-Sotelo, Sociology, Dornsife; Veronica Terriquez, Sociology, Dornsife  
Format: Senior Honors Thesis  
Title: Identity and Civic Engagement: Studying Civic Responsibility and Intersectional Political Awareness among South LA Youth  
Abstract: Many scholars study civic engagement, and several lay out models of paths to becoming a civically engaged individual. Jane Addams outlines a particularly helpful path to a holistically engaged person, a person who feels responsible to engage not only in non-political service but also in the political sphere. But this model, along with others, have an underlying bias that only allows for the examination of how wealthy, educated, white individuals might become engaged in this capacity. This research incorporates Intersectionality to illuminate other paths to this sense of civic responsibility, and what that might mean. Using data from 51 surveys and 6-10 interviews, this case study examines a youth group called South Central Youth Empowered through Action (SCYEA) which engages low-income Black and Latino high school students in South LA through political advocacy and education. This study shows that many of these students do in fact report a sense of civic...
responsibility, and cite their political and social education as reason for finding this sense of responsibility. This study also shows that the way that these students adhere to this sense of civic responsibility is closely linked to the ways in which they were politicized during their participation at SCYEA.

§§§

Exhibit#: SS16
Category: Social Sciences II
Name(s): Wendy Garcia-Nava
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Thomas D. Lyon, USC Gould Law School
Format: Senior Honors Thesis
Title: Interviewing Children: Effects of Question Type and Case Characteristics on Children’s Disclosure of Sexual Abuse

Abstract:
A large body of theoretical and applied research has investigated the developmentally appropriate strategies for questioning young children about allegations of maltreatment. From this research, structured forensic interview protocols (i.e. NICHD, TenStep) have been developed, and serve as guidelines for legal professionals as to best practices when interviewing young victims and witnesses. These protocols include suggested questions to use in order to obtain disclosures from young children. However, there has been little research conducted on how these questions are used in practice, and the productivity of each question type while considering specific case characteristics (e.g., abuse severity). The present study explored the influence of question type and case characteristics on children’s disclosures in actual forensic interviews. One hundred and thirty-five transcripts of children, aged 3- to 16-years old were analyzed for disclosure question type, the leadingness of its content and case characteristics. Results supported previous research on the efficacy of open-ended questions but showed that open-ended questions are most effective when asked as “Tell me why” questions rather than “Do you know” questions. Therefore, the structure of an open-ended question can diminish its effectiveness and disclosure in children.

§§§

Exhibit#: SS24
Category: Social Sciences II
Name(s): Eun Ah Cho
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Tara Gruenewald, Davis School of Gerontology
Format: Laboratory-based Research
Title: Investigating the Effect of Consistent Engagement in Leisure Activities Over Time on Cardiovascular Function in Older Adults

Abstract:
Leisure activities are defined as volitional activities that older adults enjoy in their free time which are hypothesized to promote better mental and physical well-being through both direct and stress-buffering mechanisms. Leisure activities are typically categorized into four domains: cognitive, physical, social, and generative. We hypothesized that older adults who consistently engaged in leisure activities over a decade-long period would have a healthier profile of cardiovascular function, under both resting and challenge conditions. The current analyses utilize data from the first two waves of the national Study of the Midlife Development in the U.S. (MIDUS), a longitudinal, epidemiological investigation of the psychosocial and behavioral factors that affect healthy aging. Leisure activity data from the first and second wave of the MIDUS Study was used to construct decade-long patterns of physical, social and
generative activity. These activity patterns were examined as predictors of cardiac vagal tone assessed in a Biomarker Substudy conducted at the second MIDUS wave. Cardiac vagal tone, as indexed by high frequency heart rate variability (HF HRV), is an indicator of the parasympathetic nervous system regulation of the heart, and an important predictor of cardiac and other forms of health. Cardiac vagal tone measures included both resting and cognitive challenge recovery measures of HF HRV. Results indicate that only consistent generative (volunteer) activity was associated with greater resting levels of HF HRV. However, analyses of HF HRV recovery from cognitive challenge indicate that the magnitude and/or time to full recovery was better in those with greater levels of each form of leisure engagement over the preceding decade. Promoting sustained engagement in leisure activities in older adulthood may act to bolster older adults' ability to recover physiologically under challenging conditions and promote better overall health as a result.

§§§§

Exhibit#: SS09
Category: Social Sciences II
Name(s): Shivanti Kariyawasam
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Tara Gruenewald, Davis School of Gerontology
Format: Analytical Paper
Title: Is it better to be curious, conscientious, or clever? Adolescent personality and intellectual predictors of life course socioeconomic and psychological well-being.

Abstract:
Creativity has been linked to better socioeconomic and mental and physical well-being outcomes in adulthood and is increasingly viewed as a crucial skill for adapting to our complex and rapidly changing environment. Ingenuity, defined as the quality of being clever, original and inventive, addresses the practical applications of creativity to everyday life. Other individual factors, such as personality traits, may also play a critical role in navigating life's challenges and shaping goal-directed behavior. Of the Big Five Personality traits, conscientiousness has been linked to the accomplishment of tasks and goals, while openness to experience is consistently associated with creativity. This study looks at how potential educational, mental and physical well-being benefits of creativity/ingenuity may be moderated by the individual attributes of the person putting them to use. Analyses utilize data from Project Talent, a longitudinal study of over 300,000 American high school students which began in 1960. Ingenuity or creative problem-solving ability and personality were assessed when participants were in high school. Educational attainment and psychological (life satisfaction) and physical (self-rated health) well-being were examined at an 11-year follow-up in over 80,000 cohort members and at a 50-year follow-up in a small subset of cohort members. We hypothesized that greater ingenuity, conscientiousness and openness would predict better educational and psychological and physical well-being outcomes in young and later adulthood and that ingenuity and personality would positively interact in the prediction of better adult outcomes. Results indicate that greater ingenuity, conscientiousness and openness to experience predicted higher levels of educational attainment and greater life satisfaction and self-rated health in adulthood. However, personality factors did not interact with ingenuity to predict educational and well-being outcomes. Findings suggest that both early life creative ability and personality may operate to promote educational success and well-being across the adult life course.
Exhibit#: SS56
Category: Social Sciences
Name(s): Krystle Irvine
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Susan Enguidanos, Davis School of Gerontology; Jaclyn Portanova, Davis School of Gerontology; Jae Yoon Yi, Davis School of Gerontology
Format: Laboratory-based Research
Title: It Isn't Like This on TV: Revisiting CPR Survival Rates Depicted on Popular Television Shows
Abstract:
Television portrayal of life-saving interventions such as cardiopulmonary resuscitation (CPR) can perpetuate unrealistic expectations about the success of extraordinary measures. Nearly two decades ago, a study of CPR in popular television shows found that the high rates of successful CPR depicted did not reflect the reality of clinical cases. In recent years, education and communication around life sustaining interventions has been enhanced. The purpose of this study was to assess the accuracy of CPR portrayed by current popular media. Additionally, we sought to examine discussions about care preferences in medical television shows. Two popular medical dramas airing between 2010-2011, Grey’s Anatomy and House, were independently coded by two trained research assistants. Patient characteristics, survival rates, and goals of care discussions were recorded. CPR was depicted 46 times in the 91 episodes. Grey’s Anatomy depicted immediate survival after CPR as 68.6% while House had a 72.7% survival rate. Among those who experienced immediate survival, more than half of the patients (71.9%) survived to hospital discharge and 15.6% died before discharge. Advance directive discussions only occurred for two patients, and preferences regarding code status (8.7%), intubation (6.5%) and feeding (4.3%) seldom occurred.
Our study found that, combined, both shows inaccurately portrayed the immediate survival CPR rate at 69.6% compared with actual rates of 36.8%. We found that popular medical dramas provide viewers with an overly optimistic view of CPR outcomes and little opportunity for vicarious learning through observation of care preference discussions.

Exhibit#: SS46
Category: Social Sciences
Name(s): Tyler Tokunaga
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Elizabeth Fife, Viterbi School of Engineering
Format: Analytical Paper
Title: Japanese Smartphone Manufacturing and Strategic Agility
Abstract:
This paper examines the failure of Japanese mobile phone manufacturers in the mobile phone market after the emergence of smartphones. This paper overviews the smartphone market, then examines the case of Japan. It finds that current theories do not sufficiently explain the difficulty Japanese firms face. It uses a literature review of studies of firms attempting to adapt to technological change in the mobile phone market to pinpoint commonalities and differences between those firms and Japanese firms. This paper concludes that Japanese firms failed to recognize the importance of software and its ability to allow the user to quickly and easily upgrade their phone.

§§§
Exhibit#: SS34
Category: Social Sciences II
Name(s): Mary Hakimeh
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Jo Ann Farver, Psychology; Gayla Margolin, Psychology; Michelle Ramos, Psychology
Format: Senior Honors Thesis
Title: A Linguistic Analysis of Couples’ Communication and the Effects on Marital Satisfaction

Abstract:
Intimacy and the desire for close relationships are inherent in the human need to belong (Baumeister & Leary, 1995). How couples communicate is often indicative of their relationship satisfaction and the actual language used may be important. This study utilized linguistic analysis to examine couples’ use of positive and negative emotion words during a family problem-solving discussion and associations with relationship satisfaction. More positive emotion words were predicted to be related to high marital satisfaction, and more negative emotion words were predicted to be related to low marital satisfaction. An exploratory approach for a ratio of positive to negative words will also be used to identify whether a certain amount of positive words may override the effects of negative emotion words.

The current study examined 32 couples, a subset from a larger study of 103 families that examined the effects of family conflict on well-being. Couples were middle-aged [Wives M(SD)=41(4.9); Husbands M(SD)=43(5.3)] and ethnically and racially diverse. This study used data from a 3-4 hour laboratory visit where families completed a variety of questionnaires. The families then participated in a 15-minute problem-solving discussion about things they most want to see changed in the family. Discussion transcriptions were analyzed using Linguistic Inquiry and Word Count (LIWC; Pennebaker, Booth, & Francis, 2007) to count the number of positive and negative emotion words used by the couple. To measure marital satisfaction, couples completed the Dyadic Adjustment Scale (DAS; Spanier, 1976). Results showed that wives’ marital satisfaction was significantly associated with her expression of both positive (r=.34) and negative emotion words (r=.43), whereas husbands’ satisfaction was not related to emotion word usage. Findings suggest that marital satisfaction, at least for wives, involves the ability to express a range of emotions, including negative emotions.

§§§§

Exhibit#: SS20
Category: Social Sciences II
Name(s): Catherine Swaidan
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Tara Gruenewald, Davis School of Gerontology
Format: Field Research
Title: Living Canvases: An Intergenerational Life Review and Art Creation Program

Abstract:
Living Canvases is an intergenerational wisdom-sharing program designed to facilitate the sharing of elders’ life stories with young adults and the broader community. During three workshop discussions, elder participants chart their life stories and identify key turning points from their lives. Elders’ life stories are then translated into visual art form by young artists who receive the wisdom of elders’ life experiences through art creation. Life stories and the art the stories inspire are then shared with the larger community through a recognition reception, as well as in other exhibits and print and electronic media. Elder workshop participants and the young adult artists who illustrate their life stories come together during the
recognition reception for intergenerational exchange and learning.

The Living Canvases Pilot Research Study was recently launched to identify the feasibility of program implementation and to query the experiences of program participants. The current study aims to identify the sociodemographic and psychosocial characteristics of young adult and elder participants and the association of such factors with participants’ motives for participation and experiences in the program. To date, sixteen elders and thirteen young adult artists have enrolled in the program. Key motives for elders’ participation in the program are opportunities for self-reflection and personal growth and to contribute to young artists, the broader community and scientific research. Key motives for the young adult artists’ participation were to interact with, and learn from, the experiences of elders and to contribute to their community and help bring elders’ stories to life. A post-participation survey of elder workshop participants indicated that elders enjoyed the opportunity to share their own, and learn from peers’, life experiences and that they would recommend the life review workshops to a friend. Overall, initial analyses indicate feasibility and successful implementation of the intergenerational Living Canvases program.

§§§§

Abstract:
A derivative of EEG is the event-related potential (ERP), which refers to an average of EEG responses at a specific time that occur due to complex processing of a certain stimuli. ERP components are named for polarity (N is negative, P is positive) and then latency (the number of milliseconds after the stimulus during which the ERP occurs). Previous studies have found a reduction in target P300 amplitude for marijuana users, suggesting that marijuana users have a deficit in executive control and decision-making, which have been previously implicated with the P300 ERP. High-risk adolescents, however, may have pre-morbid (before use) neurobiological vulnerabilities, so a longitudinal design is necessary in order to determine whether changes in EEG were induced by marijuana use, or if they represent differences that are inherently present in users.

Results show that target P300 amplitudes were significantly (p<0.5) lower for users compared to non-users even before use of marijuana (Figure 1), which suggests that the difference found in previous studies may not be a reflection of marijuana use, but rather just reflect inherent differences in the brain. The current study bears important implications for continuing discussion of marijuana’s effects and prediction of use. The study finds that users inherently possess lower executive control than non-users and the decrease in the P300 amplitude is not necessarily caused by marijuana use.

§§§§
Mothers Need Help Too: Examining the Barriers to Support Systems for Mothers of Children with Autism

Alexandra Antosy

Jo Ann Farver, Psychology; Kim Morris-Eggleston, Occupational Science and Occupational Therapy

Individual

Senior Honors Thesis

Social Sciences II

Mothers of children with autism experience higher levels of stress not only compared to mothers of children with typical development, but also when compared to mothers of children with other developmental disorders (Sanders & Morgan, 1997). These additional stressors can be mediated by support systems, which have been found to prevent as well as decrease many of the negative responses associated with stress (Honig & Winger, 1997). However, significant barriers prevent mothers from accessing the help that they require. Mothers of children with autism are one of the most at-risk parent populations for stress, which is detrimental not only to their personal health but also to the physical and mental health of their children. The study recruited a sample of 11 mothers of children with Autism from multiple child development clinics in the Los Angeles area, to identify the stressors that act as barriers to accessing support systems. Mothers completed the Parenting Stress Index (PSI-SF), the Parent Locus of Control Scale (PLOC), the Social Support Index (SSI), and a demographics questionnaire. A case study was conducted for each participant based on their respective scores on the PSI-SF, PLOC, and SSI, as well as their answers to the demographics questionnaire. There were variations within each particular case, however the overall trend was consistent with high levels of stress and low levels of social support, with demographic diversity playing a large role. It is imperative these variations be further addressed to adequately assist this population.

A New Approach to US-China Relationship: Grassroots Ambassadors

Tianqi (Amber) Liang

Jessica Peet, School of International Relations, Dornsife College of Letters, Arts, & Sciences

Individual

Analytical Paper

Social Sciences

As Edward R. Murrow famously said, the critical link in the international communication chain is the “last three feet,” which is bridged by personal contact. Unlike any traditional definition of diplomacy, Chinese students are engaging with their American classmates in a peer-to-peer level and forming personal friendships. The underlying impact on diplomacy is far greater than what a treaty through negotiation and coercion can behold. The trustful relationship between individual can transcend to a state level to influence bilateral relationship between countries, possibly stronger than any traditional diplomatic effort. As my initiative of peer-to-peer diplomacy, “Grassroots Ambassadors” allows basic communications stemming from personal level to influence diplomatic relations without government intervention. Unintentionally, Chinese and American students are weaving a web of personal engagements to influence future U.S. – China relations.
There are 4,821 correctional facilities in the United States. 415 of these were built in the last five years. The increase of jails is due in large part to the return rate of recently released offenders. In 2006 nearly 400,000 people were released from state and federal prisons as well as juvenile delinquent centers. By 2009 284,000 had returned.

The continuous construction of correctional facilities, coupled with the high return rate of inmates, is a testament to a failed system. According to experts, the problem lies in the limitations, obstacles, and barriers recently-released inmates, also referred to as “transitioning peoples,” face once released from jails. With little guidance from peers or professional counselors, transitioning peoples often fall back to old habits that ultimately escort them back to jails.

As a result of this trend, grassroots rehabilitation centers, like Homeboy Industries and the Amity Foundation, have taken it upon themselves to solve the problem. In doing so, they have created progressive models of treatment and simultaneously changed the urban landscape of their respective regions forever. The latter is a phenomenon this project aims to investigate further. When it comes to the rehabilitation center typology and its relationship to urban engagement, there remains much to be done. This is a challenge this project aims to approach head on.
likelihood of receiving a shock on CS+ trials and overestimate the likelihood of receiving a shock on CS- trials. However, OAs estimate of the CS+ likelihood was significantly greater than their estimate of CS- trials. \(t(32) = 11.62, p<0.001\). There was a significant group by condition interaction for SCR \(F(1,52) = 4.468, p = 0.039, \eta^2 = 0.079\) such that OAs had a reduced response to the CS+ relative to the YAs. OAs had reduced accuracy of contingency awareness and lacked the differential conditioned response during fear conditioning compared to YAs.

---

**Title:** Patterns of Physiological Activity Associated with Dating Violence in Daily Life

**Name(s):** Afsara (Sara) Haque, Jamie Nguyen, Shelby Rosenberg, Yeji Yang

**Submission Type:** Group

**Project Sponsor(s) and Collaborator(s):** Sohyun C. Han, Psychology; Gayla Margolin, Psychology; Adela C. Timmons, Psychology

**Format:** Field Research

**Title:** Patterns of Physiological Activity Associated with Dating Violence in Daily Life

**Abstract:**

Violent individuals tend to demonstrate lower baseline autonomic arousal but higher autonomic reactivity to stressful events (Patrick et al., 2008). Yet data are mixed for studies examining these phenomena in naturalistic environments. The present study examined associations between dating violence and physiological reactivity as measured through electrodermal activity (EDA) in couples’ daily lives. We hypothesized that physical dating violence would be associated with lower baseline levels of physiological arousal but higher levels of physiological reactivity in moments of irritation towards one’s partner. Eighteen couples (18 males, 18 females), ages 18 to 25, completed hourly surveys on mood and wore ambulatory biosensors that recorded EDA for 24 hours. Participants also completed a 66-item dating violence questionnaire (Bennett et al., 2011). Multilevel regression models showed that female victims of dating violence had lower overall levels of EDA throughout the day \(b = -0.23, p = .02\). Additionally, males with a greater history of violence perpetration showed heightened EDA during moments of irritation towards their partners \(b = 0.40, p < .01\). These findings provide evidence that violent individuals have altered patterns of physiological reactivity and that such reactivity is an important component in understanding dating partner violence in daily life.

---

**Title:** The Perfect Crime: Solving the Global Problem of Counterfeit Drugs

**Name(s):** Jordan Kondo, William Liao

**Submission Type:** Group

**Project Sponsor(s) and Collaborator(s):** Erin Quinn, Science and Health, Dornsife College of Letters, Arts, & Sciences

**Format:** Analytical Paper

**Title:** The Perfect Crime: Solving the Global Problem of Counterfeit Drugs

**Abstract:**

In 2013, the global pharmaceutical market was estimated at a gigantic $300 billion a year, a value predicted to rise to $400 billion in the next three years (WHO, 2014a). Unfortunately, unscrupulous people, keen on making money in such a lucrative market, have established an illicit industry that manufactures and sells counterfeit drugs to unwitting patients and consumers. According to estimates by the World Health Organization (WHO), an international public health agency of the United Nations, the counterfeit pharmaceutical market is valued at over $35 billion and comprises more than 15

---

92
percent of the drug market worldwide, with this proportion rising above 60 percent in developing countries (Ambroise-Thomas, 2012). In this paper, we will examine the wide array of consequences of counterfeit drugs. These illegitimate drugs challenge and undermine efforts of organizations worldwide to eradicate communicable diseases, diminish confidence in the global health system, and lead to drug resistance due to substandard levels of essential active ingredients. Furthermore, many countries lack the necessary medical infrastructure to regulate their pharmaceutical markets. We will examine where in the world fake drugs are a significant problem and how they are supplied and distributed. We will also detail efforts to combat fake drugs and some of the complicating factors. Lastly, we will provide our own recommendations to address the issue. Since counterfeit drugs can be lethal and threaten the many tenets of public health and medicine, united global efforts backed by strong political and legislative will, along with international cooperation and resources, are necessary to eliminate fake drugs and to provide high quality drugs to patients.

---

### Title: Predicting Factors Associated with Treatment Outcomes in Delinquent and Substance Abusing

**Name(s):** Karishma Dhanani

**Project Sponsor(s) and Collaborator(s):**
Stanley Huey, Jr., Dornsife, Psychology

**Submission Type:** Individual

**Abstract:**
The predicting factors of substance abusing-juveniles are being tested in this data secondary analysis of data that was collected by Henggeler et al, (2006). The primary study compared the outcomes of participants in four different treatment conditions, and it was found that participants who were in Drug Court (DC) along with evidenced based treatment such as Multisystemic therapy (MST), had better treatment outcomes compared to those who were in the non-MST condition. The purpose of this study is to find which pretreatment factors predict poorer treatment outcomes in juveniles who are abusing substances. It is important to examine which factors affect treatment outcomes, to better understand what population MST is best suited for. Finding effective treatment for adolescents is important to keep community and family expenses low. The participants in this study are 161 participants, between the ages of 12-17, who were referred by the Department of Juvenile Justice in Charleston, South Carolina. This study plans to examine risk factors that are associated with poorer treatment outcomes such as: criminal activity, substance use, family structure, and economic status. Multiple regressions and correlation analyses will be done to analyze the data and to find the significant pretreatment factors associated with poorer treatment outcomes. The data will also be analyzed to see if participants who were in the MST condition had weaker relationships between pretreatment risk factors and treatment outcomes.

---

### Title: The Psychology Effects of Frequent Self-Weighing

**Name(s):** Vicente (Vince) Victoria

**Project Sponsor(s) and Collaborator(s):**
David Walsh, Psychology, Dornsife College

**Submission Type:** Individual

**Abstract:**
The purpose of the present study was to
examine the psychological effects of daily self-weighing in undergraduate students. Participants were recruited from two undergraduate Statistics classes in psychology during the Spring 2014 semester. Participants first completed an online prescreening survey. Included in the prescreening survey were measures for depression, body image, and life satisfaction. Those who qualified were then invited to come to the social behavior lab where their weight and height were taken and recorded both at the beginning and the end of the study. Participants were randomly assigned into a control or experimental condition. Those in the experimental condition were given a scale to take home and were instructed to weigh themselves on a daily basis and record the results. Participants in the control condition did not receive any instructions related to weighing behaviors. At the end of the 10-week study, all participants were weighed and measured once again, and completed our psychological well-being measures once more. We predicted that participants in the experimental group would experience decreases in depression and body dissatisfaction, and increases in life satisfaction, as compared to the control group. We also predicted that individuals would perceive maintaining physical health as a more salient goal in the experimental condition at the end of our 10-week trial. Future studies should focus efforts on recruiting a stronger pool of participants, and following them over a longer period of time.

Exhibit#: S557  
Category: Social Sciences  
Name(s): Kathryn (Katie) Peabody  
Submission Type: Individual  
Project Sponsor(s) and Collaborator(s):  
Heather Wipfli, Ph.D., Associate Director for the USC Institute for Global Health, Keck School of Medicine  
Format: Creative Work  
Title: Public Health Week - Uganda  
Abstract:  
The Uganda Public Health Week connects medical knowledge about mental and physical health to the children in Uganda through elaborate research and design of a week-long health program. This program uses activities based in public speaking, art, theater, dance, debate, and more to educate about health behaviors that extend life through the maintenance of mental and physical health. The five areas of education include: basic sanitation, infectious disease prevention, vector transmitted disease reduction, abuse and violence prevention, and reduction of HIV/AIDS stigma. These are some of the most prevalent and concerning issues faced by Ugandan children and this project involves specific programs and curriculum that address these areas specifically.

Designing a camp for children using art, movement and interaction to impart crucial health education is an ideal project for what I have learned at USC. I am currently on track to graduate USC in May 2015 with a Bachelor of Science in Health Promotion and Disease Prevention and a Bachelor of Arts in Theater. I believe strongly in community building and encouraging healthy lifestyles. The Ugandan Public Health Camp combines the three areas I have chosen to prioritize in my USC education: helping people reach their full potential through access to education and healthy living, using art, public speaking, and movement to encourage a passion for learning and telling stories, and
building community and friendship with young people. As a part of this project, I did extensive research on how to teach specifically the rural Ugandan populations about public health and what tactics are effective to reach students of many ages across barriers of socioeconomic status, language and levels of education. I created lesson plans and ran trials with students I currently work with to create a program that is effective and powerful.

§§§§

Exhibit#: SS17
Category: Social Sciences II
Name(s): Hania Adib
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Thomas D. Lyon, Gould School of Law
Format: Senior Honors Thesis
Title: Questioning Children about Their Understanding of the Physician’s Role
Abstract:
This study explores children’s understanding of the physician’s role, focusing on the importance of truth-telling to physicians, as this information may be eligible in court under the medical diagnosis hearsay exception. Question type was examined to determine effective techniques for assessing children’s understanding of the roles of medical professionals (N= 48; 3-year-olds to 5-year-olds). The currently recommended protocol (as stated in a recent ruling by the Indiana Supreme Court) is verbally demanding and may trigger biases in children’s responses that can hinder their accuracy and credibility. The present investigation developed scenario-based questioning techniques to determine their effectiveness, while simultaneously comparing children’s performance to the recommended protocol. Results indicate that children as young as 3 years old have a clear understanding of the help-seeking function of doctors. Additionally, while children have difficulty answering open-ended questions about the importance of truth-telling to physicians, they demonstrate this understanding when asked using scenario-based questioning. Implications from the present study suggest that the recommended guidelines are not effective at demonstrating children’s actual understanding of the roles of medical professionals.

§§§§

Exhibit#: SS49
Category: Social Sciences
Name(s): William Orr
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Philip Ethington, History
Format: Analytical Paper
Title: Reckless and Indiscriminate: The Impact of Japanese Bombing in the Second Sino-Japanese War on pre-World War II American Depictions of Area Bombing
Abstract:
Hiroshima, Nagasaki, Dresden, Coventry, Guernica. These are some of the place-names which most often come to mind when one thinks of the bombardment of civilian populations from the air. Missing from this geographic roll-call of civilian suffering, however, are names like Chongqing, Shanghai, or any number of other Chinese cities. Between 1937 and 1941, Japanese air forces rained terror and destruction down upon Chinese cities during the first half of the Second Sino-Japanese War. Approximately 60,000 Chinese civilians were killed over the course of the Japanese strategic bombing campaign, but the story of bombing in China, and America’s reaction to this bombing, is often overshadowed by the three other major bombing campaigns of this era: The Blitz against Britain, the Combined Bomber Offensive against Germany, and the United States Army Air
Force’s campaign against the home islands of Japan. Of these campaigns, however, the Japanese bombing of China is the only major strategic campaign to occur before the outbreak of war in Europe in the fall of 1939. As bombs fell on the international metropolis of Shanghai and the wartime capital of Chongqing, American newswires, newspapers, and newsreels carried tales of death and destruction to American doorsteps and movie theaters. American public opinion reaction and civilian leadership condemnations illustrate the evolving moral and humanitarian opposition to the bombardment of cities from the air during this period. By 1945, however, American public opinion, civilian leaders, and air war planners were all condoning and participating in the more destructive and more deadly bombing of the Japanese home islands. This paper seeks to demonstrate the moral and humanitarian resolve exhibited by American media and civilian leaders during the bombing of China and the significance of the American departure from this moral stance during the subsequent bombing of Japanese cities in 1945.

§§§§

Title: Restorative versus Punitive Justice Attitudes: Influences of Age, Gender, and Violence Exposure

Name(s): Vivian Rotenstein

Project Sponsor(s) and Collaborator(s): Gayla Margolin, Psychology; Michelle Ramos, Psychology

Submission Type: Individual

Category: Social Sciences

Format: Laboratory-based Research

Exhibit#: SS44

Abstract:

Despite a recent shift towards more restorative views within the juvenile justice system, little is known about adolescents’ own justice perceptions, and what individual (age, gender) and situational factors (school and community violence) could potentially influence those views.

The present study utilizes quantitative methods to investigate if individual factors such as age and gender, or life experiences such as school and neighborhood violence exposure, can influence the degree to which a young adult resonates with restorative or punitive justice.

480 participants total (including 155 high school students & 325 USC Undergraduates) completed an anonymous online Qualtrics survey assessing topics such as discrimination, adverse childhood experiences, school and community violence, and criminal justice opinions.

The relationship between participants’ school and community violence exposure and their justice perceptions is specifically examined here. In regards to prior violence experiences, participants are asked whether or not they’ve witnessed an assault, shooting, or murder in their neighborhood, and if they’ve ever been bullied, or witnessed an assault, riot, or physical fight at school.

Overall, main effects of age were found for both restorative and punitive justice views: college students had greater mean restorative views compared to high schoolers, while high schoolers had greater mean punitive justice views compared to USC undergraduates. A positive correlation was found between school violence exposure and restorative justice views for males, but not for females.

Future studies could look into how the exact nature of the violence exposure (directly witnessing something vs. being a victim of violence vs. violence exposure through the media) influences restorative and punitive justice perceptions.

§§§§
Restrictive eating behavior may be facilitated by automatic inhibition, which occurs when individuals consistently inhibit their automatic approach response to a stimulus and over time develop associations between that stimulus and stopping. Accordingly, individuals who regularly avoid high calorie foods may develop associations between these foods and not eating, easing future dieting attempts. Gray (1987a)'s behavioral inhibition system (BIS) and behavioral activation system (BAS) may be related to automatic inhibition. In the present study, female participants who had refrained from eating for three hours prior to the study completed two computer-based behavioral tasks to assess their inhibition and approach in response to food cues: a Food Cue Stop Signal Task and an Approach and Inhibition Task. They also completed questionnaires to assess their restrictive eating behavior and BIS and BAS sensitivities. It was predicted that individuals who exhibited more restrictive eating behavior would display an automatic inhibition in response to high calorie foods. The results did not provide evidence for the relation between restrictive eating behavior and automatic inhibition or the relations among Gray (1987a)'s BIS and BAS and automatic inhibition. However, self-reported BIS sensitivity and behavioral inhibition were related, supporting the notion that self-reported BIS can be used as a measure of inhibition.

The Role of Identity in Belief Flexibility

This present study aimed to investigate the role of political identity in the flexibility of political beliefs. A previous study by Hall, Johnasson, and Strandberg (2012) demonstrated the phenomenon of Choice Blindness, in which many people fail to notice that their answers on a survey have been changed. When confronted with a survey in which they appear to have answered a question in a way to counter to their original belief, many people defend the new, opposing attitude. While Choice Blindness demonstrates an apparent flexibility of beliefs, some beliefs may be harder to change than others. In particular, beliefs that are tied to one’s identity may be especially inflexible. The present study focused on political identity to understand how attitude reversals relate to strength of identity. We predicted that strong identifiers would have stronger resistance to show flexibility in their beliefs. Participants were presented with political and nonpolitical belief statements and
asked to rate the extent that they agree or disagree with each statement. This survey used a slight-of-hand technique to expose participants to a reversal of their original attitudes, which allowed us to record whether they were prepared to endorse and argue for the opposite view of what they had stated only moments ago. Our results succeeded in replicating the original finding of Hall et al. (2012) with 68.3% of participants failing to detect at least one mismatch between their original intention and final outcome for a simple questionnaire. Furthermore, there was a main effect of participant’s ratings of how political they consider themselves on the number of changed political statements detected by participants in the survey. Participants who rated themselves as highly political were more likely to notice the belief change. These results suggest that political identity strength is a predictor of flexibility in political beliefs.

§§§§

The Role of Reward and Reward Sensitivity in Sequential Learning

Hootan Omidvar

Dennis Ruenger, Psychology, Dornsife College of Letters, Arts, & Sciences; Wendy Wood, Psychology, Dornsife College of Letters, Arts, & Sciences

Senior Honors Thesis

The following study investigates whether reward facilitates sequence learning as assessed by response times in a triplets learning task. Reward is represented by points, which follow correct responses made to visually presented stimuli. These points correlated with a real monetary reward given to the participants at the end of the experiment. Specifically, this study proposes that sequences following high reward will be learned better than sequences followed by low reward. Additionally, this study will investigate individual differences in reward sensitivity. It is hypothesized that reward sensitivity determines the magnitude of the effect of reward on sequence learning.

§§§§

Sages & Seekers: An Intergenerational Wisdom-Sharing Program

Manali Begur, Curtis Kim

Molli Grossman, Davis School of Gerontology; Tara Gruenewald, Davis School of Gerontology

Laboratory-based Research

Sages & Seekers is an intergenerational wisdom-sharing program that partnered older adults over the age of 50 (“Sages”) with young adult, USC undergraduate college students (“Seekers”). During the 8-week program, Sages and Seekers met weekly to share their life stories in an effort to bridge the gap between the two generations. The Sages & Seekers Pilot Study was designed to explore participants’ perceptions of the program and potential changes in psychosocial well-being over the 8-week program period. Participants were given a baseline survey, participant experience surveys during week 4 and 6, and a follow up survey at the end of week 8. Pre- and post-program surveys queried multiple domains of psychosocial well-being and attitudes hypothesized to be shaped by participation in the program, including assessments of loneliness, depression/anxiety, empathy, generativity, lifestyle activity, and expectations regarding mental, physical and cognitive aging.
Participant experience surveys queried participants’ perceptions of the program and interactions with their Sage/Seeker partners. Paired t-tests, conducted to compare participants’ psychosocial well-being and attitudes before and after program participation, indicated significant improvement in expectations regarding aging (p < .01), social well-being (p < .05), perceptions of generativity (making important contributions to others) (p < .05), as well as decreases in depression and anxiety (p < .001) among young adult Seekers. Results also revealed significant increases in activity level (p < .01) and empathic concern (p < .05). Generally, both Sages and Seekers rated their experience in the program and with their program partner very favorably (>5, max: 6). Overall, our results suggest that both younger and older adults can enjoy and benefit from intergenerational wisdom-sharing activities, although they seem to benefit in unique ways.

§§§§§

**Exhibit #:** SS10  
**Category:** Social Sciences II  
**Name(s):** Sagarika Arogyaswamy  
**Submission Type:** Individual  
**Project Sponsor(s) and Collaborator(s):**  
Margaret Gatz, Psychology  
**Format:** Field Research  
**Title:** Sleeping Through High School  
**Abstract:**  
This study surveyed 287 students in an urban high school in California, looking at sleeping habits, how students spend time, and their satisfaction with life. On average, students reported 6.5 hours of sleep on school nights. 48.6% reported at least one class where they felt sleepy every day that class met. Amount of sleep was not related to how much time that students reported spending on homework, extra-curricular activities, sports, recreation, socializing, chores, or a part-time job. Getting more sleep was significantly related to being more likely to eat breakfast, higher life satisfaction, and lower stress. Those who got the least sleep and who less often ate breakfast were most likely to feel that school should start later. Students’ GPA was not significantly correlated with amount of sleep or with eating breakfast. This study also looked at other factors related to GPA. A higher GPA was related to taking more AP classes, rating their memory as better, and having a lower BMI. Gender was found to be correlated to memory, stress level, and the amount of time spent on homework with girls reporting worse memory, a higher stress level, and more time spent on homework, despite the fact that there was no significant gender difference in terms of GPA or the number of AP classes. The findings indicate that sleep deprivation was common, and that the effects of sleep deprivation manifested themselves in excessive sleepiness in class. However, there was no support for the admonition that getting enough sleep and eating breakfast would enhance GPA.

§§§§§

**Exhibit #:** SS47  
**Category:** Social Sciences  
**Name(s):** Judith Fong  
**Submission Type:** Individual  
**Project Sponsor(s) and Collaborator(s):**  
Lisa Collins, Environmental Studies, Dornsife College of Letters, Arts, & Sciences  
**Format:** Analytical Paper  
**Title:** Stakeholder Communication on Santa Catalina Island  
**Abstract:**  
My study employs a research technique called Social Network Analysis, which will explore the network of stakeholders on Catalina. Specifically, I am looking to see if there are any gaps in communication that could potentially benefit the stakeholders’ operations and improve conservation if
resolved. My research methods consist of conducting a combination of surveys and interviews with some of the prominent stakeholders, and analyzing the data obtained to identify patterns and gaps. My survey hopes to expose linkages in communication between stakeholders, commenting on power relations, flows of knowledge, decision-making, and resource allocation. I also look into shared goals between stakeholder groups and whether or not that influences the level of interaction or the quality of the communication. For analysis, I will use network analysis methods to map the structure of the stakeholder patterns on Catalina Island. The hope is that with this information, the Catalina community can be more effective in balancing their operations with resource management and conservation.

§§§§

Exhibit#: SS38
Category: Social Sciences
Name(s): Margaret (Magalie) Carey, John (Andrew) Clark, Alexa Smith
Submission Type: Group
Project Sponsor(s) and Collaborator(s):
David Black, Keck School of Medicine, Department of Preventive Medicine
Format: Field Research
Title: A Student-Led Cooperative Effort to Promote Campus Safety and Well-being
Abstract:
The USC Undergraduate Research Associates Program encourages the collaboration between professors and students in an attempt to form an academic relationship that lends itself to advanced problem solving skills for both parties. By blurring the lines between “student” and “teacher” responsibilities and working collectively, a professor and an undergraduate both benefit from new perspectives that may help to solve problems in novel ways and contribute to the advancement of the professor’s field of expertise.

Dr. David Black designed a unique URAP experience for former, exemplary students from the Health Promotion 300: Theoretical Principles of Health Behavior class, in which undergraduates act as peer project mentors for current students. The current HP 300 group was split into three groups corresponding to prominent health topics at USC including “Sexual Consent,” “Substance Use/Misuse,” and “Wellness”. Students then divided into smaller sub-groups and selected a specific issue or topic within their overarching discipline, based on demonstrated severity and/or prominence among undergraduates at the University of Southern California. The URAP mentors assisted HP 300 students throughout the fall 2014 semester in developing a theoretically-based intervention program that may be considered for implementation by the University.

§§§§

Exhibit#: SS54
Category: Social Sciences
Name(s): Heidi Banh, Helen Banh
Submission Type: Group
Project Sponsor(s) and Collaborator(s):
Panayiota Courelli, Keck School of Medicine
Format: Field Research
Title: Targeted Marketing Strategies by Sex Tourism Websites to Attract Male Consumers
Abstract:
A global industry that is transforming the ways men feed their sexual addictions, sex tourism is a major contributor to the spread of HIV/AIDS and other sexually transmitted diseases. Organized sex tourism agencies throughout the world, particularly in developing countries, have taken advantage of the modern reliance on
technology to promote sex tourism and target male consumers that generally travel from developed countries. We will perform a literature review on an exploratory, qualitative study design that utilizes content analysis to explore the common themes and patterns of a comprehensive sample of 20 sex tour websites (Bender and Furman, 2004). The information from each website was individually analyzed, and were later compared with other websites' information and categorized into major themes and patterns as follows. These agencies depict the male consumer through three main roles -- a sexual conquistador, a companion seeker, and as overworked and unappreciated. Male consumers also leave statements on websites about their perceived personal inadequacies, reflecting their struggle with their sexual self-identity in a daily context -- this is a second sub-theme that we will explore. A third major sub-theme is that sex tour websites conduct targeted marketing, capitalizing on the consumer's vulnerabilities by sending different messages to the male consumers regarding their flaws.

§§§§

Exhibit#: SS51
Category: Social Sciences
Name(s): Crescent Cheng
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Jo Ann Farver, Psychology, Dornsife
Format: Senior Honors Thesis
Title: Targeting Environmental Attitudes: The Impact of Majority and Minority Source Status and Inclusive Language
Abstract: The study examines the effects of majority and minority source status and inclusive language on students’ environmental attitudes. Research in social psychology has shown that persuasive messages have different effects on people’s attitudes, depending on whether they are attributed to a majority or minority source. Research has also demonstrated that using inclusive language helps group leaders persuade their followers to support their vision of social change. Inclusive language is a communication tactic that highlights the collective identity of a group by using words such as “we,” “us,” and “our.” The independent variables of source status and language type were manipulated in a speech concerning climate change and renewable energy. The dependent variables were students’ direct attitudes and indirect attitudes. Direct attitudes, also called focal attitudes, are the focus of a persuasive message, whereas indirect attitudes are related to the focal attitudes but are not directly the subject of the message. In this study, the focal attitudes were students’ attitudes on climate change and renewable energy. Indirect attitudes were be represented by the students’ attitudes toward water conservation, recycling, wildlife extinction, and biodiversity, which were not directly addressed in the speech. Group differences in attitudes are expected based on the context comparison model and social identity framing theory. Investigating how the source and language in a message can impact people’s attitudes will yield insight into why certain beliefs persist, and what circumstances present an opportunity for attitude change.

§§§§

Exhibit#: SS41
Category: Social Sciences
Name(s): Karen Arcos
Submission Type: Individual
Project Sponsor(s) and Collaborator(s): Jo Ann Farver, Psychology; Kimberle Kelly, Psychology
Format: Senior Honors Thesis
Title: Teachers Think Too: The Relationship of Teacher Metacognition to Student Learning
Abstract:
The current study explored three relations among principles of learning (content knowledge, metacognition, and access to prior knowledge; Bransford et al., 2000) in eighth grade school teachers enrolled in professional development (PD) targeting Chemistry and Astronomy content and in control teachers who did not receive training. First, the relation between teachers’ chemistry content knowledge and their self-assessed accuracy (metacognition) was established using data from a Chemistry Concept Inventory. Teachers overestimated their actual performance (percent correct) by about 8%. When provided with actual performance feedback, teachers’ self-assessment accuracy did not significantly improve, possibly because their original predictions were fairly accurate. When evaluating this relationship using data from an Astronomy/Space Science Test, teachers’ actual performance was significantly related to ratings of certainty about their answers. Second, the contribution of teachers’ Chemistry content knowledge and metacognition to how accurately they predicted their students’ prior content knowledge was explored. Results showed that teachers have a very limited understanding of their students’ prior knowledge. Further, no significant relationships were found between the accuracy of teachers’ predictions of students’ prior content knowledge and teachers’ content knowledge, metacognition, or their combination. Third, the study assessed how teacher measures of these principles of learning related to their students’ eventual performance on standardized tests in a series of multiple regression analyses spanning both trained and control teachers in chemistry and astronomy content areas. The most significant predictor of student performance was teacher metacognition scores, suggesting teachers’ awareness of what they do and don’t know may be more critical than what they actually know about science content. PD programs would thus better serve teachers if they developed both domain-specific content knowledge and pedagogical content knowledge focused on metacognitive strategies and utilizing prior student knowledge.

§§§§

**Exhibit#:** SS22  
**Category:** Social Sciences II  
**Name(s):** Jodie Guller, Natasha Sosa  
**Submission Type:** Group  
**Project Sponsor(s) and Collaborator(s):** Steven Greening, Davis School of Gerontology; Mara Mather, Davis School of Gerontology  
**Format:** Laboratory-based Research  
**Title:** Threat-induced arousal interacts with attention to influence perceptual awareness  
**Abstract:** Emotional stimuli interact with attention to influence awareness using the attentional blink paradigm. For example, emotionally-arousing T2 stimuli are able to overcome the attentional blink, and emotionally-arousing T1 stimuli have been found to further enhance the effects of the attentional blink. This research assumes emotional stimuli are having an influence because of their arousing nature, yet no research has independently manipulated emotional significance. The arousal-biased competition (ABC) posits that being in a state of arousal will influence perception depending on the priority (i.e., goal relevance or perceptual salience) of competing stimuli. We independently manipulated arousal using a fear conditioned auditory tone (CS+) and also a second tone that was never paired with shock (CS-). We used two experiments to test the prediction that arousal interacts with stimulus priority (i.e., both bottom-up saliency and top-down goal relevance) to influence attention.

For the first experiment, we looked at the
effects of arousal and a 200ms stimulus onset asynchrony on T2 accuracy during both dual and single tasks when the T1 was also perceptually salient. During the dual task, when T1 is both the primary goal and perceptually salient, T2 accuracy was significantly greater on non-arousing trials than on arousing trials \( t(42) = -2.07, p<0.05 \), but there was no significant difference in T2 accuracy between arousing and non-arousing trials for the single task. In experiment two, where the T2 image was the perceptually salient image, we saw the opposite pattern. T2 accuracy was significantly greater on arousing trials than on non-arousing trials during the single task \( t(36) = 2.21, p<0.05 \), but there was no significant difference in T2 accuracy between arousing and non-arousing trials for the dual task. Therefore, arousal appears to have opposing effects on low and high priority (i.e., salient) stimuli.

§§§§

Exhibit#: SS48
Category: Social Sciences
Name(s): Rachel Jones
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Eliz Sanasarian, Political Science
Format: Analytical Paper
Title: We will not be silent no more: the case of Canada’s Idle No More and Indigenous Political Resistance in the Digital Age

Abstract:
Contemporary Indigenous political activism around resources and development is mobilizing attention to transnational problems such as environmental degradation, government marginalization and the impact of neoliberal development for these communities. In Canada, mirroring patterns found worldwide, indigenous nations reside on land that has been increasingly sought after by oil, mining and other fossil fuel extractive industries. Historically since colonial occupation in 1867, many indigenous First Nations, Metis and Inuit have dealt with the brunt of environmental and social costs, while not being able to enjoy the considerable economic gains that the corporate and political elite has amassed. This has led to a situation of gross inequality that mirrors the colonial trend initiated by the first European settlers in Canada. Through the case study of an grassroots movement called Idle No More, this project will look at how Canadian indigenous activism and the use of social media platforms such as Twitter, Instagram and Tumblr, facilitate public engagement around the legacies of colonialism, economic exploitation, and the destruction of the environment. This research is interested in how Idle No More utilizes social media as a tool to model new forms of political intervention, both nationally and regionally, and how might their strategies serve to model alternative forms of political solidarity under increased state repression of protest activities.

§§§§

Exhibit#: SS50
Category: Social Sciences
Name(s): Tyler Schiffman
Submission Type: Individual
Project Sponsor(s) and Collaborator(s):
Lisa Collins, Environmental Studies,
Dornsife College of Letters, Arts & Sciences
Format: Analytical Paper
Title: The Wrigley Institute for Environmental Studies Waste Stream

Abstract:
In 2012 Americans produced 251 million tons of trash and only 34.5 percent of the yield was recycled (EPA, 2014). As the world population increases, waste increases more rapidly and at an uncontrollable rate. As waste builds, more land is being used for the buildings of landfills and waste factories. Landfills have been expanding
due to the increase of overflow. Landfilling is one of the most prominent methods to dispose of waste however, both underdeveloped countries and developed countries practice uncontrollable dumping, producing a high threat to the environment (Sharma et al., 2008). Analyzing the waste stream provides data that can be used to find alternatives for waste disposal. On a more local level, the average American creates 4.38 pounds of trash a day, which equals 1,600 pounds of trash a year (EPA, 2014). A total of 60 percent of America’s trash could be recycled yet the maximization of recycling is not occurring (mnn, 2011). Municipal waste is brought to landfills with recyclables mixed within causing an increase of methane emission being released into the atmosphere. Composting is an alternative to waste disposal, which diverts organic matter from the waste stream. The organic waste is broken down by bacteria within the soil converting the matter into nutrients and food for plants and animals. The island of Catalina is home to the Wrigley Institute for Environmental Studies. On a small scale, waste can be difficult to dispose of and sustainable methods can be hard to achieve. All of the waste created is taken off the island and shipped back to the mainland. To prevent more contributions of trash to landfills from WIES, local composting of organic waste as well as regulations of waste on WIES can prevent landfill buildup.

---

**Exhibit#:** S$15  
**Category:** Social Sciences II  
**Name(s):** Xinyu (Catherine) Liang  
**Submission Type:** Individual  
**Project Sponsor(s) and Collaborator(s):**  
Thomas D. Lyon, Law School  
**Format:** Senior Honors Thesis  
**Title:** “You Said Sad, Tell Me More About That”: Exploring the Subjective Reactions of Children Disclosing Sexual Abuse  
**Abstract:**  
It is currently unclear how children feel about abuse, if they are able to express these feelings during their disclosures of abuse, and whether their feelings are related to the characteristics of abuse. The present study examined how children describe their subjective reactions, such as emotional feelings, cognitive thoughts and physical sensations, to their experiences of abuse with regard to their age, their relationship with the perpetrator, the severity of the abuse, and the frequency of the abuse. 177 interviews with 4- to 12-year old children disclosing sexual abuse were analyzed for subjective content. Older children, children abused by father figures, children abused more severely, and children abused more frequently mentioned more subjective reactions than their counterparts.
Symposium Participant Index

A

Abella, Paulina Sabrina 3
Adib, Hania 95
Antosy, Alexandra 90
Arcos, Karen 101
Arogyaswamy, Sagarika 99
Austin, Matthew 67
Azam, Sana 26

Bello, Deborah 4
Benavente, Isabella Marie 4
Bendinelli, Gus 2
Bettadapur, Archana 31
Bhide, Saee (Sayuli) 82
Billups, Briana 12
Blant, Aidan 21
Brown, Evan 59

B

Banh, Dalton 30
Banh, Heidi 100
Banh, Helen 100
Baron, Daniela 13
Beaudin, Jacob 59
Begur, Manali 98

Campion, Rosebud 14
Carey, Margaret (Magalie) 72 80
100
Castilla, Nina 16
Chan, Kevin 51

C

105
<table>
<thead>
<tr>
<th>Name</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chan, Lesley</td>
<td>58</td>
</tr>
<tr>
<td>Chang, Jennifer</td>
<td>80</td>
</tr>
<tr>
<td>Chen, Jianliang</td>
<td>61</td>
</tr>
<tr>
<td>Chen, Xinkai (Casey)</td>
<td>64</td>
</tr>
<tr>
<td>Chen, Yinyi</td>
<td>61</td>
</tr>
<tr>
<td>Chen, Zachary</td>
<td>26</td>
</tr>
<tr>
<td>Cheng, Crescent</td>
<td>101</td>
</tr>
<tr>
<td>Cherry, William</td>
<td>2</td>
</tr>
<tr>
<td>Childress, Steven</td>
<td>78</td>
</tr>
<tr>
<td>Chiou, Caroline</td>
<td>4</td>
</tr>
<tr>
<td>Cho, Eun Ah</td>
<td>85</td>
</tr>
<tr>
<td>Chooljian, Catherine</td>
<td>4</td>
</tr>
<tr>
<td>Chootong, Norman</td>
<td>4</td>
</tr>
<tr>
<td>Chou, Helen</td>
<td>38</td>
</tr>
<tr>
<td>Chuang, Cheng-Wei (Isaac)</td>
<td>71</td>
</tr>
<tr>
<td>Clark, John (Andrew)</td>
<td>72</td>
</tr>
<tr>
<td>Clarkin, Taylor</td>
<td>53</td>
</tr>
<tr>
<td>Collins, Paula</td>
<td>4</td>
</tr>
<tr>
<td>Copparam, Saumya (Sam)</td>
<td>44</td>
</tr>
<tr>
<td>Due, Miranda</td>
<td>2</td>
</tr>
<tr>
<td>Effenberger, Michael</td>
<td>2</td>
</tr>
<tr>
<td>Espina, Ruben</td>
<td>68</td>
</tr>
<tr>
<td>Espinoza, Cameron</td>
<td>16</td>
</tr>
<tr>
<td>Farrahi, Layla</td>
<td>42</td>
</tr>
<tr>
<td>Ficek, Bronte</td>
<td>40</td>
</tr>
<tr>
<td>Flores, Nicole</td>
<td>9</td>
</tr>
<tr>
<td>Fong, Judith</td>
<td>99</td>
</tr>
<tr>
<td>Fong, Victoria</td>
<td>9</td>
</tr>
<tr>
<td>Foon, Chloe</td>
<td>75</td>
</tr>
<tr>
<td>Franklin, Peter</td>
<td>2</td>
</tr>
<tr>
<td>Freiberg, Yael</td>
<td>34</td>
</tr>
<tr>
<td>Freere-Carossio, Quentin</td>
<td>4</td>
</tr>
<tr>
<td>Fukuda, Kial</td>
<td>4</td>
</tr>
<tr>
<td>Fullerton, Angelica (Angie)</td>
<td>79</td>
</tr>
<tr>
<td>Furlong, Jordan</td>
<td>83</td>
</tr>
<tr>
<td>Gabriel, Greta</td>
<td>9</td>
</tr>
<tr>
<td>Gago, Cristina</td>
<td>74</td>
</tr>
<tr>
<td>Garcia-Nava, Wendy</td>
<td>85</td>
</tr>
<tr>
<td>George, Alaina</td>
<td>68</td>
</tr>
<tr>
<td>George, Sanford (Sandy)</td>
<td>15</td>
</tr>
<tr>
<td>Gil, Howard</td>
<td>67</td>
</tr>
<tr>
<td>Gordon, Natalie</td>
<td>1</td>
</tr>
</tbody>
</table>

106
Gordon, Victoria 1
Guevarra, Maracel (Mara) 4
Guller, Jodie 91
102
Gupta, Anshul 7
Gustavson, Marissa 68

H
Hakimeh, Mary 88
Haque, Afsara (Sara) 92
Hara, Ellie 51
Heintz, Ryan 33
Helstad, Stephen 2
Hernandez, Cesar 64
Herrera-Rice, Troy 68
Heyer, Karl 55
Hirata, Tori 82
Ho, Jonathan 2
Homma, Heidi 56
Hong, Jane 58
Hood, Katherine 4
Hossepiian, Kristene 75
Hou, Fangli (Simon) 4
Hua, Clara 31
Huang, Vincent 48
Huck, Sarah 2
Huynh, Pauline 25

I
Ilgen, William 2
Im, Eun (Sharon) 17
Irvine, Krystle 87
Iskandar, Jonathan (Nathan) 4

J
Jakob, Kirsten 7
Jia, Yimin 61
Jiang, Crystal 29
Jiang, Joanne 39
Jones, Rachel 103
Jordan, Tristan 38

K
Kariyawasam, Shivanti 86
Kedzie, Elyse 56
Kim, Curtis 98
Kim, Emmeline 31
Kim, Nahyun (Mariah) 48
Kondo, Jordan 92
Kopania, Emily 41
Krulce, Makana 44
Kushner-Lenhoff, Samuel 62

L
Lancaster, Patrick 4
Le, Danny 29
Le, Janet 19
Lee, Alex 4
Lent, Daniella 36
Leon, Winona Riley 8
Li, Connie 68
Liang, Joanna 23
Liang, Tianqi (Amber) 90
Liang, Xinyu (Catherine) 104
Liao, William 37
Lin, Chi Tse (Jacob) 6
Lin, Joanne 37
Liu, Yuting 61
Loan, Mazen 19
Lobuglio, Brendan 4
Looby, Audrey 27
Lopera, Susana 4
Luong, Kim 56
Lyon, Ariadne 81

M
Mak, Boston 4
Maulik, Dipanwita 61
McBride, Katherine (Kate) 73
McDonnell, Patrick 15
17
21

McGillivray, Kaitlin 36
McMahon, Casey 82
McPherson, Krista 61
McRee, Ryan 14
Meier, Ryan 61
Mendoza, Adrian 4
Merced, Sara (Ivette) 73
Merrick, William 2
Miller, Ryan 65
Min, Jung-Gi 31

Minnich, Samantha 68
Moffett, Lillie 81
Mojarradi, Amir 2
Moore, Carrie 1
Moore, Tyler 9
Morgan, Alexander 4
Morris, Anaka 5

N
Nader, Michael 2
Naritoku, Alyssa 68
Nguyen, Jamie 92
Nguyen, Monica 58
Nguyen, Sophia 24
Nicholson, Kylie 20
Nishinaka, April 64

O
Omidvar, Hootan 98
Ontiveros, Roxana 77
Orr, William 95
O'Sullivan, Garrett 10
Ouyang, Ziyu 63
Overy, Cameron 6

P
Park, Annie 42
Patterson, Luke 4
Peabody, Kathryn (Katie) 94
Petit, Corey 76
<table>
<thead>
<tr>
<th>Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phillips, Elizabeth</td>
<td>7</td>
</tr>
<tr>
<td>Pittsley, Max</td>
<td>4</td>
</tr>
<tr>
<td>Qin, Zhiyin</td>
<td>35</td>
</tr>
<tr>
<td>Ramirez, Alfredo (Freddy)</td>
<td>59</td>
</tr>
<tr>
<td>Rao, Vishnu</td>
<td>36</td>
</tr>
<tr>
<td>Redda, Libanos (Libby)</td>
<td>62</td>
</tr>
<tr>
<td>Rehert, Rachel</td>
<td>97</td>
</tr>
<tr>
<td>Rhoads, Shawn</td>
<td>64</td>
</tr>
<tr>
<td>97</td>
<td></td>
</tr>
<tr>
<td>Risbud, Adwight</td>
<td>77</td>
</tr>
<tr>
<td>Robson, Marina</td>
<td>67</td>
</tr>
<tr>
<td>Romero, Francisco</td>
<td>53</td>
</tr>
<tr>
<td>Rosales, Rachel</td>
<td>46</td>
</tr>
<tr>
<td>Rosenberg, Shelby</td>
<td>92</td>
</tr>
<tr>
<td>Rotenstein, Vivian</td>
<td>96</td>
</tr>
<tr>
<td>Russell, Alexis</td>
<td>4</td>
</tr>
<tr>
<td>Shinsato, Darle</td>
<td>11</td>
</tr>
<tr>
<td>Singh, Sophia</td>
<td>64</td>
</tr>
<tr>
<td>Smith, Alexa</td>
<td>72</td>
</tr>
<tr>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Smith, Emma</td>
<td>4</td>
</tr>
<tr>
<td>So, Brandon</td>
<td>32</td>
</tr>
<tr>
<td>Song, Ziwei (Scarlet)</td>
<td>10</td>
</tr>
<tr>
<td>Sosa, Natasha</td>
<td>91</td>
</tr>
<tr>
<td>Stoneburner, Lauren</td>
<td>25</td>
</tr>
<tr>
<td>Strawbridge, Jason</td>
<td>48</td>
</tr>
<tr>
<td>Sturges, James</td>
<td>28</td>
</tr>
<tr>
<td>Suh, Gio (Kevin)</td>
<td>31</td>
</tr>
<tr>
<td>Sulistio, Christopher</td>
<td>41</td>
</tr>
<tr>
<td>Sun, Wendy</td>
<td>73</td>
</tr>
<tr>
<td>Swaidan, Catherine</td>
<td>88</td>
</tr>
<tr>
<td>Swaminathan, Sneha</td>
<td>28</td>
</tr>
<tr>
<td>Sy, Jonathan</td>
<td>48</td>
</tr>
<tr>
<td>Taing, Lilly</td>
<td>23</td>
</tr>
<tr>
<td>Tan, Wai Hwa (Ben)</td>
<td>4</td>
</tr>
<tr>
<td>Tanner, Richelle</td>
<td>27</td>
</tr>
<tr>
<td>57</td>
<td></td>
</tr>
<tr>
<td>Tavornwattana, James</td>
<td>33</td>
</tr>
<tr>
<td>Thieme, Cameron</td>
<td>66</td>
</tr>
<tr>
<td>Thomas, Christopher (Brady)</td>
<td>4</td>
</tr>
<tr>
<td>Thuy, Jamie</td>
<td>46</td>
</tr>
<tr>
<td>Tian, Lu</td>
<td>35</td>
</tr>
<tr>
<td>Tokunaga, Tyler</td>
<td>87</td>
</tr>
<tr>
<td>Tor, Kathleen</td>
<td>31</td>
</tr>
<tr>
<td>Salama, Engie</td>
<td>72</td>
</tr>
<tr>
<td>Schiffman, Tyler</td>
<td>103</td>
</tr>
<tr>
<td>Schugurensky, Alejandro</td>
<td>59</td>
</tr>
<tr>
<td>Semler, Amanda</td>
<td>18</td>
</tr>
<tr>
<td>Shan, Yu Chuan</td>
<td>63</td>
</tr>
<tr>
<td>Shaw, Brian</td>
<td>69</td>
</tr>
<tr>
<td>Shea, Elise</td>
<td>51</td>
</tr>
<tr>
<td>Shen, Audey</td>
<td>11</td>
</tr>
<tr>
<td>Shash, Joelle</td>
<td>67</td>
</tr>
<tr>
<td>So, Brandon</td>
<td>32</td>
</tr>
<tr>
<td>Smith, Alexa</td>
<td>72</td>
</tr>
<tr>
<td>Smith, Emma</td>
<td>4</td>
</tr>
<tr>
<td>So, Brandon</td>
<td>32</td>
</tr>
<tr>
<td>Song, Ziwei (Scarlet)</td>
<td>10</td>
</tr>
<tr>
<td>Sosa, Natasha</td>
<td>91</td>
</tr>
<tr>
<td>Stoneburner, Lauren</td>
<td>25</td>
</tr>
<tr>
<td>Strawbridge, Jason</td>
<td>48</td>
</tr>
<tr>
<td>Sturges, James</td>
<td>28</td>
</tr>
<tr>
<td>Suh, Gio (Kevin)</td>
<td>31</td>
</tr>
<tr>
<td>Sulistio, Christopher</td>
<td>41</td>
</tr>
<tr>
<td>Sun, Wendy</td>
<td>73</td>
</tr>
<tr>
<td>Swaidan, Catherine</td>
<td>88</td>
</tr>
<tr>
<td>Swaminathan, Sneha</td>
<td>28</td>
</tr>
<tr>
<td>Sy, Jonathan</td>
<td>48</td>
</tr>
<tr>
<td>Taing, Lilly</td>
<td>23</td>
</tr>
<tr>
<td>Tan, Wai Hwa (Ben)</td>
<td>4</td>
</tr>
<tr>
<td>Tanner, Richelle</td>
<td>27</td>
</tr>
<tr>
<td>57</td>
<td></td>
</tr>
<tr>
<td>Tavornwattana, James</td>
<td>33</td>
</tr>
<tr>
<td>Thieme, Cameron</td>
<td>66</td>
</tr>
<tr>
<td>Thomas, Christopher (Brady)</td>
<td>4</td>
</tr>
<tr>
<td>Thuy, Jamie</td>
<td>46</td>
</tr>
<tr>
<td>Tian, Lu</td>
<td>35</td>
</tr>
<tr>
<td>Tokunaga, Tyler</td>
<td>87</td>
</tr>
<tr>
<td>Tor, Kathleen</td>
<td>31</td>
</tr>
<tr>
<td>Salama, Engie</td>
<td>72</td>
</tr>
<tr>
<td>Schiffman, Tyler</td>
<td>103</td>
</tr>
<tr>
<td>Schugurensky, Alejandro</td>
<td>59</td>
</tr>
<tr>
<td>Semler, Amanda</td>
<td>18</td>
</tr>
<tr>
<td>Shan, Yu Chuan</td>
<td>63</td>
</tr>
<tr>
<td>Shaw, Brian</td>
<td>69</td>
</tr>
<tr>
<td>Shea, Elise</td>
<td>51</td>
</tr>
<tr>
<td>Shen, Audey</td>
<td>11</td>
</tr>
<tr>
<td>Shash, Joelle</td>
<td>67</td>
</tr>
<tr>
<td>So, Brandon</td>
<td>32</td>
</tr>
<tr>
<td>Smith, Alexa</td>
<td>72</td>
</tr>
<tr>
<td>Smith, Emma</td>
<td>4</td>
</tr>
<tr>
<td>So, Brandon</td>
<td>32</td>
</tr>
<tr>
<td>Song, Ziwei (Scarlet)</td>
<td>10</td>
</tr>
<tr>
<td>Sosa, Natasha</td>
<td>91</td>
</tr>
<tr>
<td>Stoneburner, Lauren</td>
<td>25</td>
</tr>
<tr>
<td>Strawbridge, Jason</td>
<td>48</td>
</tr>
<tr>
<td>Sturges, James</td>
<td>28</td>
</tr>
<tr>
<td>Suh, Gio (Kevin)</td>
<td>31</td>
</tr>
<tr>
<td>Sulistio, Christopher</td>
<td>41</td>
</tr>
<tr>
<td>Sun, Wendy</td>
<td>73</td>
</tr>
<tr>
<td>Swaidan, Catherine</td>
<td>88</td>
</tr>
<tr>
<td>Swaminathan, Sneha</td>
<td>28</td>
</tr>
<tr>
<td>Sy, Jonathan</td>
<td>48</td>
</tr>
<tr>
<td>Taing, Lilly</td>
<td>23</td>
</tr>
<tr>
<td>Tan, Wai Hwa (Ben)</td>
<td>4</td>
</tr>
<tr>
<td>Tanner, Richelle</td>
<td>27</td>
</tr>
<tr>
<td>57</td>
<td></td>
</tr>
<tr>
<td>Tavornwattana, James</td>
<td>33</td>
</tr>
<tr>
<td>Thieme, Cameron</td>
<td>66</td>
</tr>
<tr>
<td>Thomas, Christopher (Brady)</td>
<td>4</td>
</tr>
<tr>
<td>Thuy, Jamie</td>
<td>46</td>
</tr>
<tr>
<td>Tian, Lu</td>
<td>35</td>
</tr>
<tr>
<td>Tokunaga, Tyler</td>
<td>87</td>
</tr>
<tr>
<td>Tor, Kathleen</td>
<td>31</td>
</tr>
<tr>
<td>Name</td>
<td>Age</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----</td>
</tr>
<tr>
<td>Torabi, Sina</td>
<td>47</td>
</tr>
<tr>
<td>Tran, Cassandra</td>
<td>43</td>
</tr>
<tr>
<td>Tran, Jessica</td>
<td>35</td>
</tr>
<tr>
<td>Trivedi, Mehul</td>
<td>39</td>
</tr>
<tr>
<td>Tsui, Leah</td>
<td>60</td>
</tr>
<tr>
<td>Tyus, Alleluia</td>
<td>16</td>
</tr>
<tr>
<td>Tzeng, William</td>
<td>26</td>
</tr>
<tr>
<td>Umel, Ilani Fay</td>
<td>4</td>
</tr>
<tr>
<td>Vadera, Atticus</td>
<td>15</td>
</tr>
<tr>
<td>Vasan, Karthik</td>
<td>47</td>
</tr>
<tr>
<td>Victoria, Vicente (Vince)</td>
<td>93</td>
</tr>
<tr>
<td>Villanueva, Luis</td>
<td>91</td>
</tr>
<tr>
<td>Walsh, Mathew</td>
<td>59</td>
</tr>
<tr>
<td>Wang, Chenyu</td>
<td>49</td>
</tr>
<tr>
<td>Wang, Linda</td>
<td>20</td>
</tr>
<tr>
<td>Wang, Renée</td>
<td>66</td>
</tr>
<tr>
<td>Welborn, Robert (Bryce)</td>
<td>58</td>
</tr>
<tr>
<td>Wessing, Dillon</td>
<td>58</td>
</tr>
<tr>
<td>White, Luna</td>
<td>84</td>
</tr>
<tr>
<td>Wilhelm, Caitlin</td>
<td>78</td>
</tr>
<tr>
<td>Windler, Carolyn</td>
<td>84</td>
</tr>
<tr>
<td>Wong, Janice</td>
<td>22</td>
</tr>
<tr>
<td>Xu, Linda</td>
<td>61</td>
</tr>
<tr>
<td>Yang, Yeji</td>
<td>92</td>
</tr>
<tr>
<td>Yang, Yifei (Luke)</td>
<td>64</td>
</tr>
<tr>
<td>Yao, Yuan</td>
<td>2</td>
</tr>
<tr>
<td>Yasui, Remi</td>
<td>8</td>
</tr>
<tr>
<td>Yi, Xinyu</td>
<td>55</td>
</tr>
<tr>
<td>Ying, Jasmine</td>
<td>4</td>
</tr>
<tr>
<td>Yoo, Joseph</td>
<td>52</td>
</tr>
<tr>
<td>Young, Katherine</td>
<td>39</td>
</tr>
<tr>
<td>Yue, Janis</td>
<td>89</td>
</tr>
<tr>
<td>Zeineddine, Farid</td>
<td>45</td>
</tr>
<tr>
<td>Zhang, Forrest</td>
<td>64</td>
</tr>
</tbody>
</table>
Symposium Participants by Category

Arts

Abella, Paulina Sabrina 3
Baron, Daniela 13
Bello, Deborah 4
Benavente, Isabella Marie 4
Bendinelli, Gus 2
Billups, Briana 12
Cherry, William 2
Chiou, Caroline 4
Chooljian, Catherine 4
Chootong, Norman 4
Collins, Paula 4
Dickinson, Zara 6
Duan, Michael 4
Due, Miranda 2
Effenberger, Michael 2
Flores, Nicole 9
Fong, Victoria 9
Franklin, Peter 2
Frere-Carossio, Quentin 4
Fukuda, Kial 4
Gabriel, Greta 9
Gordon, Natalie 1
Gordon, Victoria 1
Guevarra, Maracel (Mara) 4
Gupta, Anshul 7
Helstad, Stephen 2
Ho, Jonathan 2
Hood, Katherine 4
Hou, Fangli (Simon) 4
Huck, Sarah 2
Ilgen, William 2
Iskandar, Jonathan (Nathan) 4
Jakob, Kirsten 7
Lancaster, Patrick 4
Lee, Alex 4
Leon, Winona Riley 8
Lin, Chi Tse (Jacob)  6
Lobuglio, Brendan  4
Lopera, Susana  4
Mak, Boston  4
Mendoza, Adrian  4
Merrick, William  2
Mojarradi, Amir  2
Moore, Carrie  1
Moore, Tyler  9
Morgan, Alexander  4
Morris, Anaka  5
Nader, Michael  2
O’Sullivan, Garrett  10
Overy, Cameron  6
Patterson, Luke  4
Phillips, Elizabeth  7
Pittsley, Max  4
Russell, Alexis  4
Shen, Audey  11
Shinsato, Darle  11
Smith, Emma  4
Song, Ziwei (Scarlet)  10
Tan, Wai Hwa (Ben)  4
Thomas, Christopher (Brady)  4
Umel, Ilani Fay  4
Yao, Yuan  2
Yasui, Remi  8
Ying, Jasmine  4

Castilla, Nina  16
Espinoza, Cameron  16
George, Sanford (Sandy)  15
Im, Eun (Sharon)  17
Le, Janet  19
Loan, Mazen  19
McDonnell, Patrick  15
McRee, Ryan  14
Nicholson, Kylie  20
Semler, Amanda  18
Tyus, Alleluia  16
Vadera, Atticus  15
Wang, Linda  20

Blant, Aidan  17
Campion, Rosebud  14

Humanities

Life Sciences

Azam, Sana  26
Banh, Dalton  30
Bettadapur, Archana  31
Chen, Zachary  26
Chou, Helen  38
Copparam, Saumya (Sam)  44
Das, Devika  49
Farrahi, Layla  42
Ficek, Bronte  40
Freiberg, Yael  34
Heintz, Ryan  33
Hua, Clara  31
Huang, Vincent  48
<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huynh, Pauline</td>
<td>25</td>
</tr>
<tr>
<td>Jiang, Crystal</td>
<td>29</td>
</tr>
<tr>
<td>Jiang, Joanne</td>
<td>39</td>
</tr>
<tr>
<td>Jordan, Tristan</td>
<td>38</td>
</tr>
<tr>
<td>Kim, Emmeline</td>
<td>31</td>
</tr>
<tr>
<td>Kim, Nahyun (Mariah)</td>
<td>48</td>
</tr>
<tr>
<td>Kopania, Emily</td>
<td>41</td>
</tr>
<tr>
<td>Krulce, Makana</td>
<td>44</td>
</tr>
<tr>
<td>Le, Danny</td>
<td>29</td>
</tr>
<tr>
<td>Lent, Daniella</td>
<td>36</td>
</tr>
<tr>
<td>Liang, Joanna</td>
<td>23</td>
</tr>
<tr>
<td>Liao, William</td>
<td>37</td>
</tr>
<tr>
<td>Lin, Joanne</td>
<td>37</td>
</tr>
<tr>
<td>Looby, Audrey</td>
<td>27</td>
</tr>
<tr>
<td>McGillivray, Kaitlin</td>
<td>36</td>
</tr>
<tr>
<td>Min, Jung-Gi</td>
<td>31</td>
</tr>
<tr>
<td>Nguyen, Sophia</td>
<td>24</td>
</tr>
<tr>
<td>Park, Annie</td>
<td>42</td>
</tr>
<tr>
<td>Qin, Zhiyin</td>
<td>35</td>
</tr>
<tr>
<td>Rao, Vishnu</td>
<td>36</td>
</tr>
<tr>
<td>Rosales, Rachel</td>
<td>46</td>
</tr>
<tr>
<td>So, Brandon</td>
<td>32</td>
</tr>
<tr>
<td>Stoneburner, Lauren</td>
<td>25</td>
</tr>
<tr>
<td>Strawbridge, Jason</td>
<td>48</td>
</tr>
<tr>
<td>Sturges, James</td>
<td>28</td>
</tr>
<tr>
<td>Suh, Gio (Kevin)</td>
<td>31</td>
</tr>
<tr>
<td>Sulistio, Christopher</td>
<td>41</td>
</tr>
<tr>
<td>Swaminathan, Sneha</td>
<td>28</td>
</tr>
<tr>
<td>Sy, Jonathan</td>
<td>48</td>
</tr>
<tr>
<td>Taing, Lilly</td>
<td>23</td>
</tr>
<tr>
<td>Tanner, Richelle</td>
<td>27</td>
</tr>
<tr>
<td>Tavorntwattana, James</td>
<td>33</td>
</tr>
<tr>
<td>Thuy, Jamie</td>
<td>46</td>
</tr>
<tr>
<td>Tian, Lu</td>
<td>35</td>
</tr>
<tr>
<td>Tor, Kathleen</td>
<td>31</td>
</tr>
<tr>
<td>Torabi, Sina</td>
<td>47</td>
</tr>
<tr>
<td>Tran, Cassandra</td>
<td>43</td>
</tr>
<tr>
<td>Tran, Jessica</td>
<td>35</td>
</tr>
<tr>
<td>Trivedi, Mehul</td>
<td>39</td>
</tr>
<tr>
<td>Tzeng, William</td>
<td>26</td>
</tr>
<tr>
<td>Vasan, Karthik</td>
<td>47</td>
</tr>
<tr>
<td>Wang, Chenyu</td>
<td>49</td>
</tr>
<tr>
<td>Wong, Janice</td>
<td>22</td>
</tr>
<tr>
<td>Young, Katherine</td>
<td>39</td>
</tr>
<tr>
<td>Zeineddine, Farid</td>
<td>45</td>
</tr>
</tbody>
</table>

**Physical Sciences, Math & Engineering**

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin, Matthew</td>
<td>67</td>
</tr>
<tr>
<td>Beaudin, Jacob</td>
<td>59</td>
</tr>
<tr>
<td>Brown, Evan</td>
<td>59</td>
</tr>
<tr>
<td>Chan, Kevin</td>
<td>51</td>
</tr>
<tr>
<td>Chan, Lesley</td>
<td>58</td>
</tr>
<tr>
<td>Chen, Jianliang</td>
<td>61</td>
</tr>
<tr>
<td>Chen, Xinkai (Casey)</td>
<td>64</td>
</tr>
<tr>
<td>Chen, Yinyi</td>
<td>61</td>
</tr>
<tr>
<td>Clarkin, Taylor</td>
<td>53</td>
</tr>
<tr>
<td>DaSilva, Natalia</td>
<td>54</td>
</tr>
<tr>
<td>Do, Thomas</td>
<td>65</td>
</tr>
<tr>
<td>Dougherty, Christopher</td>
<td>65</td>
</tr>
<tr>
<td>Espana, Ruben</td>
<td>68</td>
</tr>
<tr>
<td>George, Alaina</td>
<td>68</td>
</tr>
<tr>
<td>Gil, Howard</td>
<td>67</td>
</tr>
<tr>
<td>Gustavson, Marissa</td>
<td>68</td>
</tr>
</tbody>
</table>
Hara, Ellie 51
Hernandez, Cesar 64
Herrera-Rice, Troy 68
Heyer, Karl 55
Homma, Heidi 56
Hong, Jane 58
Jia, Yimin 61
Kedzie, Elyse 56
Kushner-Lenhoff, Samuel 62
Li, Connie 68
Liu, Yuting 61
Luong, Kim 56
Maulik, Dipanwita 61
McPherson, Krista 61
Meier, Ryan 61
Miller, Ryan 65
Minnich, Samantha 68
Naritoku, Alyssa 68
Nguyen, Monica 58
Nishinaka, April 64
Ouyang, Ziyu 63
Ramirez, Alfredo (Freddy) 59
Redda, Libanos (Libby) 62
Rhoads, Shawn 64
Robson, Marina 67
Romero, Francisco 53
Schugurensky, Alejandro 59
Shan, Yu Chuan 63
Shaw, Brian 69
Shea, Elise 51
Singh, Sophia 64
Tanner, Richelle 57
Thieme, Cameron 66
Tsui, Leah 60
Walsh, Mathew 59
Wang, Renée 66
Welborn, Robert (Bryce) 58
Wessing, Dillon 58
Xu, Linda 61
Yang, Yifei (Luke) 64
Yi, Xinyu 55
Yoo, Joseph 52
Zhang, Forrest 64

Social Sciences

Adib, Hania 95
Antosy, Alexandra 90
Arcos, Karen 101
Arogyaswamy, Sagarika 99
Banh, Heidi 100
Banh, Helen 100
Begur, Manali 98
Bhide, Saee (Sayuli) 82
Carey, Margaret (Magalie) 72
Chang, Jennifer 80
Cheng, Crescent 101
Childress, Steven 78
Cho, Eun Ah 85
Chuang, Cheng-Wei (Isaac) 71
Clark, John (Andrew) 72
Demian, Haley 77
Dhanani, Karishma 93
Djrbashian, Anoush 77
<table>
<thead>
<tr>
<th>Name</th>
<th>Grade</th>
<th>Name</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fong, Judith</td>
<td>99</td>
<td>Rosenberg, Shelby</td>
<td>92</td>
</tr>
<tr>
<td>Foon, Chloe</td>
<td>75</td>
<td>Rotenstein, Vivian</td>
<td>96</td>
</tr>
<tr>
<td>Fullerton, Angelica (Angie)</td>
<td>79</td>
<td>Salama, Engie</td>
<td>72</td>
</tr>
<tr>
<td>Furlong, Jordan</td>
<td>83</td>
<td>Schiffman, Tyler</td>
<td>103</td>
</tr>
<tr>
<td>Gago, Cristina</td>
<td>74</td>
<td>Smith, Alexa</td>
<td>72</td>
</tr>
<tr>
<td>Garcia-Nava, Wendy</td>
<td>85</td>
<td></td>
<td>80</td>
</tr>
<tr>
<td>Guller, Jodie</td>
<td>91</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>102</td>
<td></td>
<td>102</td>
</tr>
<tr>
<td>Hakimeh, Mary</td>
<td>88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haque, Afsara (Sara)</td>
<td>92</td>
<td>Sun, Wendy</td>
<td>73</td>
</tr>
<tr>
<td>Hirata, Tori</td>
<td>82</td>
<td>Swaidan, Catherine</td>
<td>88</td>
</tr>
<tr>
<td>Hossepijan, Kristene</td>
<td>75</td>
<td>Tokunaga, Tyler</td>
<td>87</td>
</tr>
<tr>
<td>Irvine, Krystle</td>
<td>87</td>
<td>Victoria, Vicente (Vince)</td>
<td>93</td>
</tr>
<tr>
<td>Jones, Rachel</td>
<td>103</td>
<td>Villanueva, Luis</td>
<td>91</td>
</tr>
<tr>
<td>Kariyawasam, Shivanti</td>
<td>86</td>
<td>White, Luna</td>
<td>84</td>
</tr>
<tr>
<td>Kim, Curtis</td>
<td>98</td>
<td>Wilhelm, Caitlin</td>
<td>78</td>
</tr>
<tr>
<td>Kondo, Jordan</td>
<td>92</td>
<td>Windler, Carolyn</td>
<td>84</td>
</tr>
<tr>
<td>Liang, Tianqi (Amber)</td>
<td>90</td>
<td>Yang, Yeji</td>
<td>92</td>
</tr>
<tr>
<td>Liang, Xinyu (Catherine)</td>
<td>104</td>
<td>Yue, Janis</td>
<td>89</td>
</tr>
<tr>
<td>Liao, William</td>
<td>92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lyon, Ariadne</td>
<td>81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McBride, Katherine (Kate)</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McMahon, Casey</td>
<td>82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merced, Sara (Ivette)</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moffett, Lillie</td>
<td>81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nguyen, Jamie</td>
<td>92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Omidvar, Hootan</td>
<td>98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ontiveros, Roxana</td>
<td>77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orr, William</td>
<td>95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peabody, Kathryn (Katie)</td>
<td>94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pettit, Corey</td>
<td>76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rehert, Rachel</td>
<td>97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhoads, Shawn</td>
<td>97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risbud, Adwight</td>
<td>77</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2015 Undergraduate Symposium
Tutor Campus Center – Franklin Suite (TCC 350/1/2)

Social Sciences

H13 SS25 SS26

SS35 SS34 SS33

SS30 SS31 SS32

SS27 SS28 SS29

H12 H11 H10

H09 H08 H07

H01 H02 H03

H04 H05 H06

Humanities

A – Arts
H – Humanities
LS – Life Sciences
PS – Physical Sciences
SS – Social Sciences
A – Arts
H – Humanities
LS – Life Sciences
PS – Physical Sciences
SS – Social Sciences