12th Annual Undergraduate Symposium for Scholarly and Creative Work

April 14, 2010
# UNDERGRADUATE SYMPOSIUM FOR SCHOLARLY & CREATIVE WORK

## SCHEDULE OF EVENTS

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<th>Date</th>
<th>Event</th>
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<td>Tuesday, April 13, 2010</td>
<td>Symposium Judging</td>
<td>9:00 am – 5:00 pm</td>
<td>Friends Lecture Hall at Doheny Library</td>
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<td>(Judges only – closed to presenters and general public)</td>
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<td>Wednesday, April 14, 2010</td>
<td>General Presentations, Exhibits, and Displays</td>
<td>11:00 a.m. - 2:00 p.m.</td>
<td>Trousdale Parkway</td>
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<td>Awards Ceremony &amp; Dinner Reception</td>
<td>6:00 p.m. – 7:30 pm</td>
<td>Town &amp; Gown</td>
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April 14, 2010

Dear Members of the USC Community:

It is my pleasure to welcome you to USC’s 12th 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, Mathematics & 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 Town & Gown 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,

Elizabeth Garrett
Vice President for Academic Planning and Budget
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 over 120 submissions with participation from over 160 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 Trojan Knights for their faithful service. Also, we would like to give 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.

THANK YOU!!!
# 12th Annual Undergraduate Symposium for Scholarly and Creative Work

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Arts

Category: Arts
Name(s): Jason Kim
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Frank Clementi, Architecture
Format: Creative Work
Title: (il)Legitimate Art
Abstract:
Graffiti has always maintained a dual reputation for as long as it existed. Two people may look at the same graffiti art on a wall and may have two opposite opinions about the piece. One may consider graffiti to be a bold and major art movement making a political statement, while the other may consider it defacement of property and vandalism that is related to gang banging. While, both parties may be true, the fact remains that many major cities around the world have a number of their buildings tagged with these art pieces; the issue then is whether to permit it, indulge it and perhaps embrace it, or to make more efforts to mediate it for the public.

In Paris, France, the Seine Rive Gauche development, artists have illegally squatted in some abandoned warehouses and tagged the facades of these buildings with their art. Fully realizing that defacement of property may be an issue, there was a heated debate over whether or not these artists should have subsidized housing within these factories that they graffitied. The government eventually legalized the squatting by making a contract that the artist may live there for free as long as they put on a biannual exhibition for the public. Les frigos, the subsidized artist residency, now houses over 250 artists.

The topic studio project tries to address the duality of graffiti art and its role in today’s society. The project tries to emulate other subsidized artist residency such as the L.A. brewery or Les Frigos in France, and therefore provides a specific design that is intended for the artist user groups who live within it as well as the public who may exhibit the residency as they would a museum.

Category: Arts
Name(s): Naveen Chaubal
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Jeff Lengyel, School of Cinematic Arts
Format: Creative Work
Title: 46321
Abstract:
short film submission
Category: Arts
Name(s): Jonathan Munoz-Proulx
Submission Type: Individual
Faculty Sponsor(s) and Department(s):
Eric Trules, School of Theatre
Format: Creative Work
Title: A Life In Progress: A Solo Performance by Jonathan Munoz-Proulx
Abstract:
The study of acting always has been, and always will be, the study of human psychology. A Life In Progress is a one-man, autobiographical play that I have developed over the past two years which explores themes of gender, sexuality, masculinity, identity, conformity, friendship, and mental health through the medium of solo-performance storytelling. In addition to being an source of entertainment, this piece also inspires many questions about the themes it discusses. This project has been the springboard for my own research in the field of friendship between homosexual and heterosexual men, specifically the stages of friendship, and what makes these stages unique to gay-straight relationships. To support this script, I have begun research in the departments of psychology, sociology and gender studies. Through my research I have found that there is very little published information about friendship. Furthermore, the information I have found has mostly explored friendship between heterosexual men, heterosexual women, homosexual men or heterosexual women and homosexual men. I have found less information about friendship between homosexual women or homosexual persons of the opposite sex, and I have found close to no information about friendship between homosexual and heterosexual men, let alone an analytical evaluation of the stages experienced within this relationship. I have, however, found personal essays from homosexual men who write about their friendships with heterosexual men, but these homosexual men also write that they have not yet identified themselves as homosexual. It is my hope that this autobiographical script will arouse questions and bring attention to the lack of research being done in this area. I offer personal accounts of my own gay-straight friendships and explore my experiences form first grade through college, challenging what I have felt has been expected of me.

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Title: A Love Not Standing
Name(s): John Redlinger, Sam Schweikert
Submission Type: Group
Faculty Sponsor(s) and Department(s):
Boni Alvarez, Theatre
Format: Creative Work
Title: A Love Not Standing
Abstract:
When Ryan is faced with the prospect of yet another blind date he considers the effects of his extreme nerves on past dates. But when he meets his new lady, Ryan gets more than he bargained for! A Love Not Standing is a creative comedic short film that deals wit such issues as men and women, hallucinations, and transgender relations.

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Title: A Self Expressive Truth
Name(s): Martin Benson
Submission Type: Individual
Faculty Sponsor(s) and Department(s):
Evan Holloway, Roski School of Fine Arts
Format: Creative Work
Title: A Self Expressive Truth
Abstract:
Human beings are divided by a duality of actions, one being cognitive (mind) and the other physical (body). These two components are also broken down in opposing pairs, the mind having conscious and subconscious sensibilities and the body
having internal and external relationships. This duality of function is consistent with every human on the planet. However, there undeniably exists a distinct harmony between the mind and the body, composing our independent perceptions of the world. After accumulating a library of images deriving from personal experiences, I found the perception of my own life to be an intriguing subject matter to explore more deeply. The most natural way for me to translate something truthful from these explorations is by expressively re-imagining the moment captured in one of my photographs. This takes place through the action of painting. Each piece is created through an interplay between conscious and subconscious layering of paint. My conscious mind serves to keep the representation of the image intact as my subconscious mind serves to create expressive textures and colors. This method brings to the surface something unseen in the photograph, representing the totality of my perception of what lies in the frame. This is achieved by using a premeditated image and expressing it down the tunnel of a remembered experience. By displaying what was physically present in the photo seamlessly with the expression of what was emotionally triggered, the art object is born. This form of artistic expression exemplifies the duality of my human nature, truthfully expressing a perception of the world I undeniably posses. A perception drenched in optimism and motivated by connection. What is left behind can be considered nothing short of a subsidiary truth, displaying a painting style layered in complete harmony to accurately depict the ongoing narrative of my subjective human experience.

§§§§

Category: Arts
Name(s): Nathan Thome
Submission Type: Individual
Faculty Sponsor(s) and Department(s): James Steele, Architecture
Format: Creative Work
Title: Ban Nam Yen School
Abstract:
The new Ban Nam Yen campus allows students to grow in a comfortable learning environment with a balance of moral cultivation and academic training. The campus inculcates an empowering learning mentality for Thai students: be confident and think imaginatively. The main design strategy was to create smaller scaled learning environments which connect nature and Thai culture, while allowing interaction between all grade levels. The vibrancy of Thai culture is immediately evident in northern Thailand and, given that 96% of the population is Buddhist, religious rituals are incorporated in all facets of daily life. Researching these two topics revealed spectacular design opportunities which appear across the campus, resulting in a truly well-rounded education.

Our primary design concept draws from the Phi Ta Khon festival in Loei. This traditional dance is choreographed according to a legend which tells of a ghost procession from the forest, adorned with colorful masks and colors. Our project puts all the buildings along the trees lining the site and, with our open classroom design, nature “processes” into the learning environment. The classroom design is extremely open and free-flowing with only sliding screens, referencing the Phi Ta Khon masks, as partitions. Nature becomes the backdrop for the classroom, rather than a plain, solid wall. Natural light floods the room while a generous overhang protects children from rain and direct sunlight. Shared areas between classrooms give the children a place to converse during lunch, outdoor science demonstrations, or a
shared activity between both classrooms. This concept is also incorporated into the library, computer rooms, and exiting structures. The other main attractions of the campus include a new auditorium, which provides a unique meditation area overlooking a Zen garden, which transforms between wet and dry seasons, and an elaborate bamboo walkway which adds an iconic element to the school's identity.

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Title: Band-Aids® in a New Light
Name(s): Alexis Markavage
Faculty Sponsor(s) and Department(s): Steve Child, Roski School of Fine Art; Esther Kim, Roski School of Fine Art; Haven Lin-Kirk, Roski School of Fine Art
Format: Creative Work
Title: Band-Aids® in a New Light
Abstract:
The idea was to design a contemporary feel for the brand that builds on its history and brand loyalty, while helping the consumer to see band-aids in a new light. The first item is a stop-motion video that would be used in a television spot or online viral video. The second item is a floor sticker that would be used in a grocery store to direct customers to the product. The last item is basic packaging design that ties the product visually to the campaign.

This campaign is designed to shed a new light on Band-Aids while building on brand loyalty and stressing the importance of the product in the American culture. Aesthetically speaking, the campaign is meant to convey the idea of “new and improved,” while also being nostalgic. The brand has been trusted for years and many consumers can recall being comforted with a band-aid, thus the use of cartoons found from the 1950’s and 60’s, inspired by Matte Stephens.
began by testing different design methods, experimenting with tensile fabric structures, as well as compressive "space frame" structures. After repeated failure in compressive structures, we tailored our design to weave a "fabric" that would maximize the cable ties' inherent and unique capability of attaching to itself without the use of any outside glue or fastening system. We began with a standard rectangular bench form and essentially carved out an area to fit the contours of the human body. In the full scale construction of the lounge, we used different length cable ties to create a calculated contour that would fit the form of the human body. The different lengths of cable ties create different heights in the lounge when folded over themselves, which granted us the ability to intentionally make certain areas of the lounge thicker than others. The resulting cable tie fabric has a double sided nature, with a dynamic interior and a smooth exterior, allowing the lounge to retain its shape and function while maintaining an aesthetic that purely features the dynamic capabilities of a simple material.

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Category: Arts
Name(s): Charles Martensen
Submission Type: Individual
Faculty Sponsor(s) and Department(s):
Susan McCabe, English Department
Format: Creative Work
Title: Contemporary Enough
Abstract:
I see this collection as a narrative of my own evolution, coming to terms with my self in all its facets- an evolution that runs parallel to evolution of the private museum I have accumulated through experience. While sexuality and gender is a predominant subject in my writing, I do not consider it a predominant element of my life or work. Rather, sexuality and relationships are areas of my life that have had a clear gestation that can examined. The narrative of my sexual development as a young man of the 21st century affords the luxury of chronology. After I wrote many poems, I realized what connected a great number them was an interrogation, or exploration, rather, of the space between what I have been exposed to and my notions of Self. By that, I mean that I recognized that in the composition of my poems were traces of specific objects and concepts I have been exposed to thus far in the crucible of my education; it is as if the poems are the result of a dialectic between learning and being, or, more simply, nurture and nature. How is it we all can see our human selves in great and lowly pieces of art, or even in high philosophical and theoretical concepts? And what is the distance between this resonance with ideas (and images), and the being that is exposed to them, what we call “Self”? Is participation in this non-binary relationship learned? I believe that is is through my survey of the world that I am better able to understand myself and my beliefs. That through an exposure to external phenomena, I gain points of reference for my interiority. Contemporary Enough is a poetry collection that contextualizes personal development within the larger development and contemporization of Culture.

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Category: Arts
Name(s): Michael Jacobs
Submission Type: Individual
Faculty Sponsor(s) and Department(s):
Richard Parker, Roski
Format: Creative Work
Title: Converse
Abstract:
A charcoal drawing of my right Converse shoe. The piece is an exploration of different textures, from the laces to the metal rings.
Title: Latrine Lander
Name(s): Yuan-Yu Chang
Faculty Sponsor(s) and Department(s): Erik Mar, Architecture
Submission Type: Individual
Category: Arts
Format: Creative Work
Abstract:
The Latrine Lander is a latrine system designed to be easily transported, rapidly assembled, and manually constructed. Materials consist mainly of aluminum, plastic, and waterproof fabric. The panels are opaque to reduce heat gain and are dyed orange to be visible in all lighting conditions. Intended for use in tropical regions prone to flooding, the Latrine Lander is also adaptable to other climates by using panels of the appropriate material and design. The project can be further developed to a flat pack configuration for easier shipping and handling.

Eco-sanitation/compost toilets are comprised of a raised platform above two chambers per toilet, one in use and one composting. Organic material is regularly added to the chamber to introduce carbon for composting, to oxygenate the composting process and neutralize odors. It takes roughly five months for pathogen free compost to be produced. To help prevent the toilet from smelling, feces and urine are not allowed to mix, as a chemical reaction between the two creates odor. Therefore, a pipe takes urine to a separate chamber. This may be used to make pellets that can be stored and used to nourish soils for crop growth, or directly mixed with water and sprinkled on plants. The compost produced is either sold – there is a ready demand – or used by the villagers themselves replacing expensive chemical fertilizers. The introduction of eco-sanitation facilities can lead to many benefits, not least the positive diversion of hard-earned wages from medical supplies, combating parasitic and intestinal illness, to food or education.

Source: http://www.wherevertheneed.org/projects/eco-sanitation2.htm

Title: Life in Retrograde
Name(s): Stephanie Spoleti
Faculty Sponsor(s) and Department(s): Peter Robinson, School of Cinematic Arts
Submission Type: Individual
Category: Arts
Format: Creative Work
Abstract:
This is a story of two people who are desperate to remedy the mistakes they committed in their youth. Convinced that their lives would improve if only they could change a single event in their personal histories, they devise a complicated method of traveling through time. However, in the process of correcting their mistakes, they just about ruin their chances of being truly happy in the future. Kevin Spimtace is a credit margin supervisor at Vandex, a large company. From the beginning, we see that Kevin isn’t exactly normal. He’s a master at reading people, predicting their thoughts and behaviors. But, even though he knows exactly how others feel, he’s strangely apathetic and bored with everyone and their daily dilemmas. He sleeps with all the women, including the company intern. His only concern is whether something is “morally” right or wrong.

Meanwhile, poor business practices have brought Vandex to the brink of bankruptcy. As if that weren’t bad enough, someone named Arnold Benning has just made a purchase of $5,000,000 on a Vandex unlimited card. The managers at Vandex are panicked----because if Arnold defaults on the $5,000,000, it would be disaster. They decide that they need to hire a collection agent.
When Kevin sees that Arnold Benning spent the money at an institute for molecular research, he becomes curious, kind of insanely curious, as to what this big-ticket item could be. After a decade of reading reports of people buying dull things like furniture and office supplies, Kevin is totally intrigued by the mystery behind Arnold Benning’s purchase. In order to find out what it is, Kevin volunteers to serve as Vandex’s collection agent.

What follows is a quantum-inspired romance which explores how the themes of regret and desire change throughout time.

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**Title:** Mufasa

**Name(s):** Lillian Lin

**Faculty Sponsor(s) and Department(s):** John Pollini, College of Letters Arts and Sciences

**Submission Type:** Individual

**Format:** Creative Work

**Category:** Arts

**Abstract:**
Throughout my life, I’ve always been fascinated by color. Color can give such great depth and convey a strong response. It gives everything a mood and character. Bright and bold colors provoke a sense of excitement, while dull and cool colors create a sense of emptiness and melancholy. I use color as a device to give my art pieces life.

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**Title:** Museum Series

**Name(s):** David Aguilar

**Faculty Sponsor(s) and Department(s):** Ron Rizk, Fine Arts

**Submission Type:** Individual

**Category:** Arts

**Format:** Creative Work

**Abstract:**
The Museum Series consists of five, identically mounted paintings that track the evolution of the human mind. Each painting is mounted on a square piece of stained wood with a small gold plaque in the bottom right corner that lists the title, as well as some brief prose. All writing is in Latin to suggest the human mind is being tracked by a civilization beyond us.

The first piece, "TECTVM" translates into "The Shell" and the basic color scheme is influenced by Piet Mondrian. TECTVM represents the most basic form of the mind, that which is limited to a physical form—the brain. The composition is of a black and white snail-like shell with three tentacles coming out of the top, each one painted in one of the three primaries.

The second piece "VOLATVS" is translated as "Flight." The form is a butterfly, also painted in "Mondrianesque" colors, though with subtle introductions of the secondary colors. This painting represents the mind as it has evolved to create hypothetical situations, and experience "that which is beyond us," as is stated in the prose.

Third is "LINGVA," or Language. This piece fully embraces the full color spectrum and is represented by varying triangular forms that are painted in styles reminiscent of different cultures. By embracing language, humans are able to communicate and share the thoughts their minds have created.

The fourth is "COGNITIO" or Recognition. By recognizing how our mind and body
work, we are able to recreate aspects of them. The form of this piece is of differing bubble-like shapes, replications similar to TECTVM.

Lastly is "ESSE" Existence. Circuit boards and plexiglass are cut in a fetal-like shape, suggesting that through our ingenuity we have created a new kind of creature, one that is "Not life, not death, simply to be."

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Category: Arts
Name(s): Yoon Her
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Richard Corsini, Architecture
Format: Creative Work
Title: New Visionary Car Showroom for Los Angeles Downtown
Abstract:
Form Function Program Movement System Tectonic

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Category: Arts
Name(s): Annamaria Feist, Andrea Vancura
Submission Type: Group
Faculty Sponsor(s) and Department(s): Everett Lewis, School of Cinematic Arts
Format: Creative Work
Title: Orange Appeel
Abstract:
A fruit-loving young woman receives a basket from an unknown sender, which she proceeds to open, revealing oranges. Happily peeling the oranges, she finds neither the gift nor the fruit to be what she expects as she descends into the throes of madness. Will she survive?

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Category: Arts
Name(s): Jeremy Allen
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Steve Child, Roski School of Fine Arts; Shannon Ebner, Roski School of Fine Arts; Haven Lin-Kirk, Roski School of Fine Arts
Format: Creative Work
Title: Paris Portraits
Abstract:
With only a vintage Vivitar camera in hand, I strive to get to know my fellow classmates -- all former strangers to me -- on a semester abroad program in Paris. By posing the question "What spot in Paris most defines you" to my peers, I forged a dialogue between place and personality, image and speech. My new friends answered, and I responded with the click of the shutter. I spent a morning, afternoon, or evening with each student, becoming immersed in the splendor of each one of their backstories as well as the splendor of the city that united us. As I planned photoshoots with my peers, I began to spend my days thinking of which angles would bring out their best qualities, which colors would most complement their complexions, which locations would most effectively translate their unique personalities into visual language. In framing my images, I tried to reference the iconic tableaus of such contemporary masters as Annie Leibovitz, Norman Jean Roy, Steven Klein, and Mario Testino -- photographers who are mostly known for their poetic fashion portraits. By lending my images a bit of a glossy, editorial edge, I attempted to make my newfound friends into icons; after all, having spent hours photographing each one of them, they became larger than life to me in their own ways. Though we returned to the United States in late December, I look back at the pictures and instantly experience that same rush of discovery that I felt at the time of
the shoots -- a sense that defined an entire semester of transient moments captured forever on film.

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Category: Arts
Name(s): Lindsey Cohen
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Jennifer Warren, School of Cinematic Arts
Format: Creative Work
Title: Pez
Abstract:
Synopsis: In a colorful suburban land, goth outcast Alicia DeWhitley happens upon a rare Eiffel Tower Pez dispenser while shopping with her perfectionist-to-the-T mother, May. Instantly growing attached, Alicia wears the dispenser as a necklace, carrying it on her body day and night. Meanwhile, Barry, landscaper extraordinaire and slob, witnesses Alicia's purchase only to realize that the Eiffel Tower Pez dispenser is the last one he needs to complete his epic Pez dispenser collection, thereby confirming his entry into the Guinness Book of World Records.

A cat and mouse game ensues as Barry does everything in his power to retrieve the precious Eiffel Tower Pez dispenser from Alicia's grasp, who holds onto it as if it were her last link to a fading memory...

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Category: Arts
Name(s): Saul Tobin
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Rick Lesemann, Thornton School of Music, Composition
Format: Creative Work
Title: Piano Sonata "HaTzmichah"
Abstract:
Rav Yitzchak Kook called the founding of the state of Israel "reishit tzmichat geulateinu" -- the first flowering of our redemption. My piano sonata, "HaTzmichah," examines that concept from the perspective of past, present, and future: the Holocaust, the diaspora, and the eventual redemption and coming of the Messiah.

The first movement, Shavua (Hebrew for "week"), attempts to cope with the Holocaust through the premise that even in an environment of utter despair, life retains its ups and downs, its mundanities. A haze of amorphous grief and tonality gives way briefly to the impression of a death march, but shortly overtakes the march again.

The second movement, Galut (Exile), attempts to address the conflicted nature of Jewish life outside of Israel, in particular now that it is possible for Jews to return there. Motives from the first movement are transformed by hints of the final movement's theme into a timeless sounding melody, which finds itself pitted repeatedly against uncomfortable and eccentric musical environments. This tension conjures some of competing pain and allure of exilic life. Ultimately the movement's hectic grit can resolve only by ascending into light, leading to the next movement.

The last movement, Ge'ulah (Redemption), reworks a commonplace Jewish liturgical melody ("There is none like you among the gods that are worshipped, O God, and none like your works! King of kings in every land, ruler of every age: God reigns; God reigned; God will reign for all eternity!") into an anthem of post-Messianic Israel, expressing hope for the exile's end. Variations of increasing complexity and escalating dissonance continue the harmonic logic gradually established in the previous movements. One gets the impression that the Messiah will bring not the solutions to every problem, but rather a ray of holiness and
hope. Tension builds into an ecstatic finale.

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Category: Arts  
Name(s): Judy Lee  
Submission Type: Individual  
Faculty Sponsor(s) and Department(s): Susan Lanier, Architecture; Paul Lubowicki, Architecture  
Format: Creative Work  
Title: Re-Ligare Institute: Reconnecting Mind, Body and Environment  
Abstract:  
The objective of this project is to design a place of retreat for the community. A retreat that will reconnect one’s mind, body and environment.

As society and technology continue to advance, we are constantly pressured to work faster and to do more. As a result many people are unhappy and are picking up a high level of stress and illnesses caused by stress. This constant strive for advancement has decreased the amount of time people have slow down and reflect on their inner selves, to achieve peace of heart. Unconsciously, the lack of self-reflection makes us put on a facade that limits ourselves and other people to see our true selves.

The Re-Ligare Institute will allow people to feel comfortable stripping off excess layers of stress or pretense and be reconnected with themselves, others and the environment. People are encouraged to find, study, enjoy and strengthen the inner self. The goal is to promote healing and re-connecting at the individual and collective levels.

The design of the institute studies the interaction between program, structure and circulation which mirrors the institution goal to reconnect mind, body and environment.

As one moves through the spaces, he or she will feel less confined by the spaces and be more opened to the outdoor spaces. Find within the building, semi-private space to meditate and self-reflect. There are also a number of interchangeable spaces that will act as large social spaces, allowing people to re-connect at the larger community level. The spa component will be on display for the public to preview the relaxation process that takes place within the architecture. This urban retreat will be connected back to the community through the link of the park across the street to the main entrance of the project.

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Category: Arts  
Name(s): Eli Linnetz  
Submission Type: Individual  
Faculty Sponsor(s) and Department(s): Howard Schmitt, USC School of Theater-Costume Shop  
Format: Creative Work  
Title: Sexuality Across Mediums  
Abstract:  
The use of red in both pieces are implicate in their attitudes towards sexuality. Red has always been used to represent sexuality, so I used it very differently in the two pieces. In the painting I used the red sparingly, near the lips, a part of the body associated with sexuality- even though the form of the image is highly ambiguous. The dress is very different in its depiction. It accentuates the curves of the body and is very revealing and is entirely red. The rest of the connections between the two pieces are up for interpretation by the viewer.
Category: Arts  
Name(s): Jeeyoon Na  
Submission Type: Individual  
Faculty Sponsor(s) and Department(s): Lewis Everett, School of Cinematic Arts  
Format: Creative Work  
Title: Silent Voices  
Abstract: This is an animation about social silencing and victim blaming which happens frequently in our society. A girl is kidnapped, and when she returns, she is not treated the same. People talk about her, point their fingers at her, and blame her actions.

Category: Arts  
Name(s): Francisco Mejia  
Submission Type: Individual  
Faculty Sponsor(s) and Department(s): Julia Paul, Fine Arts  
Format: Creative Work  
Title: The Great Table  
Abstract: The medium is oil and acrylic on canvases and wood, and the dimensions are 4'x 7' for each piece. This work has two meanings: one conceptual and another physical. The conceptual part is the meaning or significance of the art work as a describer by the artist and interpreted by the spectator. The physical part is all that you can see and touch such as drawing, texture, color, composition, perspective, and size. That is call primary elements. When this project is displayed, each single piece has complement, together draw a table. This is the physical significance. I chose it the name of table by a previous collective project with a group of Salvadorian artists, and because the table is an object that is used in multiples human activities. For example at the office, dinning rooms, kitchen, conference rooms, business and so forth each piece has 4'x 7' dimensions and each piece presents different topics of daily life. In this paper I will describe the different events that are addressed by this work such as immigration, science and technology, environment, social problems in general, politics and changes.

Category: Arts  
Name(s): Lee Arter  
Submission Type: Individual  
Faculty Sponsor(s) and Department(s): Torrie Rosenzweig, School of Cinematic Arts; David Weitzner, School of Cinematic Arts  
Format: Creative Work  
Title: The Night Life  
Abstract: This project is my undergraduate thesis film for USC. Although it was meant to be an entertaining film about vampires, its also about how we have no control over the events that enter our life, how they change and shape us, and how we can and should make the best out of what we are given. The film also tries to push the limits of what is acceptable in conventional storytelling, and how hybridization of genres can produce a compelling piece of art.

Category: Arts  
Name(s): Xin Yi Bao  
Submission Type: Individual  
Faculty Sponsor(s) and Department(s): Christopher Chomyn, School of Cinematic Arts; Angus Fletcher, School of Theatre  
Format: Creative Work  
Title: This is what I am thinking now  
Abstract: Just as a saying goes: handwriting can reveal one’s personality; sometimes writing or typing is a more free way to reveal one’s
mind. When I am filling out these forms and blanks, I experience a lot in my mind and I know that there is something really pure but exists only at the moment when I take my first reflection to these questions, it can hardly be noticed even by myself sometimes.

The pace and the smoothness of typing or writing can reveal one’s inside incisively. For example, when we revise our answer time and time again for one question, usually it is the original or the one being written smoothly that reveals the realist thought of us. For those familiar daily questions, such as name and age, we type or write with first order reflection and usually offer a precise answer right after we read the questions. However, for the questions that we are not prepared before, we will probably write down our first reaction according to the first impression, and then maybe there is a short stop for hesitating and thinking.

The whole video records my process of filling out the registration forms and also records my mind condition during the period.

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Category: Arts
Name(s): Olivia Burke, Nathan Doctor, Ryan Fischvogt, Michael (David) Hoffman, Zlatan Sehovic, Bradley Sutton
Faculty Sponsor(s) and Department(s): Rachel Berney, USC School of Architecture; Jeff Guh, USC School of Architecture; Erik Mar, USC School of Architecture
Submission Type: Group
Faculty Sponsor(s) and Department(s): Rachel Berney, USC School of Architecture; Jeff Guh, USC School of Architecture; Erik Mar, USC School of Architecture
Format: Creative Work
Title: Vernacular Architecture in Panama
Abstract:
Located in a remote and rural part of Panama, the farming community of Granja San Jose Arriba had recently been devastated by strong winds that destroyed crops and weakened structures in the area. Patronato de Nutricion, a local non-governmental organization dedicated to training and organizing subsistence farmers in Panama, had classified the region the community was living in as an area of poverty or extreme poverty. Looking to help the local farmers achieve a level of production that would guarantee an adequate daily food intake for members of the community, Patronato de Nutricion began an urgent search to find anyone that could provide architectural relief for the community’s dilapidated farmhouse. On August 9, 2009, a group of USC Architecture students came to help. Interviewing local farm partners and family members, the students spent a week conducting extensive site analysis and research in order to find the most effective and sustainable design solution for the community. On January 3, 2010, the students returned to Panama to build the farmhouse. Using local materials, including several types of indigenous woods, river rocks, and native cane, the group of architecture students designed a farmhouse with all the farmer’s needs in mind; the design included a large meeting space, kitchen, bedroom, storage room, and solar dryer. In addition, the students devised a system to protect the farm itself by strategically placing five masonry walls throughout the property. The farmhouse, known as a granja, not only serves as an agricultural facility but also as an educational facility for the local people to learn, interact with one another, and share cultural ideas that help make up a larger community.

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In August of 2009, several students founded the University of Southern California Africa Health Initiative (USCAHI) on the premise of bringing humanitarian aid to a rural village in Mali. They sought to accomplish this by means of an undergraduate service expedition during the winter break of that year. The organizers advertised a program entailing weekly two-hour preparatory classes, a potentially large cost, and three weeks of manual labor in comparably inhospitable conditions. Despite the marginal connection to a village of distant strangers and the attendant obligations, an overwhelming number of students applied. I posit the question, why?

In this ethnographic study, I explore the humanitarian impulse among the student participants of the USCAHI project in Mali. In contrast to the traditional position of ethnographic researchers, I conducted my study as a member of the project and as a peer to the participants. Moreover, my study draws upon detailed interviews, course materials, advertisements, and student presentations.

Ostensibly humanitarianism derives significance from the individuals in need of aid. However, my research suggests an alternate possibility – that rather than being a project of helping others through which one discovers the self, the project is the self through which distant strangers benefit. In this sense, humanitarianism exemplifies what Michel Foucault terms technologies of the self, i.e. the USCAHI project in Mali is a means by which students work on their individual identity. In addition to the theoretical examination of student practice, I give historical consideration to religious humanitarianism, American philanthropy, service-learning, and study abroad. Each of these factors contributes to the group dynamic and moral sensibility that guides the students’ individual and collective actions.

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This study aims to describe the order of acquisition of the Spanish verbal system by Spanish-English bilinguals. Specifically, we...
explore the possible influence that such factors as the quality and amount of language input and the bilingual situation per se may have on the progression of acquisition of the perfective-imperfective aspectual opposition in Spanish.

Audio recordings of spontaneous speech of two Spanish-English bilingual siblings between the ages of 2 and 3 were used as data source. The older sibling has received a higher amount of Spanish input than the younger sibling and has reached a higher level of proficiency in Spanish. The data from the two children was coded considering aspects of verbal usage (verb tense, tense error, tense expected, and person marking). The coded data was submitted to descriptive statistics using SPSS. The results show that the three most frequent verb tenses are the present, the preterit, and the imperative. An implication of this result is that these tenses are the first to be acquired by the bilinguals. Furthermore, the child who received a higher amount of Spanish input acquired these tenses at an earlier age than his younger sibling. Another important finding is that the children prefer the imperfect tense with stative verbs (e.g., era ('was'), había ('there was'), estaba ('was')) and with activities with inherent duration. This result supports the Aspect Hypothesis which proposes that the acquisition of tenses is guided by the lexical aspect of the verbs (Anderson and Shirai, 1994).

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**Title:** How Do We Remember Them? Onomastic Study of an Egyptian Middle Kingdom Stele

**Abstract:**
Onomastics is concerned with finding the associations and uses of proper names, and in this project, the hieroglyphic names inscribed in a Middle Kingdom funerary stele allow me to extrapolate information about the dedicant, a man named Senuankh. By grouping together and comparing similar “Senuankh” inscriptions across the extent of Eleventh to Twelfth Dynasty Egypt, I assemble data about the different individuals who shared the name, such as administrative titles and places of origin, and thereby analyze whether a set of common factors can be attributed to this naming choice. Occupational roles played by the multiple Senuankhs may point toward an association of the name with a particular type of profession, as well as preferential name-giving at some interval of the social spectrum. Although only one reference to the name appears in Porter and Moss’s canonical Topographical Bibliography of Ancient Egypt, several inexact spellings and a well-attested female form may furnish examples to a theory argued by Rita Freed, that female names were used for male funerary equipment as the Middle Kingdom progressed.

An interesting feature is the seemingly provincial craftsmanship evident on the inscriptions—the fact that the deceased individual could afford a private tomb stele but not one of high quality provokes speculation about what kind of status “Senuankh” imparted to those bearing the name. I hope to evaluate whether Senuankh, in christening his son Amenemhet (also depicted on stele), may have invoked the name of Twelfth Dynasty pharaohs to make up for lowly birth or affirm a place well-won.

Using Adobe Illustrator and reflectance transformation imaging, I also provide visual material that facilitates the study of inscriptional detail. This project complements previous comparative studies of the stele by USC students focusing on

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**Category:** Humanities  
**Name(s):** Tiffany Tsai  
**Submission Type:** Individual  
**Faculty Sponsor(s) and Department(s):** Lynn Swartz Dodd, Religion  
**Format:** Analytical Paper  
**Title:** How Do We Remember Them? Onomastic Study of an Egyptian Middle Kingdom Stele
the pictorial style, the results of which are presented alongside the onomastic analysis.

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Title: Humanity vs. Illegality: Post-9/11 Print Media Discourse on Mexican Immigration
Name(s): Gustavo Lopez
Faculty Sponsor(s) and Department(s): George Sanchez, American Studies and Ethnicity & History
Submission Type: Individual
Category: Humanities
Format: Analytical Paper
Abstract: The history of American public attitudes towards Mexican immigrants is complicated. Shifting between periods of tolerance and scapegoating, it leaves migrants in a marginalized position. Economic downturns and national tragedies tend to trigger anti-immigrant sentiment. One such tragedy that had severe consequences for perceptions of Mexican immigrants was the terrorist attacks of September 11, 2001. Though various scholars have examined how print media discourse around Mexican immigration reflects attitudes present in society, the specific role of 9/11 in shaping these discourses has not yet been analyzed. This project examines the shift in the Los Angeles Times (LAT) discourse around Mexican immigration in print media since 9/11. Additionally, this work assesses the normalized ideologies present within the terms used to describe Mexican immigration in the LAT. Articles appearing on the front-page of the newspaper from 9/11/2000 and 9/11/2002 were compiled and then subjected to an analysis guided by Critical Discourse Analysis. The study found that there was a significant decrease in the number of articles written that referenced Mexican immigration in general post 9/11. More importantly there was a sharp decline in articles that had an affirmative slant in their representations of migrants. Furthermore, post-9/11 articles were shown to focus on the ‘illegality’ of migrants while de-emphasizing their humanity thus framing migrants as undeserving of rights.

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Title: Rome Goes Green: A study of glass recycling in the ancient Roman Empire
Name(s): Alexandra Sinnott
Faculty Sponsor(s) and Department(s): Lynn Swartz Dodd, Religion / Archaeology
Submission Type: Individual
Category: Humanities
Format: Field Research
Abstract: The ancient production of Roman glass was essentially twofold. First, sand was transformed into large glass ingots at production centers located around the Roman empire. Then, the ingots were bought by artisan glass moulders and blowers, who would turn the raw material into useable vessels. However, there was a third very popular yet seldom discussed step to the glass industry: recycling. Diocletian’s Price Edict set the price of fresh, raw glass high enough that in order to turn a profit, glassblowers needed to reuse every failed attempt and broken vessel. Merchants would even carry broken glass to sell on their ships, using it as a temporary, lucrative ballast.

My research focuses on USC’s Roman glass collection, comprised of roughly 100 pieces of varying age and background. My goal was to solidify a method by which to differentiate ancient recycled glass pieces from those made of fresh glass without using destructive chemical analysis. Examining our collection superficially, I have made assumptions as to which vessels I suspect may be recycled. In order to better understand their unique physical characteristics, I interviewed and collaborated with modern day glass blowers in recreating an ancient kiln in
which to create recycled vessels.

Through my research I hope to illuminate the “green” insight of the Romans, who must have been forced to recycle almost all of their glass. If we take their efficient and effective recycling program into consideration, perhaps we can hatch new ideas on how to improve our own, somewhat flawed system.

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Category: Humanities
Name(s): Rolf Hoefer
Submission Type: Individual
Faculty Sponsor(s) and Department(s):
Meiling Cheng, USC School of Theatre, Director of Critical Studies
Format: Creative Work
Title: The Blue Man Group
Abstract:
The twenty-first century witnesses the increasing permeation of technology into the popular everyday fabric, while spaces such as the theatre where live, communal, and direct face-to-face interaction happens become less frequented. This trend has lead to a bifurcation within theatre. On the one hand, Broadway shows (particularly musicals, as for ex. “Rent” or “Chicago”) have become overly commercial in order to appeal to popular audiences. On the other hand, playwrights such as Sarah Kane and performance artists like Marina Abramovic are creating theatrical pieces that are increasingly esoteric, or intended for and understandable by only a small knowledgeable group. The Blue Man Group seems to counter this dilemma by incorporating technology (such as PVC pipes, multimedia screens, light-plays, amplified sound, and music) into its performances and exploring its potential for changing human life (through a technohuman ecology), drawing millions of spectators back into the theatre. I argue that the Group has succeeded in fusing artistic imagination with commercial appeal and preserving their artistic integrity in the face of mass popularity.

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Category: Humanities
Name(s): Tam Tran
Submission Type: Individual
Faculty Sponsor(s) and Department(s):
Jane Iwamura, Religion and of American Studies and Ethnicity
Format: Analytical Paper
Title: The Dark Knight’s Crusade
Abstract:
Religions are often thought of as traditional, organized institutions that deal with the afterlife and explain our existence in the universe. Religion and popular culture are rarely associated together but yet, the two often intersect and intertwine, such as in the film Batman Begins.

The film contains religious undertones that were used to substitute Batman for religion in a seemingly secular society, for both Gotham City and our current American nation. Bruce Wayne, the man, sacrifices himself to become Batman, the savior of mankind. A simple man transcends the ordinary to become a legend. Yet, Batman is a strange paradox for the “Dark Knight” is a combination of good and evil. Is this not oddly reminiscent of religious traditions, especially Christianity? The narrative may tell a story but the cinematography is irreplaceable in evoking a subconscious understanding of Batman’s plight. As one of the highest growing films ever, the film clearly appeals to us but why? What happened in 2005 that made Batman so appealing? Why is Batman such an icon in our society? Batman Begins is different from its predecessors; unlike the older films, this was a much darker and more realistic interpretation. How does this change in costuming and character portrayal reinforce our identity? Batman also exemplifies how superheroes are used to reinforce societal values on how we
should strive to be as Americans. As the audience, we are encouraged for a simple man saved the world, making us believe that we too can and want to emulate Batman’s best qualities. At the same time, perhaps an overreliance on a savior excuses our weaknesses too easily. Thus, a close reading of the film was used to answer these questions and research to contextualize the film allowed an insight into our own psychology.

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Title: The Front Lines of Empire: Metal Arrowheads and Projectile Points as Indicators of Social and Political Transformation in the ancient Middle East

Name(s): Sarah Butler, Tiffany Tsai

Faculty Sponsor(s) and Department(s): Lynn Swartz Dodd, Religion

Submission Type: Group

Format: Laboratory-based Research

Abstract:
Artifacts from Near Eastern archaeological sites were analyzed by synchrotron radiation-based XRD and XRF to provide information on metal working techniques prior to and during imperial domination. Our research investigates the relationships between military provisioning, political control, metal manufacturing, resource acquisition and long-distance trade. We compare metal-making traditions during periods of local hegemony with manufacture in periods of imperial socio-political domination. Tayinat and Judaidah were independent regional centers of the kingdom of Patina/Unqi in the Amuq Plain of southcentral Turkey during the 12th–8th centuries BCE. This socio-economically important region was conquered and incorporated into successive imperial control by both the Assyrians and Persians from the 8th–4th centuries BCE. Artifacts from the two imperial centers, Megiddo and Persepolis, provide a baseline characterization for imperial metal production. Megiddo (Israel) was the site of an Assyrian governor’s palace during the 8th–7th centuries BCE, while the Persian kings commissioned and provisioned their conquering armies from Persepolis (Iran) during the 6th–4th centuries BCE. Bulk elemental characterization and micro-structural analysis of the artifacts will permit us to assess changes in the metal industries both before and during imperial domination. In the pre-conquest period, we anticipate decentralized, opportunistic metal production as diverse ethnic groups established new settlements. During the subsequent period of flourishing nation states we expect a more robust, though decentralized metal industry encompassing multiple technological styles, reflecting a mix of cultural traditions. In the conquest period, as Tayinat, Judaidah and Megiddo were subsumed into Assyrian and Persian imperial rule we expect centralized, highly organized, industrial production processes to emerge.

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Title: The Iconography of Empire: Political Transition as Demonstrated in the Terracotta Figurines of Tell al-Judaidah

Name(s): Sarah Hawley

Faculty Sponsor(s) and Department(s): Lynn Swartz Dodd, Religion

Submission Type: Individual

Format: Laboratory-based Research

Abstract:
This project, directed by Lynn Swartz Dodd and supported by the University of Chicago’s Oriental Institute, seeks to uncover and publish information about previously unknown figurines from a significant Turkish archaeological site. Tell al-Judaidah was excavated in the 1930s, but the later half of the site material was never published. Only a portion of the
471 figurines found (a corpus of unusual size) have been documented—the majority have never been seen or analyzed by the larger archaeological community.

This project, which will be published by the OI, compiles information from written sources, original excavation records, and personal observation, seeking to understand a fascinating period of history: Alexander the Great’s triumph against the Persians around 330 BCE. This was a period of significant cultural change that dramatically affected people living in the region and set the stage for the ascendency of Greek culture across the Near East.

This research details changes in figurine production and deposition and links these changes to political history. This project also provides contextual data for the figurines, allowing them to be situated for the first time in their stratigraphic context, a necessary step to understanding how and where the figurines were used, displayed, or deposited. Changes in the manufactured form of figurines and in the images represented reflect new traditions in craft production and ideology, providing one way of tracing the impact of regime change on the receiving society. This research project also reveals a specific adaptation of a Persian military image to reflect Greek power, highlighting the use of artifacts as ancient propaganda. This, in turn, provides insight into abrupt changes in depositional patterns and the seeming abandonment of Judaidah following Greek conquest.

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**Title:** The USC Ossuary: An Ancient Jewish Burial Practice

**Name(s):** Aaron Muller

**Faculty Sponsor(s) and Department(s):**
Lynn Swartz Dodd, Religion

**Submission Type:** Individual

**Format:** Analytical Paper

**Category:** Humanities

**Title:** The USC Ossuary: An Ancient Jewish Burial Practice

**Abstract:**
While USC Professor Gerald Larue was in Israel in 1967, he purchased the ossuary from a family owned antiquities dealership. The owner Mousa Boudin told Larue that it was found in the Judean Hills, which are just south of Jerusalem. Via comparative analysis, this paper seeks to determine the origins of the object.

The main body of research performed on the USC Ossuary was an interpretation of the box’s various inscribed and painted designs, patterns, and symbols, as well as an analysis of its material, production, form, and size. Through direct comparison with other ossuaries from the region, the researcher was able to deduce the ossuary’s specific age, area of production, and to which culture it belonged.

Details of the box’s production, such as its vaulted lid, low arched legs, and the utilization of the chip-carve technique to form the box from soft limestone, all place its production during the Early Roman occupation of Jerusalem in the first century C.E. Also, the motifs on the box are very common amongst Jewish bone boxes - three six-petalled rosettes, enclosed in a circle with zigzag lines, are found inscribed on this box (two on the front and one on the right side). In the front a palm tree motif is added between the two rosettes, with a coupling of branches and roots pointing in opposite directions. Although all four sides of the box have a red paint wash, the back and left sides are painted in a lattice-like formation, emulating gates that would have enclosed courts. The front, right, and lid are all framed in a
border of inscribed zigzag lines, with additional zigzags etched across the top of the lid in either direction, giving the appearance of being latched down with a rope.

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Title: Analysis of the Neural Correlates of Visual Creativity

Name(s): Daniel Epstein, Ellen Messer, Erika Schnaps

Faculty Sponsor(s) and Department(s): Lisa Aziz-Zadeh, Neuroscience, Brain and Creativity Institute; Sook-Lei Liew, Neuroscience, Brain and Creativity Institute

Submission Type: Group

Abstract:
Little is known about the brain areas involved in creativity. Recent studies have attempted to find some neural correlates of creativity, but almost all of these studies have focused on verbal creativity. Using verbal problem solving tasks, such as deciphering anagrams, these studies have shown bilateral activation in the insula, prefrontal cortices, and inferior frontal gyrus. However, it is unclear whether this bilateral activation is due to the language component of the tasks involved or if it is derived from creativity itself. One way to explore this question is to eliminate language as a compounding variable and ask subjects to complete a canonical right hemisphere creativity task, such as visuospatial processing. If the right hemisphere is exclusively important for creative processing, then activity should be observed only in relevant right hemisphere areas as compared to a control task. If however, bilateral activation is important to creative processing, then we predict that in addition to the relevant right hemisphere areas, the equivalent left hemisphere areas will also be active.

Title: Are You Breathing?: Monitoring Autonomic Function using Spontaneous Cardiorespiratory Variability

Name(s): Jasmine Thum

Faculty Sponsor(s) and Department(s): Patjanaporn Chalacheva, Biomedical Engineering (PhD Candidate); Michael C.K. Khoo, Professor of Biomedical Engineering and Pediatrics, Viterbi School of Engineering, Dwight C. and Hildagarde E. Baum Chair

Submission Type: Individual

Format: Laboratory-based Research

Abstract:
According to the U.S. Census Bureau, by 2008 there were over 150 million people employed over the age of 16 in the United States. Of this population, which makes up approximately half of the entire population of the United States, half report that sleepiness on the job interferes with their performance at work, according to National Sleep Foundation polls. Also, twenty-six percent of these 150 million employees report that they would nap during work breaks if their company allowed naps. While some of this sleep deprivation can be attributed to lifestyle, there are approximately 40 million people in America who suffer from sleep-disordered breathing (SDB) which leads to decreased productivity, harmful
physiological effects, and even death.

This research project contributes to identifying the physiological effects of SDB. Namely, the research aims to identify SDB as an independent, causative factor for the development of sympathetic overactivity and insulin resistance in humans by monitoring the effects of SDB on cardiovascular response, such as baroreflex sensitivity and other autonomic functions. Since over half of adult subjects diagnosed with SDB are also obese, and obesity is already linked to insulin resistance and autonomic irregularities, the use of lean mice as an animal model was used to attempt to overcome this confounding variable of obesity. This approach allows for the isolation of the effects of SDB on autonomic function, whereby they can be measured and observed independently from obesity factors.

Using the sequence and spectral methods, we have analyzed eight sets of controlled mice data to determine the baseline response for baroreflex sensitivity in the subject population tested. Analysis to determine areas of major noise in the raw data for the hypoxia group, and the analysis of the group’s baroreflex sensitivity is forthcoming. The two data sets will then be compared for significance in variation.

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Category: Life Sciences  
Name(s): Grace Hwang  
Submission Type: Individual  
Faculty Sponsor(s) and Department(s): Steve Lund, Earth Sciences  
Format: Field Research  
Title: Assessing the impact of handling sea turtles and exploring ways to improve conservation efforts by reducing injury incurred  
Abstract: 
Listed as endangered or threatened, all seven sea turtle species are in need of human actions for protection against extinction; nevertheless, these actions must be carefully done to prevent making their precarious situation worse. Sea turtle monitoring in Baja California is an incredibly important way to aid in the conservation of sea turtles. Grupo Tortuguero is the main organization promoting sea turtle conservation, not only in the peninsula but also in mainland Mexico. The methods of handling captured sea turtles, however, might result in physical damage to the carapace, plastron, and flippers of the individuals. This study analyzes whether current capturing and handling methods for sea turtle conservation have the potential to cause any physical damage to the plastron, how frequently injury is incurred, how much damage can be found on each captured sea turtle, and whether modifications to capture methods would be appropriate. 95 pictures from monitoring trips over the past two years (2007-2009) were analyzed using the Vidana program. Damage was separated into two categories: abrasion and open wound damage and separately calculated to determine what percentage of the plastron had been affected. Results showed that 76% of the turtles captured in this span of time suffered some sort of plastron damage due to handling methods. 37% suffered only abrasion and redness damage, 4% had only open wounds, and 35% exhibited both forms of damage. Ultimately, it was determined that modifications to monitoring methods would be appropriate and the implementation of cushions and harnesses are discussed.  

§§§§
Biomechanical Analysis of Movement Strategies in Collegiate Women's Volleyball Players

Rami Hamzey, Michael Hazboun, Darcelle Kimble-Manalo, Kotaro Uyeda, Matthew Williams

Jill McNitt-Gray, Kinesiology

Field Research

Abstract:

Sport related movements involve quick and subtle characteristics that result in whole body movements. Volleyball specifically requires players to make these quick movements while being confined by external objects or barriers (e.g. the net and other players). These confinements accentuate the need to perform rapid body position changes by coupling them with a high level of precision, timing, and coordination. These considerations result in a set of subtlety complex movements that each player must master to reach her performance potential. The problem here, however, lies in the fact that each player will execute these movements according to their own strategies, dependent on personal anthropometry as well as individual preference and habit. Since there are various strategies for executing the same task it is our goal to identify each player’s strategies, and to analyze the kinetic and kinematic aspects of these movement patterns. Specifically we want to determine which methods used by the players allow for quickest generation and redirection of momentum while maintaining adequate body control. With comparative analysis of both video and force generation data we will be able to determine what aspects of each player’s movement are beneficial to the ultimate goal of the specific movement, and which aspects can be improved. Ultimately we can provide effective feedback tailored specifically to each player about her movement patterns and what changes she can make to optimize performance in a game-like situation.

Cell Transformations, Cytotoxicities of Insoluble Ni and Cr Compounds

Jimmy Zheng

Joseph Landolph, Molecular Biology and Immunology

Laboratory-based Research

Abstract:

Nickel (Ni) is used in stainless steel, jewelry, utensils, electroplating, batteries, coins, hydrogenation processes, ceramic glazes, paint pigments and other Ni alloys. When factory workers refine oxidic and sulfidic nickel ores, they breathe high concentrations of small particles containing insoluble and soluble nickel compounds. PM2.5 is produced by gas- and oil-fired power plants. Breathing PM2.5 emissions can lead to heart disease and lung case. 130 genes, including DRIP/TRAP80, are differentially expressed in transformed cell lines (green NiO, crystalline NiS, 3-Methylcholanthrene (MCA)). Half of these genes are under-expressed, and the other half are over-expressed. When insoluble nickel compounds are taken up into the C3H/10T1/2 mouse embryo fibroblasts by phagocytosis, they induce cytotoxicity and morphological cell transformation. Chromium (Cr) compounds are potent carcinogens that can cause respiratory cancer by inhalation, and sarcoma by injection. Factory workers are especially at risk as they engage in chrome-plating and other chromium compound manufacturing methods. These operations lead to disposal of Cr (VI) compounds into drinking water sources, leading to a spectrum of DNA damage when ingested (e.g., single-strand breaks, Cr-DNA adducts, DNA-protein crosslinks, other chromosomal aberrations).
Previous work from our laboratory indicates that Cr (VI) compounds induce strong cytotoxicity in 10T1/2 cells, and also that unfiltered, heterogeneous PbCrO4 particles induced small numbers of transformed foci. In this work, we fractionated lead chromate particles into various-sized fractions for further genotoxicity studying and testing.

Universal bacterial primers were then used to isolate the 16S region of bacteria. We were able to clone and sequence the PCR product. This working marine sediment DNA extraction protocol will allow use to determine the microbial diversity within the sediment basin. My next steps are to use whole-genome amplification in order to evaluate a broader suite of environmental genes, which will enable a functional view into this extreme environmental microbial community.

Title: Characterization of Microbial Diversity of Sediment Samples from the Mid Atlantic
Name(s): Paulina Gonzalez
Faculty Sponsor(s) and Department(s): Katrina Edwards, Biological Sciences
Submission Type: Individual
Abstract: Current studies are underway to develop a working protocol to extract DNA from sediments collected from a basin in the mid-Atlantic Ocean called North Pond. At North Pond we are trying to determine the microbial diversity that exists throughout the sediment basin via metagenomic analysis. In order to analyze the microbial diversity, we need to extract DNA and eliminate the presence of co-purified contaminants, such as humic acids. Humic acids are a heterogeneous mixture of biomolecules that are ubiquitous in marina sediments. Thus, extracting pure DNA from sediments remains a challenge. We attempted several published marine sediment DNA extractions, but to no avail. Using spectrometry, we discovered humic acids were still present in our DNA extracts. Several DNA purification kits have been used, however none have been able to remove the contaminants. Most recently we developed a protocol that includes rinsing the sediment with an acetate buffer to eliminate the presence of carbonates, an increased concentration of EDTA to chelate contaminants, and a second ethanol rinse to eliminate the presence of phenols.

Title: Compound-Based Rescue of Mutant p53 Using in vivo Luciferase Reporter System
Name(s): Shiyu (Sherry) Bai
Faculty Sponsor(s) and Department(s): Lin Chen, USC College, Molecular and Computational Biology
Submission Type: Individual
Abstract: The holy grail of cancer research is to eliminate tumor cells that exhibit uncontrolled cell growth without damaging normal tissue. Given the astronomical amount of proteins that play a role in cellular functions, the most efficient method is to target the mutated protein whose malfunction has led to the disruption of multiple pathways in cellular network. My ongoing research project focuses on one of the ideal candidates: Tumor Protein 53 (TP53 or p53). p53 mutations are found in more than 50% of all human cancers, making it the most frequently mutated gene in cancer known to date. As a transcription factor, p53 regulates other proteins’ expression by binding to DNA and initiates the transcription of numerous genes. When DNA damage occurs, either due to ultraviolet radiation or other carcinogenic signaling, functional p53 will act to halt cellular division, initiate DNA repairing or
begin programmed cell death (apoptosis). Because of its tumor suppressing function, p53 is called “the guardian of genome”. Mutated p53 lost its ability to bind specific DNA sequences, and thus its regulatory function, resulting in uncontrolled cell proliferation. The goal of my project is to establishing a cellular reporter system to discover chemical compounds that can restore p53 function in order to induce tumor cell apoptosis. I have recently identified a lead compound.

Category: Life Sciences
Name(s): Nadia El-Fakih
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Lorraine Turcotte, Kinesiology and Biological Sciences
Format: Senior Honors Thesis
Title: Deletion of skeletal muscle AMPKα2 reduces high fat diet-induced IL-6 expression in adipose tissue

Abstract:
Dysregulation of fuel metabolism in skeletal muscle has been implicated in the development of insulin resistance. Since AMP-activated protein kinase (AMPK) has been shown to be involved in the regulation of fuel metabolism, we sought to determine if deletion of muscle AMPKα2 would exacerbate the development of high fat diet (HFD)-induced insulin resistance. Male C57BL/6 mice (~10 wks), either wild-type (WT) or dominant negative (DN) AMPKα2 in heart and skeletal muscle, were divided into control diet (CD; 12% fat; n=8) or HFD (60% fat; n=8) groups. After 6 weeks, CD and HFD mice were anesthetized and intra-abdominal adipose tissue (AT) was freeze-clamped with liquid N2 and removed for Western Blot analysis. Although not significantly different, total food intake (kcal) was 27% higher in the HFD vs. CD mice. This is in line with the fact that body weight was 23 and 34% higher (P<0.05) in WT+HFD and DN+HFD, respectively, over CD mice. Fat pad weight was not significantly different between any of the groups (P>0.05). Plasma insulin levels were higher (P<0.05) in both HFD groups when compared to CD groups by weeks 2-6. At week 6, plasma insulin levels were 500 and 582% higher (P<0.05) in WT+HFD and DN+HFD, respectively, over CD mice. Plasma glucose levels increased similarly, although no statistical significance was obtained. In WT mice, IL6 expression in AT increased by 107% (P<0.05) with HFD. However, the stimulatory effect of HFD on IL6 expression was not observed in AT of DN mice. Our data suggest that AMPKα2 deletion in muscle does not affect insulin secretion or AT accumulation induced by 6 weeks of HFD. Conversely, AMPKα2 deletion in muscle had a dramatic impact on HFD-induced IL6 expression in AT, suggesting that cross-talk between tissues may be part of a normal physiological response to HFD.

Category: Life Sciences
Name(s): Emily Van Guilder
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Scott Paterson, Department of Earth Sciences, University of Southern California
Format: Field Research
Title: Detrital Zircon Ages from the Calaveras Complex, Western Metamorphic Belt, California: Implications for Mesozoic Tectonics and Continental Growth

Abstract:
Southern portions of the WMB, Sierra Nevada, California are composed of four major complexes including from east to west: the Shoo Fly Formation, the Calaveras Complex, the Sullivan Creek Terrane, and the Foothills Terrane. The Calaveras Complex has been previously interpreted to be a Permo-Triassic accretionary. Mapping from east to west units in this part of the Calaveras Complex are: (1) package of
quartzites and phyllites, (2) unit of banded chert, (3) argillite/siltstone unit with local pebbly mudstones, chert lenses, and Permian-early Triassic limestone blocks, and (4) a sedimentary package of quartzites, phyllites, marble, pebbly mudstones and local chert sandwiched between large volcanic belts. One marble layer surrounded by phyllite and siltstone in the western part of #4 preserves Late Triassic fossils. We find no evidence for the existence of a terrane bounding fault between these rock packages. We collected seven samples from the different clastic units of the Calaveras Complex. We successfully completed ICP-MS U/Pb dating of detrital zircons in three samples, two from the easternmost package of quartzite/phyllite and a third from the western package near one of the volcanic belts. Minimum age peaks of ~159 and ~150 Ma occurred in the former and ~170 Ma in the latter with Paleozoic zircons and older peaks at ~1100, ~1760, ~2800 Ma in samples as well. These zircon ages indicate that much of what has been mapped as Calaveras Complex in the southern WMB is Jurassic and younger than the marble blocks, and similar in age to the Mariposa Formation in the Foothills Terrane. It also confirms that clastic units with both Jurassic, older Paleozoic and Precambrian zircons occur in the Calaveras. No ages are available from the banded chert-rich units leaving open the question of whether Jurassic rock packages are getting tectonically mixed in with older chert-rich units.

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**Title:** Developing a Lentiviral Gene Delivery System to Investigate the Role of Purinergic P2X Receptors in Alcohol-Induced Behaviors in the CNS

**Name(s):** Chidubem Ugwueze

**Faculty Sponsor(s) and Department(s):** Daryl Davies, Clinical Pharmacy & Pharmaceutical Econ. & Policy; Sneha Inamdar, Pharmacology and Pharmaceutical Sciences; Letisha Wyatt, Teaching and Research Assistants

**Submission Type:** Individual

**Format:** Laboratory-based Research

**Abstract:**

P2X receptors (P2XRs) are a family of cation-permeable ligand-gated ion channels (LGICs) gated by synaptically released extracellular ATP. Previous work demonstrates that ethanol inhibits ATP-activated currents in rat and mouse neurons, suggesting a role for P2XRs in ethanol-induced behaviors. Despite these findings, the lack of specific P2XR agonists and antagonists has hampered our ability to determine the role of individual P2XR subtypes in mediating ethanol-induced behaviors. Moreover, whole animal models do not allow for studies of behavioral roles of individual P2XRs expressed in different brain regions. To address these limitations, our laboratory is developing an alternative approach that uses lentiviral gene delivery and/or gene silencing methodology in neurons. In the current study, we focused on P2X4Rs due to their abundant expression in the CNS and previous recombinant investigations that demonstrate inhibition of ATP-gated currents by ethanol in P2X4Rs. We employed a commercially available recombinant lentiviral (rLV) expression system from Clontech Laboratories that utilizes HIV-1 based sequences and a lentiviral packaging signal for pseudovirus production. Control lentiviral production and infection yielded 90-100% expression of GFP in rat primary hippocampal neurons.
We next cloned a P2X4R gene into the GFP-tagged vector to generate a N-terminal fusion protein. Transduction of neurons with the P2X4-GFP vector resulted in a fluorescence pattern that is typical for intracellular distribution of P2X4Rs. Importantly, transduction efficiency of P2X4R-GFP was significantly higher (>50%) than what is typically observed during lipid-based transfections of neurons (<10%). Electrophysiological investigations of the rLV-transduced primary cell cultures showed success in P2X4R, indicated by measurable ATP currents typical of these receptors. This work sets the stage for future utilization of lentiviral gene delivery for manipulations of the expression levels of individual P2XR subtypes in a brain region-specific manner and thus provides a means to investigate the role of specific P2XR subtypes in ethanol-induced

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Title: Development of a Rib Regeneration Model in Mammals

Name(s): Marissa Srour

Faculty Sponsor(s) and Department(s): Francesca Mariani, Eli and Edyth Broad Center for Regenerative Medicine and Stem Cell Research at USC

Submission Type: Individual

Category: Life Sciences

Format: Laboratory-based Research

Abstract:
Developing a model for understanding bone regeneration in a mammalian model will be vital for developing treatments of severe bone defects and injuries. The regeneration of the skeletal elements of appendages is typically observed in amphibians, however amazingly in humans there have been reported cases of regenerating digit tips and ribs. The goal of this project was to establish a model for skeletal regeneration in the mouse and to determine the role of the periosteum, the fibrous tissue surrounding the cartilage. More specifically, our study aimed 1) to verify the presence of rib regeneration in mice following a sternal rib resection while maintaining the integrity of the periosteum and 2) to compare sternal rib regeneration between control CD-1 mice and mutant Murphy Roths Large (MRL) mice, which have an increased capacity for regeneration. Mice (n=40) between 4-8 weeks of age underwent surgery in which a 1.0cm sternal rib was removed from the surrounding periosteum tissue. MRL mice (n=11) and CD-1 mice (n=8) were then sacrificed at ~90 days post-resection and the rib cages were stained with Alizarin Red (bone) and Alcian Blue (cartilage). Our results indicated the presence of both chondrocytes and osteocytes at the site of resection in both strains of mice, confirming regeneration and suggesting that healing was occurring by the endochondral process. This will be confirmed in future experiments through the use of a calcein as a fluorescent tracer to mark new bone formation. Interestingly, we have observed the ossification of new bone filling in from the middle of the resection site and not from the ends where the bone breakage occurred. Control surgeries were performed in which the periosteum was also removed (n=6) and these animals will be used to determine if the origin of new chondrocytes is from the periosteum or the adjacent bone marrow.

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Title: Digit Tip Regeneration in Neonatal Mice

Name(s): Saud Siddiqui

Faculty Sponsor(s) and Department(s): Francesca Mariani, Broad Center for Stem Cell Research and Regenerative Medicine, Keck School of Medicine

Submission Type: Individual

Category: Life Sciences

Format: Laboratory-based Research

Abstract:
We developed methods to perform distal 3rd phalangeal digit tip resections in
neonate mice. Our techniques include local anesthesia, isoflurane anesthesia, and utilization of a light microscope and microscissors to perform resections. Bone and cartilage staining was also successful, and we observed interesting darkened and rigid regions which we hypothesize correlate with regenerated areas. Samples were sectioned with cryostat, however gene expression was not examined because of insufficient probes (fgfr1, fgfr2, fgfr3, fgfr4) and because of limited time. We also observed strange regenerated processes when amputations were performed at the 2nd phalanx. This observation is the basis of our current study. Future recommendations for digit tip resection experiments include using a microscope reticle to ensure consistent amputations and to utilize fluorescent calcein dye to more accurately quantify regenerated areas. Decalcification of samples before sectioning is also recommended to improve sectioning.

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**Title:** Does social group membership modulate empathy for physical pain?

**Name(s):** Ashnoo Nanavati

**Faculty Sponsor(s) and Department(s):** Lisa Aziz-Zadeh, Department of Occupational Science

**Submission Type:** Individual

**Abstract:**

Previous research has shown that the neural systems involved in eliciting an empathetic response for others can be modulated by contextual factors surrounding the stimulus. Specifically, race and social status have been shown to modulate the empathy response to seeing another person in pain.

Here, we aim to understand how these systems are impacted by non-physical cues to social group membership. We conducted an fMRI experiment using right-handed, Jewish males and exposed them to four stories of individuals holding strongly anti-Semitic beliefs, and four stories of people who do not hold such beliefs. Afterwards, in a brain scanner, the participant saw a video of each stimuli drinking a water bottle as well as receiving an injection in order to evaluate activity of the mirror neuron system and empathetic response, respectively. In order ensure the effectiveness of the stories in eliciting the desired response, we conducted behavioral testing using undergraduate students. While the experiment is still in progress, preliminary analyses of the results indicate that watching outgroup members undergo pain activates the anterior cingulate, temporo-parietal junction and anterior insula, components of the pain matrix that has been previous cited as playing a role in pain empathy.

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**Title:** Exploring different gene expression of various tissues of Mytilus californianus through DNA microarrays

**Name(s):** Yelin (Sara) Shin

**Faculty Sponsor(s) and Department(s):** Andrew Gracey, Biological Sciences

**Submission Type:** Individual

**Abstract:**

Marine intertidal mussel species play an important ecological role because they are the dominant species in many habitats, and have an economical value through their harvesting and farming (Veneir 2003). Mussels are sessile active filter feeders, and are tolerant of environmental changes including exposure to xenobiotics, which make them useful bio-indicator species for coastal pollution. However, they remain a non-model species with limited knowledge of their physiology at the molecular level. This research will support the annotation of...
the *Mytilus* genome by measuring the expression of the transcriptome in different tissues. I used cDNA microarrays to investigate the differential expression of genes between various tissues of marine intertidal ribbed mussel, *Mytilus Californianus*. This species is a fast growing and sturdy marine intertidal mussel, which make them effective competitor for intertidal space on rocky shores (Suchanek 1981). Further knowledge of their gene expression will help to explain why it is the prevailing competitor in their niche. The different tissue types I observed were hemolymph, gill, posterior mantle, anterior mantle, foot, labial palp, retractor muscle, digestive and adductor muscle. The advanced approach of cDNA microarrays provides a platform to explore the genome with respect to how transcriptional response of individuals is altered. Comparison of the types of genes that are expressed in different tissues will provide insights into the function and the physiological processes that are active in each tissue.

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**Title:** FMRI study of the neural correlates of ADHD  
**Name(s):** Dustin Tetzl  
**Faculty Sponsor(s) and Department(s):** Xavier Castellanos, NYU School of Medicine: Departments of Child & Adolescent Psychiatry and Radiology; Albert Herrera, USC Dept. of Biological Sciences, Vice Dean  
**Format:** Senior Honors Thesis  
**Abstract:** Attention deficit/hyperactivity disorder (ADHD) is a common form of child and adult psychopathology that often brings significant and lifetime impairment. Task-based models of ADHD have shown consistent deficits in neural activity in the fronto-striatal and fronto-parietal circuits of the brain involved in executive function, and previous studies have failed to support models emphasizing deficits in any one frontal region, but rather show a distributed nature of activation loci. The present study provides new insight into this hypothesis, and characterizes the direction of recent research by providing a direct, unbiased, quantitative meta-analysis of the published fMRI studies of ADHD. The results demonstrated the expected findings of frontal dysfunction popularized by the prevalent task-based literature. In addition, various new areas of hypo-activation for ADHD patients were found in the cerebellum, implicated in motor control and coordination deficits, and the subgenual area of the cingulate cortex, which has been linked to depression and dysfunctional reward processing. These results suggest a novel direction in the neuroimaging research, and a better characterization of the areas of dysfunction in ADHD. This serves as a valuable resource for researchers and physicians in the investigation, diagnosis and treatment of this widespread debilitating disorder.

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**Title:** Larval Competition in Drosophila melanogaster: The Effects of Genetic Diversity and Population Density on Competitive Success  
**Name(s):** Jessica Grubman, Matthew Harkenrider  
**Faculty Sponsor(s) and Department(s):** Sergey Nuzhdin, Molecular and Computational Biology  
**Format:** Laboratory-based Research  
**Abstract:** On a large scale, our project investigates why genetic diversity persists within populations. Extensive research has examined the role of genetic diversity
within populations, as well as among species in communities and ecosystems. In the vinegar fly *Drosophila melanogaster*, genetic variation has been maintained among different wild populations, and has been examined on the molecular level and up to the much larger behavioral level. Lewontin was the first to investigate the effects of both genetic diversity and population density on competitive success in *melanogaster* larvae; his findings suggested that medium density (of population size) facilitates viability, and that an individual genotype’s success rate depends on the combination of other genotypes with it (Lewontin 1955). Though more recent studies have examined the correlation between larval diversity and competitive success in *melanogaster*, no trend has become apparent, in large part because of inconsistent methods of testing (Saltz 2006). Our research aims to thoroughly test the correlation between genetic diversity and competitive success in *melanogaster* larvae. Our experiment tests different combinations of genetic diversity at both high and low population densities. We define competitive success as larval survival through pupation and consequent eclosure (a maturation and metamorphosis stage) to adulthood. We hope to understand whether the presence of genetic diversity itself correlates to competitive success and how (if at all) particular genotypes are affected by population diversity and affect their population’s competitive success. We are also simulating a polyandry effect to look at the consequences on larval offspring competitiveness of a single female mating with multiple males. Some research indicates that polyandry may have a net fitness advantage for females; our experiment hopes to find evidence on whether it affects the net fitness of a population (Hosken 2003). Experimental trials should be complete in early May; however, preliminary data supports our hypothesis that diversity is correlated with population success.

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**Title:** Maternal Sound Stimulation of Premature Infants

**Name(s):** Kianni Courtade

**Faculty Sponsor(s) and Department(s):**
- Smeeta Sardesai, Keck School of Medicine
- Jack Turman, Keck School of Medicine
- Sheila Woodward, Thornton School of Music

**Submission Type:** Individual

**Format:** Field Research

**Abstract:**
This study aims to answer the particular question: Does maternal sound-based intervention improve independent oral feeding, growth and neurodevelopmental outcomes in preterm infants through to 5 years of age? Considering the poor prognosis for optimal neurodevelopmental and psychological outcomes for many preterm infants through adolescence, this study aims to make a valuable contribution to the literature. This setting also provides us with ideal conditions for determining the broader question of the impact of early auditory stimulation on human development. The auditory environment in the isolette is deprived of many of the sounds that would normally be experienced during pregnancy. If indications of results are positive, this innovative concept may lead to wider research and potentially transform society’s view of the impotence of early auditory stimulation in human development.
Novel Mutants link DNA Replication and Centromere Function in the Fission Yeast, Schizosaccharomyces pombe

Cara Bickers
Susan Forsburg, Department of Molecular and Computational Biology

Individual

Life Sciences

Laboratory-based Research

The centromere is a region on each chromosome that connects to the mitotic spindle. The spindle forms after DNA replication is complete, and pulls the duplicated chromosomes apart during mitosis. My hypothesis is that there are novel genes that link chromosome segregation and centromere function to the replication of the chromosomes. To isolate mutations in these genes, I am isolating yeast strains that are sensitive to both hydroxyurea (HU) and thiabendazole (TBZ). These anti-proliferative drugs arrest the cell cycle by interrupting two separate phases. HU functions by depleting the supply of nucleotides in the cell so that DNA replication cannot occur and S-phase arrests. TBZ functions as a spindle poison and so disrupts the proper segregation of chromosomes during anaphase. I began by performing a genetic screen in which I mutagenized S. pombe cells with ultraviolet radiation. Surviving colonies were screened for sensitivity to both HU and TBZ. An initial screen identified 46 candidates, which were then further analyzed. Four mutants possessing strong sensitivity phenotypes were identified from this testing and further genetic analysis was carried out which classified all four mutations as separate, single-gene, recessive mutations. Currently I am working on identifying the mutated genes within the four mutants by a process called cloning by complementation. In this process, the cells are transformed with a genomic library made of plasmids each with a small segment of the S. pombe genome. If a cell takes in a plasmid containing the mutant’s affected gene, the sensitivity phenotypes vanish. Once this occurs, the plasmid can be extracted, amplified, and sequenced in order to identify the gene(s) that link chromosome segregation and DNA replication. Recently, I have identified a possible candidate for one mutant that appears to have lost its sensitivity, and will soon identify more.

Phosphotyrosine-like immunoreactivity marks putative microglia in the hypothalamus and thalamus

Jeannie Zhang
Arshad M Khan, Biological Sciences

Individual

Life Sciences

Laboratory-based Research

Our laboratory is interested in investigating the effects of hypoglycemia on the brain. I undertook a study designed to identify molecules in the LHA that respond to insulin-induced hypoglycemia by showing changes in their tyrosine phosphorylation status. Methods: The USC Institutional Animal Care and Use Committee (IACUC) approved all procedures. Adult male Sprague-Dawley rats fitted with jugular catheters were divided into two groups and given either an i.v. bolus of insulin (2U/kg) or saline vehicle. Thirty to forty-five minutes later, the rats were euthanized by systemic pentobarbital injection. The brain tissue was then processed for indirect immunofluorescence histochemistry using a polyclonal antibody directed against phosphotyrosine. The following antibodies were also used: an antibody directed against GFAP (glial fibrillary acidic protein, which is found in subpopulations of astrocytes), and two antibodies directed against Iba1 (a calcium-binding protein...
found in microglia cells). Results: I observed that most of the phosphotyrosine-like immunoreactivity (pY-ir) was observed in microglia-like cells within the diencephalon, with virtually no signal in neurons. These microglia-like cells were abundant in both the hypothalamus and thalamus, with a greater parenchymal signal present within the hypothalamus. I observed no differences in preliminary analyses in the numbers, distribution, or appearance of these cells between the insulin-treated and control groups. Double immunostaining revealed that GFAP was not found in the pY-ir cells. Only the ‘activated’ forms of the microglia-like cells were marked by Iba1. Interpretation: My results highlight the distribution of an unusual antigenic determinant in the diencephalon. An earlier study reporting that pY-ir is a marker of microglial cells suggests that the cells identified in the present study may also be microglia. Efforts are now being made to use additional antibodies to rule out other types of microglia, such as oligodendrocytes.

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Title: Rebalancing the Nitrogen Budget of Coastal Marine Sediments
Name(s): Cara Magnabosco
Faculty Sponsor(s) and Department(s): Douglas Capone, Biological Sciences
Submission Type: Individual
Abstract: Due to the large amounts of denitrification occurring in coastal marine sediments, the impact of nitrogen fixation in these sediments has been largely ignored. However, recent investigations by Bertics and Sohm have found that nitrogen fixation is in fact occurring in the sediments. Thus, it was our goal to accurately assess the balance between nitrogen fixation and denitrification in the marine coastal sediments of Catalina Harbor, CA. Through this study, we have concluded that both nitrogen fixation and denitrification are occurring in these sediments. Notably, denitrification dominates this ratio; however, the presence of nitrogen fixation suggests that a reevaluation of nitrogen budgets and cycling in coastal marine sediments is warranted.

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Title: Reciprocal Relations of Subcutaneous and Visceral Fat to Bone Structure and Strength
Name(s): James Chalfant
Faculty Sponsor(s) and Department(s): Tishya Wren, BME
Submission Type: Individual
Abstract: Increased body fat is a risk factor for cardiovascular and metabolic disease, yet it is uncertain whether obesity protects against osteoporosis or adiposity is harmful to bone. The aim of this study was to assess whether the pattern of adipose tissue deposition influences bone structure and strength. A custom Matlab program was developed to measure subcutaneous and visceral adiposity in 100 healthy women ages 15-25 years from computed tomography scans. A separate Matlab program was used to measure the cross-sectional dimensions and principal moments of the femur. Multiple linear regression analyses indicated that, after adjusting for leg length and thigh musculature, both subcutaneous and visceral fat had strong and independent associations with femoral cross-sectional area, cortical bone area, principal moment maximum, principal moment minimum, and polar moment. However, whereas subcutaneous fat had a positive predictive value with all femoral bone phenotypes, a similar but negative effect was observed between visceral fat and these measures.
Therefore, we found that visceral and subcutaneous fat have opposite effects on the appendicular skeleton; whereas subcutaneous fat is beneficial to bone structure and strength, visceral fat serves as an unique pathogenic fat depot.

Title: Rizobia and Crop Productivity in High Salinity Areas
Name(s): Negar Kahen
Faculty Sponsor(s) and Department(s): Sergey Nuzhdin, Molecular Cell Biology
Submission Type: Individual
Format: Laboratory-based Research
Title: Rizobia and Crop Productivity in High Salinity Areas
Abstract: There is a growing consensus that governments around the world should collaborate and better coordinate efforts to address acute hunger. Ecological and community genetics can help us to explore how genetic diversity influences population-level and community processes and thus implement innovative solutions to sustainable food security to benefit the world’s poor. In modern agricultural methods maintaining crop yield under adverse stress environment is a major challenge. Salinity has been described as one of the most serious threats to agriculture and the natural status of the environment; it affects both the crop productivity and quality (Lorenzo 2007).

Rizobia, a nitrogen fixing soil bacterium, has symbiotic association with major non-legume crops of the world. I hope to unravel mechanisms underlying adaptive differentiation of plants in high salinity habitats by introducing different strains of rhizobia at various salt concentrations.

Title: Screening for meiotic inhibitors of checkpoint function
Name(s): Elizabeth Crow
Faculty Sponsor(s) and Department(s): Susan Forsburg, Molecular and Computational Biology
Submission Type: Individual
Format: Laboratory-based Research
Title: Screening for meiotic inhibitors of checkpoint function
Abstract: Checkpoints exist in cell division cycles to halt cell division and avoid cell death. Fission yeast, Schizosaccharomyces pombe, are halted at the G2-M checkpoint in the presence of DNA damage such as double-strand breaks (DSBs). This checkpoint is activated by the chk1 protein. Strains that lack the chk1 gene (Δchk1 strains) are, therefore, not halted when DSBs occur. When grown in the presence of DSB-causing drugs such as CPT, the effect of DSBs is exaggerated and Δchk1 cells generally look small, sick, or elongate. Chk1 is not activated in meiosis, an effect that may be due to the creation and persistence of DSBs during meiotic recombination. My goal is to identify the gene(s) responsible for this checkpoint bypass. I plan to do this by transforming wild type S. pombe with a meiotic cDNA library, growing them in the presence of a DSB-causing drug, and screening for colonies that mimic the Δchk1 phenotype. Through this process, the cDNAs that cause this outcome can be sequenced and the genes expressed during meiosis that allow the cells to bypass chk1 activation can be identified. The goal is to ultimately gain a greater understanding of checkpoint regulation and its role in cancer and birth defects.
Selective vulnerability of the neuromuscular junction in a mouse model of Spinal Muscular Atrophy

Rebecca Gibbs

Chien-Ping Ko, Biological Sciences; Karen Ling, Biological Sciences

Laboratory-based Research

Abstract:
Spinal muscular atrophy (SMA) is a recessive disorder that is a common genetic cause of death in young children. Affected patients suffer from muscle weakness that impairs their ability to function normally. My project focused on studying how this disease affects various muscles in the mouse model for SMA. This was done by dissection of target muscles, followed by antibody staining and quantification of innervated neuromuscular junctions by fluorescent microscopy. We studied proximal muscles along the spine, neck, and head. Our data consistently showed a severe synaptic defect in many of the proximal muscles, which manifested as significant denervation at the neuromuscular junctions. This finding is particularly interesting because denervated muscles are unable to function normally, and this could account for some of the weakness seen in patients. For example, affected people cannot hold up their heads, and the muscles responsible for this function were found to be severely affected in our animal model. This data immediately leads to the question of whether the defect is due to formation or maintenance problems, so we gathered data from different time points to try to isolate when the denervation occurs. We found that in embryonic stages, muscles are fully innervated. However, severe denervation occurs as early as age P1 and persists until the end stage (P14). The fact that the junctions are well formed before birth, but are lost in post-natal stages, has led us to conclude that the problem is a maintenance issue. Aside from this conclusion, our data is useful because these muscles can now be used as a preparation for further study. By comparing differences between muscles with the defect and those unaffected, we can hopefully elucidate what factors exist that allow some to be protected while the others are not.

Short and Long Term Acclimation/Adaptation to Toxic Chemicals in Tigriopus californicus: A Multigenerational Study

Tigran Karamanukyan, Amanda Suzuki

Suzanne Edmands, College of Arts and Letters - Department of Biological Sciences

Laboratory-based Research

Abstract:
Tigriopus californicus, more commonly known as the copepod, is an intertidal invertebrate that has long been considered an excellent model organism for studying the marine ecosystem. Its short lifespan make it an ideal organism to investigate the effects of different pollutants over many generations, allowing us to separate physiological acclimation from genetic adaptation. In our study, we collected copepods from San Diego, acclimated them to lab conditions, and separated the population into three groups: a seawater (control) group, a copper sulfite group (0.053 mg/L), and tributyltin-oxide group (0.16 µg/L). Concentrations of chemicals were based on the LC50 values determined by Kwok & Leung 2005, Kwok et al. 2009, and Lee et al. 2007 in a similar studies on Tigriopus japonicus, a close relative of our organism of interest. Generations were segregated by removing adults upon appearance of juveniles and transferring subsequent clasped pairs to new replicate containers. Fitness of the populations were
assessed by isolating 20-25 clasped pairs in Petri dishes containing their respective water treatments, then counting their offspring 14 days and 28 days after hatching, at the nauplius and copepodid stages respectively. By the second generation, all three treatment populations were subjected to fitness assays in all three (control, copper and TBTO) environments, to evaluate any development of cross-resistance to other chemical contaminants. Findings have indicated that copper has a strong detrimental effect on the number of offspring and juvenile survival. Fitness assays from the F2 generation suggest that copepods previously acclimated to one chemical may develop cross-resistance to other chemicals upon exposure. The multigenerational design of the experiment has the potential to give us a deeper understanding of how chemicals affect the survival of the population as well as whether the organisms' resistance to these substances is temporary and physiological or more permanent and genetically based.

References:

**Category:** Life Sciences  
**Name(s):** Alexander Stram  
**Submission Type:** Individual  
**Faculty Sponsor(s) and Department(s):** Gary Chen, Department of Preventive Medicine  
**Format:** Field Research  
**Title:** Techniques for Utilizing Wide-Low Coverage Next Generation DNA Sequencing Data  
**Abstract:** The 1000 Genomes Project has an ambitious goal of sequencing and releasing data on 1000+ anonymous individuals from ethnicities across the world, with the primary goal of identifying rare single-nucleotide polymorphisms, with a minor allele frequency of less than 1%, as well as studying structural variants (particularly insertions and deletions) in the human genome to a degree not yet done. While this project will eventually present nearly-revolutionary data in the study of human genomics, much of this data, while publicly accessible, is very cumbersome to deal with due to the sheer magnitude of the data being sequenced. My work has homed in on developing novel techniques to make this data more accessible to researchers in the Department of Preventive medicine at USC. Most notable of my accomplishments with this project has been developing the ability to strip and compress this data to sufficient statistics, which comprise less than 0.03% the data's original size. This allows us to store 1000 Genomes data locally, making for quicker and easier analysis, particularly when looking for undiscovered single-nucleotide polymorphisms, especially those which force amino acid changes in corresponding genes. Furthermore, I have begun work on genotype calling on individuals for which there is only low-coverage sequencing data available, which will allow our department to do haplotype analysis on a much larger number of individuals than previously possible.
Title: The Effect of Oxygen Cycling on Long Term Stationary Phase Microbes

Name(s): Marlo Gawey

Faculty Sponsor(s) and Department(s): Will Berelson, Department of Earth Sciences

Submission Type: Individual

Format: Laboratory-based Research

Abstract:
As the extent of anoxia in the world’s oceans grows, characterizing the behavior of microbes in oxygen and nutrient limited conditions becomes increasingly vital. Though most analysis of microbes is on exponentially growing cultures, microbes in the environment spend significant portions of their lives under nutrient limitation. In order to better characterize true environmental conditions, our group has measured the growth and respiration rates of microbes in Long Term Stationary Phase (LTSP), a nutrient limited phase where nutrient recycling occurs, after environmental forcing (nutrient and oxygen pulsing). Past studies have shown that anaerobic microbes have a higher rate of respiration than aerobic after anaerobic growth (Harrison and Loveless, 1971), but little is known about the effect of oxygen limitation on LTSP microbes. In order to address questions about the behavior of LTSP microbes exposed to anoxic environments, we conducted oxygen pulsing experiments on the environmental microbe Shewanella oneidensis MR-1 during LTSP. Microbes were grouped into 4 different 56 day tracks that experienced 100% aerobic conditions, 100% anaerobic conditions, 83% aerobic conditions and 83% anaerobic conditions. We analyzed changes in specific oxygen consumption (QO2) and growth rates between parent and derived populations. We find that populations having faster growth rates have lower specific oxygen consumption rates and higher maximum population densities relative to the parent population.

Title: The joint effects of high-fat diet and low testosterone on development of Alzheimer-like pathology in male 3xTg-AD mice

Name(s): Meghan Brown, Angela (Holly) Villamagna

Faculty Sponsor(s) and Department(s): Christian Pike, Gerontology

Submission Type: Group

Format: Laboratory-based Research

Abstract:
Metabolic syndrome induced by diet and characterized by obesity, high blood insulin and glucose, is a recently established risk factor for Alzheimer’s disease (AD). In men, metabolic syndrome has also been linked to decreased testosterone levels. Interestingly, low testosterone has been independently proven to be a risk factor for the development of AD. Our goal was to demonstrate an interactive relationship between these two risk factors in the development of AD pathology. To investigate the interaction of diet and hormone manipulations, we used the male 3xTg-AD mouse model of AD. Mice were fed either a high-fat (60% fat) or standard diet (4% fat) while receiving one of three hormone treatments (sham, gonadectomy (GDX), or GDX+T) for four months. Mice fed the high fat diet demonstrated multiple indices of metabolic syndrome, including increased body weight, abdominal fat, and fasting glucose levels. Increased levels of the neurotoxic beta amyloid peptide (Aβ), which is thought to be the initiating factor in the AD neurodegenerative cascade, were observed immunohistochemically in the hippocampus of high fat-fed mice. Similarly, GDX mice demonstrated higher levels of Aβ compared to testosterone-treated mice. Most notably, animals with both high-fat diets and depleted testosterone showed the highest levels of...
Aβ accumulation, indicating a possible synergistic effect between the two, or the possibility that these factors act on the same pathways to increase AD pathology. These hypotheses are further reinforced by the finding that some metabolic changes, most notably changes in blood glucose levels, were worse in high-fat diet mice depleted of testosterone than those in the GDX+T group alone. These findings have significant clinical applications in that they may point to a population of males highly at risk for the development of AD.

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Title: The morphology of axonal projections from the High Vocal Center to vocal motor cortex in songbirds

Name(s): Zhiqi Yip

Faculty Sponsor(s) and Department(s):
Sarah Bottjer, Department of Biology, Neurobiology section; Vanessa Miller-Sims, Department of Biology, Neurobiology Section

Submission Type: Individual

Format: Laboratory-based Research

Abstract:
Studying how zebra finches (Taeniopygia guttata) learn to generate vocal behavior provides an outstanding model for understanding speech development in humans. Song production is controlled by an interconnected set of brain nuclei called the song control system. The High Vocal Center (HVC) is a cortical premotor brain region that is found only in birds that learn the sounds used for vocal communication and is critical to song production. Many HVC neurons send axonal projections to the vocal motor cortex (the robust nucleus of the archipallium; RA), which directly projects to vocal muscles and drives vocal output. Populations of neurons in HVC converge in RA and drives a single burst of activity in an ensemble of neurons in RA. Studies have suggested that axonal projections from HVC to RA are not topographic: neurons in a subsection of HVC do not project to neurons in a subsection of RA. However, on the level of individual neurons, it is not known whether each axon projects to specific sub-areas of RA. To better understand how axons from HVC innervate in RA, my project explores the morphology of individual axonal projections from HVC to RA. Single labeled axons are reconstructed using a microscope with software to see the location and quantity of innervation within RA. The axon projections in RA suggest that an ensemble of neurons from HVC project individually within RA without extensive branching to code for a subsyllable in birdsong.

§§§§

Title: The Role of BMPRIB in Cell Fate and Commissural Axon Outgrowth in Mammalian Systems

Name(s): Joseph Li

Faculty Sponsor(s) and Department(s):
Samantha Butler, Neurobiology

Submission Type: Individual

Format: Laboratory-based Research

Abstract:
By acting as chemorepellants, the Bone Morphogenetic Proteins (BMPs) play a role in commissural axon guidance and development in the spinal cord during neurogenesis. These ligands exert their effects by attaching to the membrane-bound BMP receptor I (BMPRI), which then forms a heterodimer with BMP receptor II (BMPRII), initiating a signal cascade. BMPRI exists in two isoforms: BMPRIA and BMPRIB, and Yamauchi and colleagues have demonstrated that the constitutive activation of either isoform results in the delay of commissural axon outgrowth in chicks, with constitutively activated BMPRIB (caBMPRIB) producing a more robust effect. However, such gain-of-function studies have not been performed in mammalian systems, a task that represents the goal of
this project. The comparison of the transverse spinal cord sections of embryonic day 11.5 mice with caBMPRIB to those of wild-type controls revealed that the mutant mice exhibited a lower number of Islet-1/2 cells, suggesting that the receptor plays a role in inducing the fate of this population of cells. Both mutant and wild-type mice showed similar levels of outgrowth of the Tag-1 positive axonal population. If caBMPRIB does delay commissural axon outgrowth in mice, the effect is not large enough to significantly impact the average length of the entire population of Tag-1 positive axons.
This research project is a study of temporal changes in the seismic structure of the solar interior through the measurement and analysis of the 5-minute acoustic oscillations of the Sun. One of our objectives has been an extension of an unexpected relationship between changes in these oscillation frequencies and corresponding changes in the levels of solar activity that this group discovered last year. To extend our previous results, we have analyzed observations obtained with the Michelson Doppler Imager (MDI) instrument onboard the NASA/ESA SOHO spacecraft between 1997 and 2000. These observations have filled in the gap between the previous minimum of solar activity in 1996 and the most-recent maximum of solar activity which occurred in 2001. We have divided the observations that were obtained during each year into sets of three day time series, and we have generated sets of power spectra from each of these time series. We have fit all of the peaks contained within these spectra to obtain yearly tables of the shifts in the frequencies, widths, amplitudes, and asymmetries of the oscillations. We have inter-compared these different sets of parameter shifts and we have performed linear regression analyses of these shifts upon changes in the levels of solar activity. We have found that most of these parameter changes have fallen between our 1996 and 2001 results.

The western part of the Boyden Cave pendant in the southern Sierra Nevada is composed primarily of metasediments, sedimentary rock that have been metamorphosed by heat and pressure, namely quartzites and marbles potentially of Paleozoic age (approximately 520-350 million years ago). Some layers of calc-silicate schist are also present. Mesozoic (250-65 million years ago) plutons intrude into these metasediments and so alternate with these metasediment layers. The
eastern part of the pendant is primarily Mesozoic plutonic rocks, granites and granodiorites. A small section of Cretaceous metavolcanic rocks and metarhyolite flows interrupts the plutonic sequences in the east. I was particularly interested in exploring whether the metasedimentary rocks matched with miogeoclinal sequences that had been originally formed in Nevada and southeastern California along the former margin to North America and were then displaced to their present location.

My research involved field mapping, sample collecting, and then lab analyses on selected rocks to determine the ages of a mineral called zircon in the metasediments in order to evaluate their origins and determine where they fit into California’s geologic history. Zircon dating involves examining the ratio of atomic decay of radioactive elements in the zircons. Analysis of such data has revealed that, indeed, metasediments in Boyden Cave match the age spectra of zircons from in situ miogeoclinal units to the SE. Our sample from station BC-31 in the field has a minimum zircon age of 500 million years and sample BCE-8 has a minimum zircon age of 420 million years. Age peaks on these two samples, including peaks at approximately 1400 million years and 1700 million years corresponding to the ages peaks of other miogeoclinal sequences.

Category: Physical Sciences & Engineering
Name(s): Ryan Berti
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Michael Crowley, Viterbi School of Engineering; Robert De Groot, Southern California Earthquake Center
Format: Laboratory-based Research
Title: Bridging the Gap: The Use of Ad-Hoc Enabled Smart Phones to Distribute Data Locally in the Cellular Network
Abstract:
Delay tolerant ad-hoc networking is a type of connection scheme that passes data between mobile entities without previous knowledge of their location and level of connection in a network. These networks are currently used in applications dealing with communication where data distribution can afford to have a certain amount of delay. As wireless enabled cell phones become more prevalent, ad-hoc networks can be used to connect users and allow delayed data transfer in a local area. The ability to transfer data locally would have many applications ranging from the implementation of a fully independent emergency cellular network to the local wireless network that coexists within the larger physical grid. My primary research focused on the production of an energy efficient switching algorithm for delay tolerant ad-hoc networks. Because mobile devices are traditionally battery powered, conservative use of the processor and radio antenna during ad-hoc interactions is necessary for extending the network lifetime. To achieve the goal of efficiency I accurately simulated multiple types of entity mobility, investigated the passing algorithms that make up ad-hoc data transfer, and finally produced an intelligent algorithm that successfully extends network life with minimal effects to network delay and delivery rates. While this research was the most focused of the project, I was also able to explore the mobile hardware currently available to consumers as well as
research the inter-workings of the modern cellular network. After two semesters of work in the area, I believe that the integration of ad-hoc networks into the larger physical grid is not only beneficial, but inevitable.

§§§§

**Title:** Comparisons of detrital zircon ages and characteristics of easternmost metasedimentary packages in the Saddlebag Lake pendant, Sierra Nevada: implications for depositional environments and tectonic histories

**Name(s):** Kristan Culbert

**Faculty Sponsor(s) and Department(s):** Scott Paterson, Earth Sciences; Wenrong Cao, Earth Sciences

**Submission Type:** Individual

**Format:** Field Research

**Title:** Comparisons of detrital zircon ages and characteristics of easternmost metasedimentary packages in the Saddlebag Lake pendant, Sierra Nevada: implications for depositional environments and tectonic histories

**Abstract:**
Data collected from the Saddlebag Lake Pendant, a belt of metamorphic rock along the eastern margin of the Tuolumne Batholith (near Yosemite National Park), continue to give insight into the complex tectonic histories of each rock unit within the area. Geologic mapping, geochronology and geochemistry tests, and careful examination of thin sections help determine the age and origins of each metasedimentary package along the Eastern Sierra Crest Shear Zone (ECSZ).

The westernmost package contains clastic metasedimentary and metavolcaniclastic rocks, is intruded by a 232 Ma pluton, and contains zircons from the late Paleozoic (280-380 Ma). This first package is juxtaposed along a pre-232 Ma thrust fault with a second, laterally extensive metasedimentary package, consisting of siltstones, mudstones, cross-bedded sandstones, local conglomerates, and limestones. All samples from this package contain Jurassic (171-190 Ma) and Precambrian (<540 Ma) zircons. A large, dextral strike-slip shear, interpreted to be a part of the ESCSZ, borders the Jurassic package on the east. Late Triassic volcanics lie east of the ESCSZ, and conglomerate beds (containing older clasts and arc-derived zircons) lie near their base. This unit, intruded by the 165 Ma Green Lakes pluton, contains ~220-250 Ma zircons and some PC zircons. Farther south, conglomerates containing Permian and Mississippian fossils are bracketed by the late Triassic volcanics (Barth, personal comm., 2010). All four packages represent distinct assemblages displaced by poorly-constrained distances along Paleozoic thrusts and Cretaceous strike-slip faults.

My research focuses on the eastern portion of the fault. We have found that the similar compositions and zircon ages in these two packages closely match volcanic and marine Golconda strata. These similarities could imply that these sediments are part of the larger Golconda allochthon, a thrust sheet covering portions of central California and western Nevada.

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**Title:** Comparisons of the age and characteristics of metasedimentary packages in the Saddlebag Lake pendant, Sierra Nevada: implications for depositional environments and tectonic histories

**Name(s):** Phillip Ehret

**Faculty Sponsor(s) and Department(s):** Scott Paterson, Earth Sciences

**Submission Type:** Individual

**Format:** Field Research

**Title:** Comparisons of the age and characteristics of metasedimentary packages in the Saddlebag Lake pendant, Sierra Nevada: implications for depositional environments and tectonic histories

**Abstract:**
In the Saddlebag Lake pendant in central Sierra Nevada, California, the implications for depositional environments and tectonic histories are being investigated in three distinct metasedimentary packages in the Virginia Canyon and Saddlebag Lake
regions.

The western-most metasedimentary package exposed in Spiller Canyon contains clastic metasedimentary and metavolcaniclastic rock types. This first package is intruded by a 232 Ma pluton, contains detrital zircons from 380 Ma to 2.8 Ga, and is interpreted to be late Paleozoic. This package is juxtaposed with a second metasedimentary package along a pre-232 Ma thrust fault, which consists of mostly mud and siltstones, and less frequently, cross-bedded sandstones, conglomerates, and limestones. All five samples from this package, which appears to be of shallow marine origin, contain PC zircons with minimum age peaks between 171-190 Ma. The third unit of Jurassic metasediments are bordered on their western margin by a large, dextral strike-slip shear, which is interpreted to be part of the Eastern Sierra Crest Shear Zone. Triassic volcanics lie east of the shear zone, and conglomerate beds containing Permain and Mississippian fossils lie at their base. This unit, intruded by the 165 Ma Green Lakes pluton, contains ~220-250 Ma zircons and one PC zircon.

Package one contains zircons much younger than typical Roberts Mountain assemblages but have ages and older peaks that do not entirely preclude these from being part of the Roberts Mountain allochthon. Ages may better match inferred Golconda units but I am not aware of detrital zircon data from Golconda rocks. Package two is interpreted to be part of a marine Jurassic overlap sequence now recognized throughout the Sierra Nevada. I conclude that all four packages represent distinct assemblages and are displaced, poorly-constrained distances along early thrust and younger strike-slip faults.

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**Category:** Physical Sciences & Engineering  
**Name(s):** Dayton Thorpe  
**Submission Type:** Individual  
**Faculty Sponsor(s) and Department(s):** Aiichiro Nakano, Department of Physics and Astronomy  
**Format:** Laboratory-based Research  
**Title:** Conformational Substates in Two Carbonmonoxy Myoglobin Mutants  
**Abstract:**  
The well-studied oxygen transporter Myoglobin has become an important model for the study of protein conformational change. Two conformational substates of the Carbonmonoxy form of Myoglobin (MbCO) have an ultrafast interconversion time of 47 ps, first experimentally determined in a mutant in 2008. Molecular dynamics (MD) simulations were used to study the structural differences between these substates in two mutants that have recently been the subjects of experiments. Statistical methods were employed to determine the free energy along three coordinates characterizing the distal histidine, which experiments have suggested is the most important structural element differentiating the substates. Using transition state theory and calculations of the energy barrier to substate interconversion yields a predicted switching time of 128 ps, within a factor of 2.7 of the experimentally observed time. This is close agreement for a process that can a priori take less than a picosecond or more than a microsecond. The Fayer Group, which first measured MbCO substate interconversion time experimentally, described a computational prediction of the same value as “an important target for future MD simulations because the barrier crossing will need to be simulated accurately” (2008). Understanding conformational dynamics in MbCO can help to elucidate fast conformational switching processes in other proteins. Learning about the connection between fast, local structural changes and slower, global changes that
have experimentally known effects on protein function enables rational drug design and targeted control of chemicals for environmental benefit.

### Distributed Constraint Optimization Problems (DCOP) and Robotic Sensor Networks

**Title:** Distributed Constraint Optimization Problems (DCOP) and Robotic Sensor Networks

**Name(s):** Prateek Tandon

**Faculty Sponsor(s) and Department(s):** Milind Tambe, Computer Science

**Submission Type:** Individual

**Abstract:**
The USC Landroids Project seeks to apply the Distributed Constraint Optimization Problem (DCOP) Framework to a robotic sensor network. DCOP is a general purpose algorithmic framework for multi-agent coordination previously used for agent-based scheduling and other domains. During the summer of 2009, I built a robotic sensor network of 5 iCreates to prototype our group’s algorithms. I developed software that would allow each of these robots to autonomously communicate with the other robots to form a network. Currently I have been able to scale the network up to 8 robots. Soon I hope to have 10 iCreate robots in the network executing the planned algorithms. DCOP algorithms facilitate coordination amongst the robots as they decide within their local networks the direction and extent of movement of each robots so that the connectivity between robots is enhanced. The key to my work was to compare different DCOP algorithms to see if real world performance confirmed performance in simulation. The experimental results obtained from the robotic network have been published part of our group paper at the Distributed Constraint Reasoning (DCR) conference at IJCAI 2010. In addition, during 2009 this robotic system I had developed was used in a joint study between the USC Embedded Networks Lab and the TeamCore research group with which I work to test network metrics on DCOP algorithms. DCOP utilizes local optimizations. We had hypothesized that these local optimizations could improve global network metrics such as global throughputs and ping rates. Running experiments with the system allowed the team to prove the hypothesis. The results indicate that even with small scale movements alone the throughput of the robotic network can be improved nearly 40%! The results of this study are in a publication currently being prepared for the Infocom Conference on Computer Communications.

### Electrokinetic Remediation of Hexavalent Chromium in Groundwater

**Title:** Electrokinetic Remediation of Hexavalent Chromium in Groundwater

**Name(s):** Andrea Wong, Aditi Yokota-Joshi

**Faculty Sponsor(s) and Department(s):** Lewis Hsu, Andrew and Erna Viterbi School of Engineering; Massoud Pirbazari, Sonny Astani Department of Civil and Environmental Engineering; Ryan Thacher, Andrew and Erna Viterbi School of Engineering

**Submission Type:** Group

**Format:** Laboratory-based Research

**Abstract:**
The purpose of the research is to gain a better understanding of the electrokinetic removal of hexavalent chromium from groundwater. To minimize variability, kaolinite was used and specific amounts of chromium contamination were considered. Testing was performed with clays from both a commercial chemical provider (Sigma Aldrich) kaolinite and raw kaolin from a Florida quarry (EPK). Influence of clay source on both pH and pollutant adsorption was evaluated in this study.
Columns were constructed to hold fixed amounts of clay between two electrodes while providing sampling ports to measure the movement of chromate ions through the column. The contaminant is concentrated by applying an electric potential that causes the chromate and dichromate ions to migrate towards the anode. Using these columns, the efficiency of applied electrokinetics to simulated subsurface environments was tested. Effects of pollutant concentration and pH were among the variables tested.

#### Title: Fingerprinting DNA with Quantum Mechanics: DNA Nanopore Sequencing via Principal Component Analysis

**Name(s):** Henry Yuen  

**Faculty Sponsor(s) and Department(s):** Aiichiro Nakano, Department of Physics, Department of Computer Science  

**Format:** Senior Honors Thesis  

**Title:** Fingerprinting DNA with Quantum Mechanics: DNA Nanopore Sequencing via Principal Component Analysis  

**Abstract:**  
Human genome sequencing promises to offer significant advances in medicine and biology. Knowing the genetic blueprint of an individual allows for complete and accurate diagnoses of inherited diseases, development of preventive medicine, detailed risk assessments of potential conditions, and personalized drugs with minimal side effects. The Holy Grail for personalized gene sequencing is the so-called Ultra Low Cost Sequencer (ULCS), which would be able to sequence an entire human genome for less than 1000 USD. Such affordability would introduce personal genomes as a routine part of individualized health care. The quest for the ULCS is motivating much research into alternative methods of genome sequencing. One of the more exciting avenues is nanopore sequencing. Where traditional methods usually require massive replication of DNA, a nanopore sequencer only requires a single strand. As the strand threads through a ~2 nm nanopore, the device infers the base sequence from the fluctuations in an induced electrical current. While many groups have studied different ways of nanopore sequencing, the enduring difficulty is that of distinguishing the nucleotides based on the fluctuations in the input current. I propose a method of using Principal Component Analysis (PCA) to "learn" the characteristics of the input electrical signal that differentiate the different nucleotides. I present theoretical calculations that PCA can indeed learn the "electronic fingerprint" of the four DNA bases: the algorithm correctly identifies nucleotides 85% of the time with 1× coverage. With modest parallelization, an entire human genome could be reliably sequenced within 10 hours using this method. I use quantum mechanical calculations - called Density Functional Theory (DFT) - to determine the density of states of DNA molecules. It is this density of states that serves as the "electronic fingerprint" of the nucleotides.

#### Title: Hydrogen Isotopic Analyses of Leaf Wax Biomarkers in Miocene and Pliocene Age Marine Sediments off NE Africa

**Name(s):** Lesley Petrie  

**Faculty Sponsor(s) and Department(s):** Sarah Feakins, USC College of Letters, Arts and Sciences; Department of Earth Sciences  

**Format:** Laboratory-based Research  

**Title:** Hydrogen Isotopic Analyses of Leaf Wax Biomarkers in Miocene and Pliocene Age Marine Sediments off NE Africa  

**Abstract:**  
Environmental pressures such as climate play a crucial role in driving natural selection and evolution, yet existing climate reconstructions based on pollen and geochemical proxies disagree over the environmental changes in northeastern Africa in the Miocene and Pliocene during
key points in hominid evolutionary history. Carbon isotopic studies of soil carbonates, fossil teeth and plant leaf waxes indicate there was an expansion of C4 plants between 8 and 6 million years ago, which may be linked to increased aridity in NE Africa and the intensification of the Indian Monsoon circulation (Cerling et al. 1997; Huang et al. 2007). The intent of this research project is to use the analysis of hydrogen isotopes in plant leaf waxes to reconstruct environmental variability in the Pliocene and Miocene. The study also troubleshoots the current methods used to extract terrestrial leaf waxes from marine sediments in order to improve the abundance of leaf wax yields for hydrogen isotopic analysis. The innovative use of leaf wax biomarkers as a proxy for climate and environmental change could help resolve the differences between conflicting climate reconstructions for the region, and better characterize the environmental context of hominid evolution. We predict that if the fractionation of deuterium and hydrogen isotopes indicates changes in precipitation, then an increase in δD values from the plant leaf waxes from DSDP Site 231 indicates the climate became more arid. Further study anticipates that substantial variations in the fractionation of deuterium and hydrogen (D/H) will be observed in plant leaf wax biomarkers between 8-5.5 Ma, signaling a change in regional precipitation that perhaps explains the changes in aridity and grassland development in Eastern Africa.

Category: Physical Sciences & Engineering
Name(s): Lauren Gelbach
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Scott Paterson, Department of Earth Sciences
Format: Field Research
Title: ICP-MS dating of zircon in the Iron Mountain Pendant: Implications for Sierran tectonics

Abstract:
The Mesozoic Sierran arc and Phanerozoic host rocks in California have undergone several tectonic events that have been preserved in metamorphic host rock pendants throughout the region. Members of the USC 2009 undergraduate team research program have studied the Iron Mountain pendant (SW of the Tuolumne Batholith) to establish ages of the different rock units and to clarify which tectonic blocks are preserved in the pendant. The pendant is composed of a mix of metavolcanic, volcanoclastic, metasedimentary, and hypabyssal plutonic rocks. ICP-MS, U/Pb zircon dating has established that an overlying meta-andesitic to rhyolitic units are approximately 96-103 m.y., one package of marine metatsedimentary phyllites, schists, and quartzites have a minimum age peak of about 140 m.y. (thus the units are likely Jurassic), and an older package of mature quartzites, and phyllites with Precambrian zircon populations with peaks at 1100, 1400, 1770, and 2700 m.y. that closely resemble miogeoclinal rocks elsewhere. We interpret these data to indicate that this pendant exposes part of the miogeoclinal Snow Lake block and a Jurassic marine overlap sequence, both of which are overlain by Cretaceous continental margin arc volcanics. Ductile shear zones occur in the area and may separate the Jurassic overlap from the miogeoclinal rocks. These observations add support to hypotheses that the Snow Lake Block extends throughout the central and southern Sierra Nevada and that a Jurassic marine overlap
sequence is also present throughout the central and southern Sierras as well. To our knowledge the overlying Cretaceous volcanics in this pendant, part of a belt of Cretaceous volcanics locally preserved along the central axis of the Sierra, represent the westernmost exposure recognized to date. The coarse clast size in some volcanic layers, map pattern, and intrusion by a hypabyssal pluton suggests that these may be near or remnants of a Cretaceous caldera complex.

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**Title:** Iron-Oxide Coated Sand and Bio-Sand Filter for Removal of Arsenic and Pathogenic Bacteria and Viruses from Drinking Water

**Name(s):** Szeyan (Charlotte) Chan, Hannah Gray

**Faculty Sponsor(s) and Department(s):** Massoud Pirbazari, Department of Civil and Environmental Engineering; Varadarjan Ravindran, Department of Civil and Environmental Engineering

**Format:** Laboratory-based Research

**Abstract:**

Owing to the pressing global demand for safe drinking water in developing nations, our research focuses on studying the removal of microbial pathogens (bacteria) and arsenic from contaminated water sources. A microbial bio-film formed in the bio-sand filter is capable of removing bacterial and viral pathogens, while a column of iron-oxide coated sand can remove dissolved arsenic by sorption. The bio-sand filter used in this application was constructed of a transparent polyethylene-resin to facilitate visual observation of microbial activity and reactor flows. The filter bed essentially consists of a sand layer supported by gravel and glass beads. A bio-film developed in the filter medium is capable of removing pathogenic bacteria during process operation. The bio-film development requires careful operation and monitoring of the bio-sand filter. Microbial analysis of influent and effluent samples has shown that the bio-sand filter maintains high efficiency for removals of bacteria (coliform used as surrogates for pathogenic bacteria) and turbidity. The evaluation of contaminant reduction in the bio-sand or iron-coated sand is conducted at three specific points in the filter. Additionally, a comparison of bacteria removal with and without the presence of arsenic shall demonstrate the effect that arsenic has on bacterial populations in the water and in the biofilm. Our presentation shall discuss the filter efficiencies regarding bacterial and arsenic removals. Additionally, it will include details on the characteristics of the microbial bio-film formed and iron-coated sand employed in the filter medium. Furthermore, the presentation will explain the relevant mechanisms associated with bacterial and arsenic removals.

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**Title:** Programming Pinball Machines

**Name(s):** Clark Kromenaker, Allen Pan, Ryan Zink

**Faculty Sponsor(s) and Department(s):** Hrudesh Doke, Computer Science, Viterbi School of Engineering; Sven Koenig, Computer Science, Viterbi School of Engineering; Daniel Wong, Electrical Engineering, Viterbi School of Engineering

**Format:** Laboratory-based Research

**Abstract:**

Our project began with an off-the-shelf Stern Lord of the Rings pinball machine. Our original goal was to simply modify the built-in game and add in features. Initially, the project consisted of creating a drop-in replacement for the game hardware and writing a software control mechanism for it. However, our experience with crafting a new hardware control system for the pinball machine led to our exploration of
other forms of software and hardware development, in particular motion tracking and a form of artificial intelligence to determine the strength of the player. The next step in our development of the pinball machine was to make the software system modular, such that it could be used on any pinball machine, increasing the relevance and impact of our work. Later, in order to make games development more achievable for interested parties, we developed a library of common game events and actions that developers could use to more quickly create a game without having prior knowledge of either the hardware or software architecture. A partnership with another research team at the University of Alberta is on the road to producing a much simpler method, through the use of scripting and a graphical game designer, of developing games without the need for any programming experience at all. Now that the framework for creating new games is in place, we are exploring innovative new ways to bring gameplay elements to the pinball experience, something that has been constrained in a rather rigid paradigm for years. Our ultimate goal is to create a pinball system that allows for anyone to create a new game as a way to develop programming skills and foster interest in games development.

The general approach to this research project is to create tutorials based off of personal experience, supporting materials and media, and experimentation in order to facilitate the student’s design project execution using the necessary tools. The target software, Revit Architecture, is a form of BIM (Building Information Modeling), a technology still in its infancy that is transforming the way architects, engineers, contractors, and associated occupations work together.

Topics covered entail, in order of priority, detailing of sections with accompanying annotations, scheduling components and layouts, visibility and overwrite standards, internalized structure components, and elaboration on differences in structural components in Revit Architecture and Revit Structure. Additional secondary topics cover the fundamental processes of material takeoffs, scheduling, estimating, and so on.

The method of execution is to collect and distill various resources and materials on BIM and present it in a clearer, more intuitive manner, with the intention of instructing peers on a wide variety of BIM applications using simple examples and projects. This kind of “translated” material will allow students who would not otherwise understand certain material to do so in a more time-sensible manner. This area of research will also concentrate on methods of further evangelizing BIM solutions to peers, who are often more concerned with the conceptual underpinnings of design and not the means to build it, and architecture firms, many of whom are hesitant to invest time and effort in learning a technology that could potentially replace its older forms falling into obsolescence.
Title: The Effect of Catalysts on Solid Propellant Burn Rate

Abstract:
By using the strand burner, we are finding the burn rates of solid propellant formulas with given burn rate catalysts to see in what types of rockets these propellants should be used. Burn rate of a propellant changes what a standard sized rocket can do. Hopefully, with more research we can attempt to find a relationship between the percentage of catalyst used and the increase in burn rate, something that has only been estimated from experience before.

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Title: The seawater nutrient history of Biscayne National Park, FL, as recorded by coral skeleton

Abstract:
Coralline P/Ca has been proposed as a novel paleo-nutrient proxy, evidenced by a strong correlation between coralline P/Ca and ambient seawater phosphate. Coral P/Ca records have thus far been limited to modern corals from upwelling regions with high nutrient concentrations. Demonstration of P/Ca reliability on centennial timescales in low-nutrient environments would expand the applicability of this new proxy. In upwelling regions, several seawater properties covary seasonally, preventing isolation of a possible influence of secondary variables (e.g. sea surface temperature) on coral phosphorus. We test the seasonal temperature dependence of skeletal P/Ca incorporation at this new site, where variations in seawater phosphate are independent of the strong seasonal variation in SST. The lack of correlation suggests that SST is not a major influence on P incorporation in M. faveolata.

Coral growth rates in Biscayne National Park, Florida reefs have declined through the last century in response to a poorly understood combination of multiple stressors. To test whether anthropogenic nutrient loading (as traced by phosphate) could have played a role in the decline of coral growth in Biscayne National Park, we reconstructed the seawater phosphate history of the park through the last 120 y by making sub-seasonal P/Ca measurements in eight discrete (5-10 year) down-core time windows in a M. faveolata coral. Coral P/Ca values were similar to modern values (~6-16 µmol/mol P/Ca) through the entire period, indicating that phosphate concentrations at this reef location remained below ~0.07 µmol/kg since the pre-industrial era. These results suggest that anthropogenic phosphate loading did not directly cause the observed decrease in coral growth rate since the 1950s; other factors such as temperature rise or disease are more likely responsible. These results constitute the first century-long coral P/Ca record, and imply that the P/Ca proxy is not subject to major diagenetic alteration on this time scale.
The newly discovered northern extension of the Eastern Sierra Crest Shear Zone (ESCSZ) along the eastern margin of the Tuolumne batholith, central Sierra Nevada, strikes N-NW varying in width from 1 – 2km. Shear sense indicators including S-C structures, shear bands, asymmetrical folds, sigma and delta clasts, and asymmetrical boudins occur in both areas with stretching SE plunging lineations that weaken outside the shear zone. These indicators indicate, synmagmatic, oblique, dextral shear in the 88 (Saddlebag Lake area) to 86 (Virginia Canyon area) Ma Cathedral Peak granodiorite and longer durations of shear in the sedimentary, and volcanic units. Ductile shearing in the host rocks occurred under amphibole (< 700°C) to subgreenschist facies conditions and continued well after 83 Ma (biotite cooling ages in the Virginia Canyon area).

The steeply dipping, discreet brittle fault, in the middle of the ductile shear zone, marks the contact between the two rock packages described above as well as a surface along which dikes from the TB are truncated. Local slickenlines, steps, and offset dikes suggest dextral oblique motion mirroring the motion of the ductile shear zone. Breccias, gouge, and local pseudotachylite and large breccia-filled, quartz veins are common along the fault. Brittle motion continued after biotite closure ages and possibly significantly younger than 80 Ma during exhumation and cooling of this portion of the Sierra Nevada.

The absence of the entire Jurassic volcanic sequence across the fault in the Saddlebag and Virginia Canyon area suggests tectonic removal during faulting caused by significant displacement on this fault. The Jurassic marine sedimentary sequence and their detrital zircon histograms may provide an opportunity to better constrain the fault displacement although no matches have yet been found.

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The Northern Death Valley-Fish Lake Valley fault zone (NDV-FLVFZ) is the largest, most continuous system of the eastern California shear zone (ECSZ). Although recent studies have determined the slip rate of the fault (2.5 to ~5 mm/yr, depending on location), much less is known about the magnitude and frequency of the earthquakes that have occurred along this fault system. In my project, I used LiDAR (Light Detection and Ranging) data to document small- to intermediate-scale (meters to tens of meters) offsets along the NDV-FLVFZ, using the computer program ArcGIS. I compiled a set of 95 offsets, graded them on the basis of clarity and confidence, measured their displacements, and estimated potential errors. A histogram of these data with distance along the fault on the horizontal axis and displacement along the vertical will allow me to determine clusters of offsets based on location and amount of slip. These slip measurements provide useful estimates of the magnitude of individual ancient earthquakes on this major system.
This is important to understanding what kinds of earthquakes the NDVFZ produces, which will in turn help us to better assess the likelihood of future earthquakes along this major fault.
Social Sciences

Title: All for One and One for All: Exploring the Predictive Variables of Vicarious Retribution among Gang and Nongang Youth

Name(s): Elizabeth Trawick
Faculty Sponsor(s) and Department(s): Jo Ann Farver, USC Department of Psychology; Karen Hennigan, USC Department of Psychology
Submission Type: Individual
Category: Social Sciences
Format: Senior Honors Thesis
Abstract:
During the difficult and uncertain stage of adolescence, groups become a crucial refuge through which adolescent males gain an identity. Self-worth gained through group membership helps shape the identities of the youth as well as the entitativity, or perceived cohesion, of the groups. However, as these groups and resultant allegiances develop, intergroup conflicts between rival adolescent groups become inevitable. The current study focuses on male adolescent peer groups because of the vulnerability of their group identities, and their propensity to respond aggressively to conflict. To better understand the underlying forces that lead to such aggressive reactions, I used Social Identity Project interviews with Los Angeles males aged 14 to 21 about their group affiliations and reactions to intergroup conflict. To date, little research has been done to explore the effect of ingroup entitativity and other cognitive group processes on retaliation. The current study examined this relationship more specifically through a multiple regression analysis to test the influence of group type, group norms, and ingroup entitativity on four measures of vicarious retribution. Using data collected for the USC Social Identity Project, this secondary data analysis revealed some predictive influence of such group mentalities on vicarious retribution, especially forms of displaced retaliation.

Title: Biased Brain: Exploring thought heuristics and biases in predictions about an uncertain future

Name(s): Robert Siko
Faculty Sponsor(s) and Department(s): Richard John, Psychology
Submission Type: Individual
Category: Social Sciences
Format: Senior Honors Thesis
Title: Biased Brain: Exploring thought heuristics and biases in predictions about an uncertain future
Abstract:
To aid in understanding the thought processes which go into thinking about uncertain future events, predictions were elicited from subject volunteers. Judgment and decision making literature has identified many detrimental thought heuristics which can negatively affect prediction accuracy. This study explores the role of the packing bias in predictions about how teams fared in the 2009 MLB Playoffs. This study finds that the packing bias is strongly displayed in this elicitation paradigm; subjects tended to allot more confidence in teams when they were presented individually rather than in a group (i.e. New York Yankees and Boston Red Sox).
Red Sox vs. Teams from AL East). Another explored heuristic is an individual's level of knowledge about a domain - while providing them with valuable information, highly knowledgeable subjects may perform poorly when attending to personal feelings rather than statistical data. This study finds that a high level of knowledge about the 2009 MLB season actually led to lower prediction accuracy. A new predictive model is also tested which essentially cleans the collected data, normalizing responses and removing inconsistencies and abstentions which can plague standard group-derived prediction models.

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**Title:** Body Integrity Identity Disorder: Happiness Costs an Arm and a Leg

**Name(s):** Alicia Johnson

**Faculty Sponsor(s) and Department(s):** Lisa Aziz-Zadeh, Occupational Therapy/Brain and Creativity Institute

**Format:** Laboratory-based Research

**Title:** Body Integrity Identity Disorder: Happiness Costs an Arm and a Leg

**Abstract:**
Body Integrity Identity Disorder is a condition in which people desire amputation of healthy limbs (or, in some cases, paralysis, blindness, or other disorders). It is a poorly understood disorder, with much of the previous research viewing it primarily as a paraphilia. The current study was created to learn more about the condition both generally as well as with specific attention to perceived physical differences of the affected limbs. Participants were recruited from 3 BIID-focused internet forums to respond to an initial survey as well as a follow-up survey. There were 97 participants total, with 25 responding to only the first survey, 32 responding solely to the second, and 40 people responding to both surveys. The results confirmed findings of a previous interview study, especially with regards to the demographics (age, gender, and sexual orientation) of people with BIID. While there did not appear to be perceived physical deficits, physical differences of the limb may not be consciously recognized. Interestingly, it was also found that people who achieved amputation almost always had phantom limbs and that many people with BIID used (or, if amputation had not been achieved would plan to use) prosthetics post-amputation. These results lead to many questions about the perception of self and about body schema. We plan on using this data to create neuroimaging studies to better understand the neural components of BIID and body schema.

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**Title:** Conflict Management Strategies, Intimacy Goals and Demand-Withdraw Behavior in Close Personal Relationships

**Name(s):** Caroline Manis

**Faculty Sponsor(s) and Department(s):** Brian Baucom, Psychology; Gayla Margolin, Psychology

**Format:** Senior Honors Thesis

**Title:** Conflict Management Strategies, Intimacy Goals and Demand-Withdraw Behavior in Close Personal Relationships

**Abstract:**
The demand-withdraw interaction pattern is a very common cycle of interaction in intimate relationships with higher levels of demand-withdraw behavior associated with serious relationship dysfunction (e.g., increased relationship distress and risk of divorce) and individual dysfunction (e.g., increased depressive symptoms and impaired psychoneuroimmunological functioning). The present study examines cross-sectional and short-term longitudinal associations between demand-withdraw behavior and two previously unexplored variables: intimacy goals, and conflict management strategies. Ninety-eight heterosexual female college students in current or recent dating relationships completed self-report questionnaires of
relationship satisfaction, demand-withdraw behavior, conflict management, and intimacy goals and also rated the importance of intimacy goals and conflict management while listening to four audio-recorded vignettes of different types of demand-withdraw conversations. Results suggest women initially rate closeness-enhancing motivations more highly when they are in the demanding role and that women tend to respond with a decline in closeness-enhancing motivations over the course of the interaction when their male partner is in a demanding role. The present study demonstrates the importance of considering the interact

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**Category:** Social Sciences  
**Name(s):** Megan Moine  
**Submission Type:** Individual  
**Faculty Sponsor(s) and Department(s):** Ann Marie Yamada, USC School Of Social Work  
**Format:** Field Research  
**Title:** Consumer Perspectives of Effective Providers: The Dimensions of Successful Communication  

**Abstract:** Working alliance (Bordin, 1979) refers to the components of the provider-consumer relationship thought to contribute to consumer outcomes (Ware et al, 2004). Yet limited information is known about the experience of consumers with severe and persistent mental illness (SPMI) as they work with their service coordinators as part of comprehensive psychosocial rehabilitation services. While previous studies have suggested that there are positive trends associated with therapeutic alliance, the consumer-provider relationship has yet to be properly defined (Meier et al., 2005). For example, higher alliance levels consisting of a stronger bond and collaboration between client and therapist have been found to be a significant predictor of decrease in clients’ symptoms (Barber et al, 2000). The purpose of this study was to explore and illustrate the communication of working alliance between mental health service recipients and their providers. Based on data from a standardized interview, we explored the perceived relationships of culturally diverse consumers with their providers. In seeking to define the factors of a positive consumer-provider relationship, the study focused specifically upon the clients’ opportunities for communication in a therapeutic setting. Themes underlying communication related elements of working alliance were feeling “known”, the importance of talk, and recognition as an individual. Implications for development of consumer-driven, meaningful outcome variables and future studies will be discussed.

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**Category:** Social Sciences  
**Name(s):** Esther Man Yan Lo  
**Submission Type:** Individual  
**Faculty Sponsor(s) and Department(s):** Jo Ann Farver, Department of Psychology; Stanley Huey, Jr., Department of Psychology  
**Format:** Senior Honors Thesis  
**Title:** Effects of Self-Disclosure on Treatment Outcome for Subsyndromal Depressed Patients  

**Abstract:** In the US population there is a 20% lifetime prevalence rate for Major Depressive Disorder (MDD). However, little research has focused on a milder form of depression – Subsyndromal Depression (SSD). Judd et al. (1996) has stressed the dynamic nature of depressive disorders, noting that depressive symptoms tend to wax and wane over time, and that SSD individuals often develop into MDD patients. Unfortunately, research on SSD is limited and clinicians are still debating which treatment plans are most effective for the SSD population. This gap in the
literature provides a strong rationale for the current study.

The larger study evaluates the effectiveness of a 20 minute brief treatment for Asian American and European American college students with SSD. A total of 120 participants are being randomly assigned to directive treatment, non-directive treatment, or a control group. For my part of the project, the behavior of particular interest to me is the willingness of participants to self-disclose their depressive symptoms. Self disclosure is recognized as a factor that enhances therapy outcomes. The VPPS is being used and the scale "patient participation" is the component that is most important to this project.

* project is in the final stage of data collection thus no conclusion can be made at this point.

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Category: Social Sciences
Name(s): Zachary Kleiman
Submission Type: Individual
Faculty Sponsor(s) and Department(s):
Jo Ann Farver, Psychology; Richard John, Psychology
Format: Senior Honors Thesis
Title: Emotion Driven Outcome Assessment in Sports
Abstract:
Emotion, as it relates to sports outcome assessment, is the idea that our evaluations of teams and their abilities are colored by our long-standing allegiances. While there has been a significant amount of research on the effect of bias in making decisions, there are many areas to explore and investigate through further research. Bias in sports prediction is an important topic to consider because it not only contributes heavily to the gambling industry, but also is a unique manifestation of how emotion colors our decisions in normal facets of life. Participants will complete a total of two questionnaires: one measure on how many games they expect each of 14 teams to win in the upcoming season and one measure on how much they like or dislike these same 14 teams. For the first questionnaire, participants will be randomly selected to take part in one of two conditions. In the first, an “over-under” line will be displayed for each team, representing the amount of games that Las Vegas has set for people to use to make wagers. This line is thus the “expected” win amount. In the second condition, no such information will be given. After predicting how many games they expect each of the 14 teams to win, participants will be asked to identify their emotions for each team. This will be done on a 7-point “Love/Hate” scale. The study came up with significant findings in regard to information and emotion bias. Those participants who make predictions without the line had significantly greater success than those given a line. Additionally, Participants made considerably better predictions about teams they are indifferent about, rather than teams they either love or hate. Moreover, there was a moderate interaction effect between information and emotion.

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Category: Social Sciences
Name(s): Tina Khiani, Neelam Savla
Submission Type: Group
Faculty Sponsor(s) and Department(s):
Carol Prescott, Psychology
Format: Field Research
Title: Examining the Relationship Between Major Area of Study and Environmentaism Among College Students
Abstract:
There are questions about how the major area of study that a college student chooses will affect other aspects of their life. The aim of the present study was to assess the relationship between the effect of college major and involvement in
environmentalism, as measured through self-reported behaviors, attitudes, and values. The data from the present study was gathered as part of a larger study that involved a dorm vs. dorm competition with baseline and follow-up self-report surveys. The competition challenged residence halls on a private university campus to reduce their electricity consumption. Our analyses were based on the responses of the 298 college students who participated in the first survey. The survey included several scales that assessed environmentally-relevant behaviors, attitudes, and values. Analyses showed a significant relationship between major and environmental behavior; biology and psychology majors had a significant relationship while business and engineering majors did not. No significant relationship was found between major and attitudes or values. These results suggest that the major that one decides to pursue in college may influence other aspects of their life outside the classroom as well.

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**Title:** Falling out of favor: Processes of status loss within groups

**Name(s):** Ellen Lee

**Faculty Sponsor(s) and Department(s):** Jennifer Overbeck, Marshall School of Business

**Submission Type:** Individual

**Format:** Senior Honors Thesis

**Abstract:**

Two studies examine how leaders lose status in groups, specifically how goal alignment affects the extent of status loss. I argue and show that leaders who are aligned with their groups generally experience less status loss; however, when the group fails at a task, aligned leaders actually experience more status loss than leaders who are not aligned with the group’s goals. In Study 1, participants rated the extent to which they would retain Steven Sample as President of the University of Southern California depending on how his goals aligned with the group’s goals. In Study 2, I manipulated a leader’s goal alignment and the group’s performance to explicitly measure status and found that goal alignment actually threatens a leader’s status after failure.

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**Title:** Goal Settings and Treatment Outcome in Multisystemic Therapy

**Name(s):** Danielle Stevenson

**Faculty Sponsor(s) and Department(s):** Jo Ann Farver, Psychology; Stanley Huey, Jr., Psychology

**Submission Type:** Individual

**Format:** Senior Honors Thesis

**Abstract:**

This study is a secondary analysis that examines how parents and children’s initial treatment goals differ and how these differences affect treatment outcome for African American and European American populations. Seventy seven children ranging from ages 12-17, were recruited from the Charleston, SC Department of Juvenile Justice. All youth were substance-abusing juvenile offenders who received multisystemic therapy. Youth and their caregivers were evaluated at pre-treatment (T1), four month follow-up (T2), and 12 month follow-up. It is hypothesized that parent-child agreement on initial treatment goals will be associated with reductions in drug use and antisocial behavior.
Title: Investigating cognitive coherence in language and action

Name(s): Noelle Garza, Alexandra Ruelas

Faculty Sponsor(s) and Department(s): Elsi Kaiser, Linguistics

Submission Type: Group

Category: Social Sciences

Format: Laboratory-based Research

Abstract:
The human ability to represent events in our minds is crucial for understanding the world. It plays a central role in language comprehension and production. Past research has indicated that actions can influence language in terms of space and motion. We wanted to see if the actions performed by participants would influence language on a more abstract level, namely how people understand relations between sentences. We used priming to identify patterns of the representations constructed during language production to further our understanding of the underlying mental representations.

Research has shown that linguistic primes have an effect on later linguistic processes. For example, reading a particular sentence can influence how you interpret another sentence. Our experiment investigated whether action primes would have the same sort of result -- particularly since they involve no linguistic input, just concepts such as cause/effect or certain events happening.

We looked at whether participants' actions influenced sentence completion responses. Thirty participants were asked to complete different kinds of actions and to continue simple sentences (e.g., "Jason kicked Matt. ..." ). Actions were of three types: Causal (e.g. roll ball towards bowling pins to knock them over), TwoEvent (e.g. roll die, cross two sticks) and OneEvent (e.g. build puzzle). The data was analyzed for the relationship between the test sentences and participants' continuation sentences (e.g. causal, or two unrelated events). Our results indicated that after Cause primes, participants were more likely to write a continuation with the same kind of causal relationship than after TwoEvent or OneEvent primes. We will also discuss how our results relate to automatic/involuntary consequences vs. intentional consequences. It seems that there is a significant relationship between the action and the sentence produced. In a broader context, this indicates a cohesive framework through which a person receives information and reacts to it.

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Title: Menstrual Culture from Seven Ethnic Dayak Tunjung and Benuaq Villages of West Kutai (Borneo): Associated Spiritual Practices, Attitudes, and Distress

Name(s): Marrissa Emond

Faculty Sponsor(s) and Department(s): Robert Delgado, Anthropology and Biological Sciences

Submission Type: Individual

Category: Social Sciences

Format: Field Research

Abstract:
Among female mammals, menarche marks the life history stage of sexual maturation. For young women, however, menarche also serves as a major psychological, cultural, spiritual, as well as biological transition (Uskul, 2004). The cultural beliefs relating to menstruation, a natural and necessary biological phenomenon, influence the prevailing thoughts of gender power and privilege (Lee & Sasser-Coen, 1996). As a topic often shielded from society, considered taboo, and shrouded in negativity, many cultures scorn menstruation and encourage women to hide its existence. Spiritual beliefs associated with menarche and menstruation may support this oppression of women, but could also have a positive...
influence on a woman’s status or fitness.

Over the summer of 2009 I surveyed women from seven villages that were historically Dayak Tunjung and Benuaq in West Kutai, (Borneo) Indonesia, utilizing adaptations of the Menstrual Attitude Questionnaire and the Menstrual Distress Questionnaire (Brooks-Gunn & Ruble 1980; Moos 1968) to examine the perspective of women on menstruation and their experiences of menarche. Through interviews with village chiefs, I gathered data on the spiritual practices associated with each village.

This work examines the connections between spiritual practices and beliefs associated with prevailing attitudes toward menstruation among village women, as well as the women’s psychological and physical distress before and after menarche.

This research provides preliminary work on what I hope to examine as the impact of spiritual practices associated with menarche on the ecological fitness of women.

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Category: Social Sciences
Name(s): Michael Shashoua
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Carl Voigt, Marshall School of Business
Format: Analytical Paper
Title: Microfinance in The Middle East: The Palestinian Option for Peace
Abstract:
One of the most pressing issues the world will have to address in the next century is how to create a peaceful Middle East. Due to increased globalization and the growing departure from fossil fuels, the Middle East will likely undergo huge economic upheaval coupled with social and political turmoil. To prevent this mayhem, Middle Eastern countries will have to develop a strong, diverse market economy. Poverty breeds discontent as those with nothing often turn to extremism. A particular puzzle is that of the Palestinians. The Palestinians are a people mired in poverty, refugees scattered throughout the world, and citizens to an ineffective and slow government. Their situation is aggravated by an Israeli economic blockade which is meant to deter Palestinians from supporting a radical government while at the same time pushes them deeper into their anti-Israeli sentiments. They need a solution; something has to be done to end this destructive cycle. It is nearly impossible to create a traditional, structured economy under an economic blockade, which unfortunately means that the Palestinians will not be able to benefit from an economy until Israel or the Palestinian Government yields. However, thanks to the Nobel-prize winning economic guru, Muhammad Yunus, the world has a new tool to fight poverty: microfinance. The Palestinian people seem to be the perfect candidates for microfinance as they have a large population, relatively high education rate, and financial support from oil-rich nations. To take advantage of microfinance, the Palestinians must still undergo a series of government reforms to deal with the main variables: role of family networks, weakness of property rights, nature of labor, weak states, and scarcity. If the Palestinians can create the restructuring necessary for microfinance, they may finally bring an end to their poverty and create a platform that yields real social reform.

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The purpose of this proposed research is to examine the role of attitudes in predicting HIV prevention outcomes preceding and following exposure or not to an interactive video (IAV) behavioral intervention designed to change unprotected anal intercourse (UAI) for men who have sex with men (MSM). This research is a secondary data analysis of an NIAID grant involving approximately 600 MSM. This proposed study has three main hypotheses regarding MSM’s (a) attitudes toward condoms at baseline, (b) change in attitudes toward condoms, after receiving the IAV intervention, (c) intentions to use condoms at baseline, (d) change in intentions to use condoms, (e) negotiation behavior, (f) change in negotiation behavior, (g) change in UAI. Both simple and multiple regression analysis will be employed to test the hypotheses. If the proposed findings are consistent with the hypotheses, it would lend more credibility to the importance of beliefs and belief change in behavioral HIV prevention interventions. Assessing the components of HIV prevention interventions may greatly improve them, and therefore also improve the lives of MSM, by decreasing MSM’s susceptibility to degenerative diseases including, STDs, HIV, and AIDS.

A “near crisis” is defined as an incident in which there was nearly a crisis between two states but the situation did not escalate to involve conflict. To meet the criteria of a “near crisis,” an event must include the following three parameters: a perceived threat to basic values on the part of the state leadership, an element of time pressure which distinguishes the event from a protracted conflict, and an indication that one party perceived a potential escalation to military or economic conflict. There are three major stages to our research process: (1) individual research, (2) debating candidate cases, and (3) coding. During the individual research phase, one member is assigned a specific month and year. The researcher then utilizes USC library resources to probe historical records of that period searching for incidents of near crisis. At weekly meetings, the team collaborates to debate
Candidate cases. This process involves evaluating the sources that have been found, typically news or scholarly articles, and looking for evidence of the three necessary variables which can qualify a case as a “near crisis.” Finally, the coding phase organizes the candidate cases into a centralized physical database.

Title: Ovulatory Effects on Women’s Voices: Vocal Analysis and Ratings of Attractiveness
Name(s): Laura Simon
Faculty Sponsor(s) and Department(s): Robert Delgado, Departments of Anthropology and Biological Sciences in the College
Submission Type: Individual
Category: Social Sciences
Format: Senior Honors Thesis
Abstract: As women do not seem to physiologically advertise when they are most fertile, scientists have suggested that humans exhibit 'concealed ovulation.' That is, when women are ovulating (the 1-2 days when they are most likely to become pregnant), they do not show overt visual, olfactory, or auditory cues to interested males. However, in the last decade, studies in evolutionary psychology have revealed that women may indeed produce cues to their fertility, albeit subtle ones. For example, women may dress more provocatively or smell more attractive during ovulation than during a low fertility period in their menstrual cycle. This study examines whether women’s voices may be cues to men revealing their fertility. Vocal analysis and men's ratings were conducted, using luteinizing hormone urine tests with the female participants to confirm ovulation.

Title: Phonological Influences on Word Recognition in Chinese: Do Skilled Readers Demonstrate Larger Phonological Effects?
Name(s): Puipui Cheung
Faculty Sponsor(s) and Department(s): Franklin Manis, Psychology
Submission Type: Individual
Category: Social Sciences
Format: Senior Honors Thesis
Abstract: The purpose of this study is to examine whether skilled readers demonstrate a larger phonological effect in lexical decisions. Previous studies examined the role of phonology in English reading, and some of the results show that phonology plays a key role in mediating word identification. However, the role of phonology in Chinese reading is less well understood. We expect that participants will take longer to make a lexical or semantic decision for the words with longer pronunciations, reflecting their reliance on an internal mental representation of the word’s pronunciation. Moreover, we hypothesize that more fluent readers of Chinese will show a larger effect of pronunciation length, indicating they are more reliant on phonology as an adjunct to reading Chinese characters. In Experiment 1, total of 30 native speakers who used Simplified Chinese characters participated in a lexical decision task. They were told to judge whether the stimuli are real or pseudo characters. However, the result showed no significant differences between characters with long or short vowel length. Experiment 2 investigated the role played by phonology in a semantic categorization task tested given to another 40 native Chinese speakers. Participants had to judge whether a single character was a noun or a verb. Results of Experiment 2 indicated a significant difference in the reaction time for categorizing words with long and short vowel lengths. Further inspection of the data revealed the effect was present for verbs but not nouns, and it was significant.
for lower fluency readers but not higher fluency readers for verbs. We concluded that no phonology mediation was found in lexical decision but in semantic categorization, revealing that people may rely more on phonology in semantic categorization. However, it was puzzling that the effect was only found for verbs, and further investigation using this novel method is needed.

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**Title:** Predicting Reactivity to Stress  
**Name(s):** Benjamin Heikali  
**Faculty Sponsor(s) and Department(s):** Mara Mather, Gerontology  
**Format:** Laboratory-based Research  
**Abstract:**  
Previous research has discovered that physiological responses to stress can impact health, cognition and behavior. Research on the relationship between personality and stress reactivity may yield important information about groups of people who are most vulnerable to the effects of stress. Specifically, the relationship between personality characteristics and reactivity to stress may differ by age and gender. In this study, we investigated associations between different dimensions of personality and physiological reactivity to stress in men and women in early and late adulthood. We aimed to determine whether personality factors relating to emotional reactivity and well being predicted stress reaction to the Cold Pressor Task (CPT) in these groups. The CPT elevates physiological stress levels and is conducted by putting one’s non-dominant hand in a pitcher filled of ice-cold water (water: 0-5 °C) for a minimum of one minute. Using within-subject design, we had participants complete both the CPT and a control condition (water: 37-40 °C). Order of stress and control procedures was randomly assigned. In order to test reactivity to stress, participants’ physiological stress reactions to the CPT were measured using heart rate variability during a paced breathing exercise immediately following the CPT. As part of a larger study investigating the effects of stress on decision making, we included an even number of older and younger males and females (young females, young males, older females, older males). Healthy older adults (aged 65-90 years) were recruited alongside younger adults (aged 18-35 years). Personality traits were investigated using the Multidimensional Personality Questionnaire- Brief Form (MPQ-BF), which measures personality traits such as stress reactivity, harm avoidance, and well being. Analysis will compare participants’ personality dimensions results with their respective responses to the CPT.

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**Title:** Reference to ego in Spanish by Spanish-English bilinguals  
**Name(s):** Susan Lee, Kristen Steach  
**Faculty Sponsor(s) and Department(s):** Carmen Silva-Corvalán, Spanish and Portuguese  
**Format:** Analytical Paper  
**Abstract:**  
This is a case study of two Spanish-English bilingual children between the ages of 4;0 and 5;6, who have attained different levels of proficiency in Spanish. We examine the frequency with which these bilinguals express the first-person singular subject yo ‘I’ in Spanish. Spanish is a “pro-drop” language; that is, subjects are not required to be expressed explicitly because the rich morphological markings of the verb make the referent of the subject identifiable. English, by contrast, requires that a grammatical subject be expressed with every conjugated verb. The two bilinguals are growing up in a household where the input in English is much more frequent
than the input in Spanish, especially in the case of the younger bilingual. Therefore, we hypothesize that compared to monolinguals, the bilinguals’ rate of first-person subject expression will be higher and that the younger bilingual will express this subject more frequently than his older sibling. This will be so because a higher rate of expression of yo reflects the violation of restrictions on subject expression in Spanish, the weaker language of the bilinguals. Both quantitative and qualitative results of our study offer support for our hypotheses: as exposure to English increases with age and Spanish proficiency is further reduced, the frequency of expression of yo increases and violations of subject expression rules become evident.

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Category: Social Sciences
Name(s): Daniel Wu
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Leland Saito, Sociology
Format: Senior Honors Thesis
Title: Reimagining the Figueroa Corridor, 1960-2000: Growth Politics, Policy, and Displacement

Abstract:
The first time I heard “gentrification”, I was shocked at the emotional turmoil it caused in a local public hearing. Working-class residents organized and testified against the threat of being displaced from their homes and businesses. Developers and planners, on the other hand, framed the issue in terms of trendy restaurants and businesses and a revitalized city. It was clearly a complicated issue.

There wasn’t a better example of gentrification less than fifteen blocks north of campus, in the heart of the Figueroa Corridor. Just south of Downtown LA, the Convention Center, the Staples Center, and the newly constructed, $2.5 billion LA Live project glow colorfully at night with people, expensive restaurants and bars, congestion, and, of course, LA Lakers fans. Supported by over half a billion dollars of city subsidies and aid, the entire complex was predicted to create jobs, stimulate tourism and businesses, and transform LA’s downtown into a vibrant entertainment metropolis, a west coast Times Square, with glitz, glamour, and profits.

Chicago school urban ecology would explain this development through free markets, which create urban organizations that benefit all. In contrast, this paper takes an urban sociological and historical view of the three developments, uncovering a growth coalition transforming in a 40-year period, amidst shifting demographics, neoliberal political-economic shifts, and inter-urban competition. Qualitative methods such as interviews of displaced residents and an analysis of newspaper and city archives between 1960-2009 as well as quantitative methods such as demographic mapping and statistical analysis of historical and current Census data will be utilized. This mixed-methods approach can provide both a broader picture and a fine-grained analysis on growth politics.

A historical theme is the displacement of local community residents (often working class, people of color) to make space for an exclusive reimagination of the city. The research historically periodizes the transformation and discursive, “value-neutral” practices of the growth coalition and community resistance among economic and racial grounds the past 40 years. Additionally, logistic regressions find statistically different growth rates of Latinos compared to higher-income Whites.

No previous longitudinal case study has been conducted on the Figueroa Corridor, specifically examining these three developments. This research has implications for urban development, commenting on widespread efforts to
transform downtowns into tourist, entertainment districts, amidst larger political economic shifts and policies, and ultimately urges for a more inclusive urban agenda for all urban citizens.

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Category: Social Sciences
Name(s): Rose Kirby
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Joseph Greenfield, Information Technology Program; Steven Lamy, International Relations
Format: Senior Honors Thesis
Title: Security in Cyber Anarchy: A Comparative Analysis of Chinese and American Treatment of Cyber Warriors

Abstract:
The Chinese government’s practice of treating its cyber warriors as mercenaries provides an answer to the foreign policy question of why Chinese cyber warfare is more actively offensive than American policy. Using the method of difference, it becomes evident that this is the critical difference that causes international norms against rogue online attacks to limit American but not Chinese policy. The U.S. government maintains continuous control of cyber warriors through a command and control structure as well as the imposition of strong social and legal norms against rogue hacking and offensive online behavior. The U.S. military’s strong commitment to minimizing collateral damage, following international law, and improving civil-military relations directly limits the types of attacks the U.S. military is willing to develop, support, and execute, especially outside of the context of declared war and combat. An aggressive strategy linked to the U.S. government would become obvious to the public quickly because of the transparency of American-style democracy. Therefore, such policy development is unlikely because it is too politically risky for American politicians to support blurring the lines between civilian and military use of cyberspace. Cyber attacks from within China are perpetrated by the People’s Liberation Army (PLA), government contractors, government-approved hacker groups, nationalist individuals, and hacker groups operating outside the scope of the Chinese government and Communist Party rule. Recently published reports on Chinese hackers include information concerning China’s methods of paying and encouraging hacker groups that can be used to classify Chinese cyber warriors as mercenaries. Since the PRC is not a democratic or transparent state, the normal constraints of the electorate and legislature have never existed to set limits on contracts with cyber warriors. State contracts with private actors make the public sentiment of nationalist aggression towards the West into China’s de facto foreign policy.

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Category: Social Sciences
Name(s): Robin Yuan
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Stephen Madigan, Psychology
Format: Senior Honors Thesis
Title: Seeing Red: The Effect of the Color Red on Creative Performance

Abstract:
Existing literature suggests that color can have significant effects on human behavior. Specifically, the color red has particularly strong influences on mood, arousal, attention, and performance. This study examined the effect of red on creative performance as measured by the Remote Associates Test (RAT). Participants included 320 female and 93 male undergraduate psychology students. Each participant completed one 20-item RAT on the computer via an online survey, and color manipulation was achieved by displaying a red or green bar above the instructions
given on the first page of the test. Analysis of variance revealed no significant main effect of color or gender. It is possible that the cognitive processes engaged by the Remote Associates Test are unaffected by the color red, or that the test used was unable to detect any effects.

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Category: Social Sciences
Name(s): Nicole Samii
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Mara Mather, Gerontology
Format: Laboratory-based Research
Title: Stress and Sex Differences in Risk-Taking in the Balloon Analogue Risk Task
Abstract:
Which would you choose? Gambling for more money with the possibility of losing or taking the little money you have earned and walking away with the knowledge that you could have earned more? For most, it is usually difficult to choose the best behavior between a risky but potentially more profitable action and a safe, reliable one. This decision processing may also be affected by stress and sex differences, in terms of how each gender copes with stress. This study examines the effects of stress and sex on brain activities during risk-related tasks. Half of each sex group was randomly selected and asked to place their hand in warm water (no-stress group), while the other half placed their hand in cold water, for as long as they could up to 3 minutes (stress group). The cold water was designed to potentiate a stressful situation in order to determine differences between stress and control groups. Afterwards, participants played a risk-taking decision-making task, the Balloon Analogue Risk Task (BART), while their brain activity was scanned in an MRI scanner. Using independent component analysis, we determined a brain network that was strongly activated during the BART task in each group. Although activity in the prefrontal cortex and posterior lobe were similar across groups, we found a significant interaction between stress and sex in one reward-related region of the brain, the putamen. In females, the putamen was involved in the task-related network more strongly in the no-stress situation, while in males it was involved more strongly in the stressed situation. These results were analogous to performance during the BART task; males earned more money during the stressed condition while females earned more in the no-stress condition, showing that the putamen may play a role in interaction between sex and stress in risk-taking behavior.

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Category: Social Sciences
Name(s): Jenna Tomei, Emilie Winckel
Submission Type: Group
Faculty Sponsor(s) and Department(s): Thomas D. Lyon, Gould School of Law and USC Department of Psychology
Format: Senior Honors Thesis
Title: The “Monster Molester” and the “Innocent Victim”: Child Sexual Abuse Stereotypes and Their Effects on Jury Decisions
Abstract:
There are various misconceptions surrounding child sexual abuse cases and this study aims to examine two in particular: the perpetrator as the “Monster Molester” and the “Innocent Victim.” More specifically, this study analyzes how these misconceptions affect jury decisions. The data consists of 2,403 subject arguments within the closing arguments of 30 felony child sexual abuse cases in the Los Angeles Superior Court system (15 convictions, 15 acquittals). A unique coding scheme has been devised to operationalize common arguments and to analyze the data. It is hypothesized that juries are more likely to deliver a guilty verdict if the perpetrator
meets the stereotype of a “monster” and a) is a stranger and b) uses force to attain sexual contact. A conviction is also more likely if a) the child reacted to abuse with resistance, b) physical evidence of sexual abuse was presented, and c) expert medical, forensic, or psychological accommodation testimony was presented. In contrast, an acquittal may result if a perpetrator a) uses seduction to gain the child’s compliance and b) is described as having “good character” by witnesses. Further, an acquittal is more likely if a) the child appeared to consent to the abuse, b) no physical evidence was presented, and c) expert testimony was not presented. Results revealed that acquittals were more likely when a) force was not alleged than when it was alleged, b) forensic testimony was presented, and c) when accommodation testimony was presented. Convictions were more likely in cases where perpetrators were strangers to their victims. This study and future research will better educate society regarding what actually occurs during instances of child sexual abuse and in trial and may ultimately increase the efficiency and accuracy of the criminal justice system.

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Category: Social Sciences
Name(s): Shelly McArdle
Faculty Sponsor(s) and Department(s): Richard John, Psychology
Submission Type: Individual
Format: Senior Honors Thesis
Title: The Best Boss You Will Ever Have: A Field Study on Personality Traits in Student Leaders

Abstract:
The study will examine the effects of emotional intelligence (EI) and leadership style on leaders’ performance in a field setting. The study will consist of 140-180 Residential Advisors (RAs) from the Department of Residential Education at the University of Southern California (USC). They will each complete a measure of emotional intelligence and a measure of leadership style as well as simple demographic information about the group leader. Objective measures of the successes of these student leaders will also be collected from the RAs’ supervisors, peers, and residents. Previous research has shown that there are three styles of leadership: transformational, transactional, and laissez-faire leadership. Other research has shown that leaders with high emotional intelligence are better able to communicate with, understand, and portray emotions to their subordinates. Therefore, this study predicts that leaders with the highest emotional intelligence and a transformational style of leadership will be the most successful in accomplishing the goals of an RA as outlined by the objective evaluation measures collected. In addition, those groups led by leaders with a laissez-faire style of leadership and low emotional intelligence will have the least successful output. Successful and effective leadership is increasingly important during times of recession and change, especially in terms of employee motivation and maximizing efficiency. Many companies are going out of business, organizations need to restructure, and employees are asked to produce more or face layoffs. Unfortunately, many problems in the workplace are due to inadequate leadership and poor decision-making. In order to better recruit, select, and train leaders, it is imperative to understand what qualities make an effective leader, what kind of leader best works with the group, and how to maximize group performance.

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Abstract:
This research effort is part of a larger study known as the USC Social Identity Project (SIP). The project interviewed adolescent males to assess the effectiveness of law enforcement policies and community-based service programs for youth living in gang-populous Los Angeles. The current research study, which analyzes 390 of the SIP participant interviews, focuses specifically on interactions with law enforcement authorities, and will examine the moderating effects of social identity on the relationship between procedural fairness judgments and a willingness to cooperate with local police. It is predicted that two aspects of social identity, strength of identification and group norms, will determine the relative importance of an individual’s perception of fair procedures on his or her willingness to cooperate with the police. It is also hypothesized that the more closely an individual aligns himself or herself with a street-oriented group with antisocial norms, the less likely that individual will be to cooperate with the police. Conversely, the stronger an individual’s identification with a conventional group that does not have antisocial norms, the more likely that individual will be to cooperate with the police. Two multiple regression analyses were conducted to test the hypotheses. The relationship between strength of identification and cooperation was confirmed—those who strongly identified with street gangs were less willing to cooperate, while those who strongly identified with friends involved in conventional groups were more willing to cooperate. Post-hoc analyses confirmed that gang members endorsed antisocial norms and youth associated with friends involved in conventional groups did not endorse antisocial norms.

Title: The Moderating Effects of Social Identity on Procedural Fairness, Trust, and Cooperation with the Police in Gang-Populous Los Angeles

Category: Social Sciences
Name(s): Caroline Holmes
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Jo Ann Farver, Department of Psychology; Karen Hennigan, Department of Psychology
Format: Senior Honors Thesis

Abstract:
The study investigated and determined whether the binding of an individual’s memory and attributed memory processes are influenced by – (a) the emotionality of a picture stimulus and/or (b) the valence (positivity, negativity, or neutrality) of the picture stimulus presented to the observer. The objective of this experiment was to distinguish whether these factors influence memory accuracy for face-picture associations. In the study, both younger and older adults observed and tried to encode various versions of numerous face-scene paired pictures in four-block sequences (equally dispersed and graded in regards to valence and intensity/neutrality), after which they were only shown the associated face and were told to describe the matching scene that was specialized to the respective face-scene picture pair. We specifically tested for the ways in which repeated reminders of a scene might affect memory and its affiliated binding processes by incorporating a face-questions task into the study, during which the participant consecutively sees and answers subjective questions about only the faces from the
earlier encoding portion of the study. By presenting the faces alone with a subsequent question, we are trying to distinguish whether the repeated exposure of only the neutralized portion of the learned pairs (the face) has the potential of impacting one's memory. We anticipate that the emotional content and number of exposed repetitions of the images will influence both younger and older individuals’ memory of the pairs.

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Title: The Role of Economics in Determining Social Constructs
Name(s): Shaimaa Abdelhamid, Adrian Au, Kamau Butcher, Monica Murillo, Lauren Nalepa
Faculty Sponsor(s) and Department(s): Chris Boehm, Anthropology
Submission Type: Group
Format: Field Research

Abstract:
Sikoro, a small village in Mali, is inhabited by five hundred people. It is located approximately five kilometers from the nearest health clinic, middle school, market, and main road. With limited access to these essentials, Sikoro becomes isolated and insulated from both the cultural and economic ties located nearby. As a result, their culture has become removed from both Western and neighboring ideals. Although the concept of Westerners is not foreign to the village, the villagers mainly construct their culture on Malian tradition. By investigating various aspects of Malian culture specifically in Sikoro, the underlying conceptions for their culture become more apparent. Through viewing Sikoro culture as a function of gender roles, religious ethics, dietary rituals, and photographs of their private lives, the differences between their economic levels is minimized. Therefore, these findings suggest that there is less emphasis on individual status and material gain. As a result, the village's culture promotes a stronger sense of community and interpersonal responsibility. All of the observations presented in this analysis indicate that the interdependence that exists within the village is primarily influenced by the minute economic differences between the villagers. Although this vast generalization is founded upon subjective standards held by the observers, the conclusion that economics indirectly controls Sikoro’s cultural ties is a reasonable deduction based on the various disciplines considered.

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Title: The Structural Neuroimaging Correlates of Post-stroke Depression in a Demented Population
Name(s): Robert Weise
Faculty Sponsor(s) and Department(s): Margaret Gatz, Psychology
Submission Type: Individual
Format: Senior Honors Thesis

Abstract:
Post-stroke depression (PSD) is one of the most common and devastating sequelae of cerebrovascular disease (CVD), with many serious implications for the quality of life of affected individuals (Wright & Persad, 2007). Prevalence estimates of PSD vary widely, ranging from 20% to 50% of stroke survivors (Barker-Collo, 2007), with a generally accepted estimate of 1/3 of stroke survivors most commonly used in the literature (Gaete & Bogousslavsky, 2008). Factors which contribute to this immense variation in prevalence estimates include the differential rate of PSD between inpatient and community settings (Spencer et al., 1997), as well as the selection biases that systematically exclude certain stroke subpopulations such as aphasics (Townend, Brady, & McLaughlan, 2007). Many negative outcomes are associated with PSD, including poor rehabilitation course and outcomes, increased mortality, increased suicide risk, and lower quality of...
life for both the patient and caregiver(s) (Gaete & Bogousslavsky, 2008; Spencer et al., 1997). The combination of physical symptoms from stroke and affective symptoms from PSD make the prognosis of affected individuals very poor. Therefore, a better understanding of the disease, particularly the structural neuroimaging correlates that underlie its course and development and its relation to dementia, should be a top priority amongst researchers and is the subject of my proposed research (Spalletta, Bossu, Ciaramella, Bria, Caltagirone, & Robinson, 2006).

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Category: Social Sciences
Name(s): Andrea Chin
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Jo Ann Farver, Department of Psychology, College of Letters, Arts, and Sciences; Bob G. Knight, Davis School of Gerontology
Format: Senior Honors Thesis
Title: The stuff of memory: Age differences in the emotional valence and themes of autobiographical recollections
Abstract:
This study is a secondary data analysis investigating how manipulated mood influences the emotional valence and thematic content of autobiographical memories for younger and older adults. Participants, either current USC students or USC alumni over 65 years old, underwent a mood manipulation procedure before recalling autobiographical memories from 1 week prior, 1 year prior, 3 years prior, and from high school. This study found age significant differences in the emotional valence of memories for relatively recent and high school age autobiographical memories, providing partial evidence for a decreased negativity bias associated with aging and suggesting that there may be a relationship between valence and easily retrievable memories. Our findings for individuals in the sad induction group, however, provided mixed evidence for the decreased negativity bias and indicate that recall time frame may play a bigger role in what older and younger individuals identify as sources of regret.

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Category: Social Sciences
Name(s): Ellis Beier
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Kyeung Hae Lee, School of Social Work; Ann Marie Yamada, School of Social Work
Format: Field Research
Title: The Therapeutic Alliance in Community Mental Health Treatment
Abstract:
Semi-structured interviews were used to examine how clients receiving mental health care from a community health center viewed their relationships with the center’s staff. Sample informants consisted of 50 clients experiencing severe and persistent mental illness (SPMI), receiving treatment from a recovery-oriented facility. Clients’ feedback was classified into categories: Provider Characteristics, Client Characteristics, and System Issues. These categories were then broken down into subcategories. For instance, Provider Characteristics were broken down into components, such as opportunity for treatment input and explanation of problems. Characteristics of Clients dealt with aspects like compatibility between clients and providers, or the clients’ comfort levels in sharing their opinions. System Issues, such as frustration with the bureaucracy of the facility, included the high turnaround rate of the center’s staff and were cited as negatively influencing on the relationship between clients and staff.

Previous research on therapeutic alliance has been conducted within traditional therapy settings among homogenous
samples of suburban clients where providers possessed professional degrees. There is a notable absence of actual feedback from consumers in a case management setting, as well as a lack of research on this subject within populations that are urban, low-income, and racially diverse. Therefore, we sought to fill this gap, and examine what elements made therapeutic alliance successful from the perspective of a diverse group. Additionally in our sample, both clients and providers at treatment facilities were ethnically diverse, urban dwelling individuals and providers seldom possessed degrees beyond High School diplomas. Our findings suggest that therapeutic alliance in community mental health care can be improved by assessing issues specific to the community setting, and by taking into account consumer’s needs and specific factors that contribute to the therapeutic alliance for more diverse populations.

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Category: Social Sciences
Name(s): Kimberly Goswiller
Submission Type: Individual
Faculty Sponsor(s) and Department(s):
Jo Ann Farver, Psychology; Norman Miller, Psychology
Format: Senior Honors Thesis
Title: The Validity of Inferential Judgments in Assessing Guilt, Shame, and Embarrassment

Abstract:
The purpose of this research was to assess the validity of using inferential judgments to evaluate the amount of guilt, shame, and embarrassment induced in studies that manipulated these emotions. Four judges rated the extent of guilt, shame, and embarrassment felt by participants in a number of studies. Reliability between judges’ ratings was found to be high. Interactions between judges’ composite ratings of each emotion and type of emotion manipulated were then conducted. Results suggest that judges were accurate in rating shame and guilt, but not embarrassment. However, this could be due to a limitation that judges were presented with a limited number of studies that manipulated embarrassment.

These inferential judgments may be particularly useful when conducting a meta-analysis on subjects for which guilt, shame, and embarrassment may be mediating variables. When conducting a meta-analysis, one hopes to compile comprehensive information on a subject. A substantial amount of the literature written about the subject may involve mediating variables, which are often not reported because they are not manipulated. Judgments that can help determine the effects of mediating variables without actually manipulating these variables may therefore be useful to researchers conducting a meta-analysis. On a broader scale, findings may provide insight on what types of situations people assume will provoke self-conscious emotions in others.

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