Sponsored by the Vice President for Academic Planning & Budget

Arts
Humanities
Life Sciences
Social Sciences
Physical Sciences & Engineering

April 11, 2007
UNDERGRADUATE SYMPOSIUM FOR SCHOLARLY & CREATIVE WORK

SCHEDULE OF EVENTS

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<td>Symposium Judging</td>
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<td>Wednesday, April 11, 2007</td>
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<td>11:00 a.m. - 2:00 p.m.</td>
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April 11, 2007

Dear Members of the USC Community:

It is my pleasure to welcome you to USC’s 9th 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 in the University Club 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 80 submissions with participation from over 120 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 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. And finally, we would like to express our gratitude to USC Stevens for their time, effort and commitment to this special event.

THANK YOU!!!
9th Annual Undergraduate Symposium for Scholarly and Creative Work

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Title: "Complicating Oversimplification"

Abstract:
In my efforts to include concept in my art, I decided to challenge the notion of stereotypes and bring awareness to them through a series of drawings. I thus began to research common underlying stereotypes amongst our society and to look into what types of things shape these fabricated perceptions we have of others. I came across numerous articles that pointed towards cartoons and movies, specifically Disney movies, influencing us as children. The stereotypical gender roles of women and men, for example, can become constructed for children by the damsel in distress stories where the prince is out to save her.

With this idea in mind I set out to create a series of drawings that would bring light to these stereotypes that are engraved in us by pop culture. My main target became villains and what makes one a "stereotypical" villain. I wanted to be able to make caricatures of these villains in order to add humor to my project so I chose villains that were not cartoons therefore avoiding characters that were already caricatured by creation. I then, using a cross-hatching technique with black pen, set out to draw my chosen villains in non-villainous situations. For example one of the drawings depicts Michael Myers feeding some baby ducks peacefully by a pond. In doing these drawings I hope to bring light to the stereotypes that we have in general and specifically of these perceived villains by humanizing them so as to blur our perceptions.

§§§

Title: Alberto Ginastera’s Twelve American Preludes, performed by Jackie Tu

Abstract:
Too often, classical music lives up to its stuffy formal reputation, adhering to proper musical forms or composed through mathematical equations. True, form provides structure without which unmusical black dots would erupt from the pages of Doheny Music Library’s dusty tomes with chaotic cacophony—however, once in a while, serious musicians come across a fun and exciting work that doesn’t wrestle with mathematically
genius complexity.

Alberto Ginastera’s (1916—1983) Twelve American Preludes comprises of two books of six short “mood” pieces, each ironically named after traditional forms, classical techniques, and Ginastera’s contemporaries. Effortlessly tossed into random wonderfulness, the preludes follow no particular order; Sadness succeeds Accents and precedes a rompy Creole Dance. Vidala, a non-identifiable English word (except in the popular Diablo II computer game in which it serves as the name of a specific set of interactive game pieces),follows. Ginastera ends the first book with a fiery tribute to fellow Argentinean composer Roberto Garcia Morillo and begins his second book with equally noisily leaping octaves. Ginastera then sandwiches a random Pastorale between a smoldering slow tribute to another Argentinean composer Juan Jose Castro, a cheerfully dissonant tribute to North American composer Aaron Copland, and another noisy and rhythmic tribute to Brazilian Heitor Villa-Lobos. A stately chordal crescendo in the pentatonic major mode ends the entire work, culminating in a crashing finale that slowly decays into nothingness.

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Category: Arts
Name(s): Jennifer Smith
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Daniela Bleichmar, Art History; Eunice Howe, Art History
Format: Senior Honors Project
Title: Deruta Lusterware Ceramics from the 1500s
Abstract:
Maiolica is pottery, which has an iridescent luster, is of a Spain or Islamic origin and traveled finally to Italy. Maiolica is known for its density of clay, white base coat of paint and brilliant color designs. Also maiolica’s opaque white glaze makes it distinguishable from other types of pottery. One of these techniques which eventually made its way to Italy was lusterware. Lusterware was an iridescent paint applied to the ceramics on top of the other colored painted designs and required a third firing. The background of maiolica cannot be traced exactly, however through making connections between types of art specify and design patterns, and trade, maiolica can be given a context in history. Maiolica in Italy began to appear as early as the 1200s and was actively created and traded in the 14th and 15th centuries. Deruta is a city located in Italy and is best known for their maiolica pottery from the 1200s through to the 1600s. High quality lusterware appeared in Deruta in the early 1500s. In order for certain maiolica to be dated, they must be placed into historical context. Looking at local and surrounding history and culture provides a basis of understanding, which allows art historians to place maiolica into a historical context. Image designs of Moorish men on horseback, on pieces of Deruta lusterware, are similar to images on the Portrait medals of Mehmet II. These similar images represent a connection for trade and ideas between Turkey, Spain and Italy.

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Category: Arts
Name(s): Beck Bennett, Kyle Mooney, Patrick Wood
Submission Type: Group
Faculty Sponsor(s) and Department(s): Andrea Zittel, Fine Arts
Format: Creative Work
Title: Good Neighbor
Abstract:
Good Neighbor is a comedy group. We’re young people who strive to create
and inspire each other. We were born out of USC’s premier improvisational and sketch comedy troupe Commedus Interruptus, where we’ve entertained and captivated student audiences for our entire tenure here. We like to make people laugh, and we also like to make people think. It is our belief that one of our greatest strengths lies in our talent as performers. We believe that comedy comes from truth, and hope we can convey this notion through our performances, even when dealing with the absurd. Today, sketch comedy is huge, thanks in large part to the Internet, and popular comedy groups like the Upright Citizens Brigade.

We hope to bring something fresh to this new wave of comedy acts. So, our approach is unique. We perform sketches live, but also embrace alternate mediums: film, animation, music, and whatever we can find for inspiration from second-hand shops and dollar stores. We want to tell real stories about real people. We also want to tell real stories about real Birdmen who fight Dogmen with spears.

Green Flash is a musical journey from daybreak to sunset. Throughout its five sections I focused on the manipulation of colors and textures rather than thematic development. I treat the orchestra as one large instrument, capable of creating a near infinite number of different colors and effects. Through attention to subtle details and the use of some special techniques and effects, the music flows from color to color seamlessly just as the brilliant colors of a sunset blend in the evening sky.

I wrote the music thinking of a progression of images that one might witness during a day without the adulteration of man’s technology. The most basic musical building block is the natural harmonic series, representing the beauty and symmetry of nature.

The world goes by at a faster pace than ever, and most people hardly even think to stop what they are doing and look around at the beauty of Mother Nature. In Green Flash, I hope to capture a few precious scenes of nature; I hope to delight both the aural and the visual imagination simultaneously.

Name(s): Roger Zare
Faculty Sponsor(s) and Department(s): Morten Lauridsen, Music Composition
Submission Type: Individual
Category: Arts
Format: Creative Work
Title: Green Flash
Abstract:
A green flash is a rare atmospheric phenomenon that occurs as a sunset reaches its end. If conditions are just right, then a spark of green will hover on the horizon for a fleeting moment as the sun disappears. I first witnessed this subtle effect in Florida a year and a half ago. Seeing this mythical event for the first time inspired this composition.

Title: Internationality: The Grey Movement
Abstract:
In a world of black and white, where are the shades of grey?

Growing up in a multi-cultural environment, I was exposed to people of
different backgrounds and ethnicities. Five of my most formative years were spent in an international boarding school in England, where I first witnessed social segregation - every social clique was divided by race. Here at USC, I continue to notice this separation but to a lesser extent. This project enables me to address this issue by showing that if you take away the color, are we really so different?

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Category: Arts
Name(s): Ehrin Marlow
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Paul Backer, Theatre; Paula Cizmar, Theatre
Format: Creative Work
Title: Lost In Thought
Abstract:
A One Act Play about a Therapy Session between a patient that has conversations in his head and the doctor that he has conversations in his head with. The patient and doctor get lost in the patients thoughts. It is an existential study of the writer's struggles to complete a story. Is the story completely in his head? The play is an exploration into the mind of the playwright and his actors, some real and some fictional.

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Category: Arts
Name(s): Benjamin Brown
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Jay Willis, Fine Arts
Format: Creative Work
Title: Man Adapts to the Natural World
Abstract:
The natural elements of the earth are substances that remain constant over time. Trees grow and reproduce to form forests of identical wooden structures. Metal ore lies within the earth in an unchanged form. The wind blows all the same over the planet that has lasted for over 4.6 billion years.

Man is a perpetually evolving organism on planet earth. Mankind has changed both physically and psychologically and continues to grow as the dominant race across the world. Man's personal evolution in turn parallels his ability to recognize and use the natural elements of the earth to his own personal benefit. Wood was originally used for fuel as fire, but now serves to build the base of residential houses. Metal is melted and shaped to make pipes for an artificial running water system. Man can now analyze the molecular composition of the air and gain a greater understanding of what truly allows man to live on his planet earth. The array of elements themselves has grown itself over time with the discoveries of man.

This sculptural presentation reflects on man's appreciation for the natural elements of the earth and reveals several ways in which man either studies or uses the elements to benefit humankind as a whole. Man's continues to evolve in his world and thus he develops new and different uses for the resources at his disposal. This presentation only skims the surface of man's relation to the offerings of the planet.

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In 1928, Spanish poet Federico García Lorca successfully captured ‘duende’ - the austere, sorrowful, and passionate spirit of gypsy life – in his poem ‘Romance de la pena negra’. Never before had a poet so evocatively manifested the dark sentiments and painful innuendo of Andalusian life to such critical and popular acclaim. That poem, part of a larger collection titled “Romancero Gitano” married academic literary technique to the woes of an outcast people to produce a shockingly brutal yet dignified portrayal of the Spanish gypsy plight. For myself, ‘Romance’ achieves something much more fundamental; it provides an exceptionally raw rendition of a people that dare to celebrate the inner darkness of human anguish.

Capturing the essence of duende in music is nothing new. For centuries, gypsies have wailed their suffering to the drone of guitars and the rhythm of clapping. To behold duende in music is a fantastic experience, the intense fervor and passion of the performers penetrates and mesmerizes without fail. Most flamenco performances have an element of duende in them. However, much as the Spanish generally regard duende as an elusive spirit, not all performances maintain it. For me, it’s not enough to simply imitate flamenco. Rather, it is more important to capture duende and manifest it – as Lorca once did – for a new group of performers and audience members.

A tragic drama in a post apocalyptic world after an atomic bomb goes off in Los Angeles. The people in this story have been exposed to enough radiation that their immune systems cannot fight back the common cold that has become a plague among the ones left behind in the disaster zones. The story follows a young couple the night before they die. It is about hope, beauty, art and the feeling that there is more to us than just this life. The protagonist, Jasmine, is in love with a painter who manages to find the beauty that the world can offer even in the most horrific of times. His paintings become a sign for Jasmine upon his death. The look of this film is dream like and poetic.

Africa is changing. Telephone poles and paved roads are appearing where none were before. At the same time, the Maasai people of Kenya and Tanzania,
perhaps the oldest culture in the world, maintain their ties with the land. Surrounded by the vastness of the African wilderness, they have learned to live with nature.

Nature, of course, continues as it always has: slowly, unperturbed. The Maasai become a part of the landscape. They are the red earth which feeds all life. They are the tall trees where the baboons take shelter from the African sun.

The African wildlife pass like the shadows of clouds on the tall grass. Lion cubs play in the shade, and impalas watch from a safe distance. There is a sense of balance in everything here. Giraffe and Topi keep watch together over the hillside as the light rolls over them.

The Maasai, the stewards of the land, raise their children under the infinite African sky. Follow them, and they will lead you into the bush, on a tour of this majestic land. Listen for their footsteps ahead of you, even if you don't see them. And when you find their footprints, you'll know they walk lightly on the red earth.

§§§
Category: Humanities

Title: Dramaturgical Techniques Used in Video Games through Elicit Emotions

Abstract: This project evaluated the methods of theatre that could translate to video games in order to provide an emotional experience for the game player. This project evaluated elements of story composition, character composition, music and its relation to emotions, music and its utilization in Western Theatre, and how each can be implemented to make a video game an emotionally compelling experience. The premise of my project was that an emotional video game, at its core, possessed specific theatrical elements to enhance the emotion the player would feel while playing a video game. I analyzed two different video games in order to show how each used the elements of story and music to create an emotional experience for the player. I compared the game Final Fantasy VII with Arthur Miller’s All My Sons in order to elaborate on parallels of dramatic storytelling used in both that elicited emotion from people. Next, I evaluate how music has been used in theatre to conjure emotions through dynamics, pitch, and tempo. I drew upon research to explain how music could be emotional through context and past experiences of an individual and their society. Then I reflect upon how the theatre has utilized these elements to elicit emotions from the audience and how it is applied in the video game Chrono Trigger.

Category: Humanities

Title: More than Pretty Women: The Geisha and Courtesan in Popular Western Film

Abstract: Since antiquity, poets and artists have represented the prostitute as victim and siren. Little has changed in popular Western culture, when we still see these archetypes have been transferred to the medium of film. Most recently, filmmakers have created a prostitute who is also an independent and accomplished heroine--but is she really?

A subgroup of this character type, who also defies the prostitute label, has become a recognizable protagonist in popular cinema. The geisha and the courtesan are represented in several Western films as selling their arts and skills along with sex. They were historically, some of the most educated.
and talented women of their time, seeing themselves as artists, poets, and professional dancers. Sex was only a part of their trade. In my project, I compare the self-representation of these extraordinary women in their autobiographies and poetry with how they are portrayed in modern Western film within the last 10 years.

The three films I will focus on are "Memoirs of a Geisha", "Kama Sutra: A Tale of Love", and "Dangerous Beauty", which represent the nations of Japan, India, and Italy respectively. In my project, I argue that while these films set out to enlighten a misinformed public about the lives and customs of geisha and courtesans and succeed to a certain extent, they fail to escape the typical prostitute love story. The Hollywood vehicle is inherently flawed, inevitably romanticizing and marginalizing the lives and artistic accomplishments of these women.

§§§

Title: Nicknames Uncovered

Abstract: The objective of this research project is to examine hypocoristic formation in various languages. Hypocoristic formation is the study of how nicknames are formed from a phonological perspective. This was done in various language families, including Slavic, Baltic, Romance, Semitic, Germanic, and Altaic. Researchers collected and analyzed data using the methods of Optimality Theory (Prince and Smolensky 1993) in order to discover the underlying constraints that dictate nickname formation. Researchers have chosen to focus on hypocoristic formation in four languages from four separate language families - Polish from the Slavic family, Japanese from the Altaic family, French from the Romance family, and Arabic from the Semitic family. Researchers will present data from these four languages and provide a template to form one’s own nickname in any of these languages. This format is designed to demonstrate that nickname formation is systematic, and that each language forms nicknames within its own set of rules, or constraint rankings.

§§§

Category: Humanities

Name(s): Ashley Flor, Michelle Sklaver, Joe Ungco

Submission Type: Group

Faculty Sponsor(s) and Department(s): Anna Lubowicz, Linguistics

Format: Field Research

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§§§

Title: Re-examining the Past: a Multi-University Collaborative Research and Mentoring

Abstract: Fifty years ago, world-renowned experts examined a collection of Mesopotamian cylinder seals. In 2006, 36 USC undergraduates reexamined them with cutting-edge imaging technology and critical eyes in order to confirm or revise the original findings. New attributions and interpretations resulted from this work. This research project reveals the power of collaborative research by committed undergraduates from two major research universities. This collaboration created new information resources for the museum that owns these ancient artifacts, and these results will be

Name(s): Kristin Butler, Carly Dykes, Hannah Marcuson, Elizabeth Martin del Campo, Georgiana Nikias, Ashley Sands

Faculty Sponsor(s) and Department(s): Karen Stern, Religion; Lynn Swartz Dodd, Religion; Bruce Zuckerman, Religion

Format: Laboratory-based Research

Title: Re-examining the Past: a Multi-University Collaborative Research and Mentoring

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published on that museum’s website.

Cylinder seals are small cylindrical artifacts, generally made of semi-precious stone and decorated with carvings and inscriptions. These seals were used continuously throughout three thousand years of Mesopotamian history. They functioned like modern signatures as they were rolled over clay to verify documents and protect enclosed contents or worn around the neck as protective amulets. Cylinder seals provide critical historical information to archaeologists because they reveal information about those who controlled the flow of goods in society, whether on a personal or societal level.

Like the cylinder seals recently looted in Iraq, these seals lack a find spot. Our research is the only way to connect the existing artifact to its ancient origin. Through intensive comparative research we each analyzed a seal’s iconography, inscriptions, material and techniques in order to recover lost information about the seals and their owners. Our project is valuable to both archaeologists and the broader public because our research recovers a context for these orphaned archaeological finds.

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Category: Humanities
Name(s): Jonathan Zabel
Faculty Sponsor(s) and Department(s): Chris Swain, Interactive Media
Submission Type: Individual
Format: Field Research
Title: The Great Divide: Gender Parity in Gaming
Abstract: For many, it is a common conception that gaming is a largely male pastime. Western game developers have long coveted the female market segment, but have largely failed in their efforts (aside from notable successes like “The Sims”). East Asia, however, is a different case entirely. Japan in particular is intriguing for its seeming contradictions.

Nintendo, long known for being one of the few companies able to reach traditionally unreachable demographics with its games, has achieved such a high level of mainstream success that I would have assumed that basically everyone in Japan - females included - was interested in gaming. However, as my research shows, quite the opposite is true, and female gamers in Japan are not only more rare than their counterparts in the States, but even more stigmatized than their American counterparts.

§§§
17-ß-Estradiol (E2) is a steroid hormone known to be involved in sexual development, the cardiovascular system, and bone production. We have demonstrated that E2 is also neuroprotective against excitotoxicity induced by N-methyl-D-aspartate (NMDA), a glutamate receptor agonist. Additionally, this neuroprotection requires the activation of the extracellular signal regulated kinase (ERK) pathway. The mechanism and the identity of the receptor involved in E2-mediated neuroprotection and ERK activation remains unclear, but it has been suggested that the E2 receptor alpha (ERα; ) and the G protein subunit Gαi/o are involved. This study demonstrates that E2-mediated neuroprotection against NMDA induced excitotoxicity and ERK activation involved a G protein-coupled receptor (GPCR) mechanism. Biochemical and image analysis of cultured hippocampal slices revealed that E2-mediated neuroprotection is sensitive to pertussis toxin (PTX), a blocker of Gαi/o. Immunoblot analysis of cortical cultures showed that E2-induced ERK activation is also sensitive to PTX, while E2 treatment induced GPCR-kinase 2 (GRK2) activation. Treatment of cortical cultures with E2 initiated the recruitment of β-arrestin-1, a GPCR adaptor protein, to ERα; and in a synaptic membrane preparation ERα; was internalized after E2 stimulation. In addition, image analysis of cortical neurons revealed that the ER agonist E2-BSA(FITC) binds to neuronal membranes and also becomes internalized. These findings demonstrate that E2-mediated neuroprotection and ERK activation involve Gαi/o, GRK, β-arrestin-1, and ERα; suggesting E2 utilizes a GPCR mechanism of action. Studying the mechanism of E2 action will help us to understand its role in the progression and treatment of neurodegenerative diseases such as Alzheimer’s.

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Category: Life Sciences
Name(s): Bhavraj Khalsa
Submission Type: Individual
Faculty Sponsor(s) and Department(s):
James Weiland, Ophthalmology and Biomedical Engineering
Format: Laboratory-based Research
Title: An in vitro Model for a Retinal Prosthesis
Abstract:
Retinitis Pigmentosa and Age-Related Macular Degeneration are the two most common outer retinal degenerative diseases. Currently, the best hope for individuals with these blinding diseases is a retinal prosthesis, which transduces a physical light stimulus into an artificial electrical impulse. The goal of this study is to understand the electrical properties of the retina which will allow the prosthesis to evoke responses that are well correlated with the stimulus. We looked at two aspects of retinal response to electrical stimulation in salamander retinas. A custom-built micro-electrode array was used to stimulate and record from the retina. First, we looked at the effect of electrode-electrode interactions for cell sites in between stimulating electrodes. Cells were stimulated either with a single electrode, with two electrodes of opposite polarity, or with two electrodes of same polarity. Next, we sought to determine frequency dependence of the response and delivered pulse trains to retinal ganglion cells, increasing the pulse frequency for successive trains. The resulting data presented a counterintuitive result: charge threshold was twice as high for dual monopolar stimulation than for monopolar or bipolar stimulation. With respect to pulse stimulation, frequency greater than 10-20 Hz effectively eliminated presynaptic input. These results indicate that 1) charge is not the only mitigating factor and one needs to consider electric field perturbations from electrode-electrode interactions and 2) one can take advantage of existing mechanisms to drive target ganglion cells by increasing frequency to eliminate complex presynaptic input.

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**Title:** Analysis of Mutations in Colorectal Cancer Characterized by Rapid Growth

**Abstract:**
Cancer is one of the leading causes of death in America in which half of men and one-third of all women will develop. Cancer is characterized by uncontrollable and abnormal cell growth believed to be caused by genomic mutations. Observations suggest that most cancers develop gradually over a period of time and can be detected with regular surveillance by practitioners. For example, the development of colorectal cancer is thought to take decades. Yet, despite regular checkups, some patients develop colorectal cancer within a short period of time, which suggests that these cases of cancer developed at surprisingly accelerated rates. The goal of our research is to determine if some mutations are responsible for more rapidly growing colorectal cancer. Our study compares BRAF, KRAS and Beta-Catenin mutations between rapidly growing colorectal cancer that arise a few years after a negative clinical examination (colonoscopy) and cancer that arise sporadically with an unknown growth interval. Potentially the frequencies of these mutations may differ between the cancers, and therefore suggests certain mutations are associated with more rapid cancer growth.
Category: Life Sciences
Name(s): Brad Johnson
Submission Type: Individual
Faculty Sponsor(s) and Department(s): John Heidelberg, Biology
Format: Laboratory-based Research
Title: Anammox in Catalina Island Sediments
Abstract:
Anaerobic ammonium oxidizing (anammox) bacteria are now recognized as a major factor in the sequestration of fixed nitrogen to N$_2$ gas in both marine and freshwater environments, however the extent of global anammox importance is not known. This study examines the presence of anammox bacteria in two marine and two freshwater sediment samples from Catalina Island off the southwestern coast of the United States. Identification was performed using 16s rDNA amplification by polymerase chain reaction, covering all known genera of anammox bacteria. Geochemical properties (porosity, NO$_x^-$, NH$_4^+$, O$_2$) were measured in all samples to better characterize anammox habitats. To my knowledge, this study provides the first evidence of anammox bacteria in Santa Catalina Island, California marine and freshwater sediment, further implicating anammox bacteria as a globally important marine and freshwater bacterium. Experimental results indicated that while the “Candidatus” genera “Kuenenia” and “Brocadia” were most likely present at all marine and freshwater locations, “Candidatus Scalindua” genus was present only at the two locations in the freshwater reservoir. It is possible that “Ca. Scalindua” is particularly well suited to the freshwater environment. Furthermore, a broad range of oxidation conditions, organic matter content, and sediment composition values between samples may indicate that the anammox metabolism is more robust than previously thought.

Category: Life Sciences
Name(s): Julia Kroh, Tanya Nguyen
Submission Type: Group
Faculty Sponsor(s) and Department(s): Melvin Lyon, Biological Sciences
Format: Laboratory-based Research
Title: Animal model of schizophrenia shows increases in number of neurons in brainstem
Abstract:
Experimental studies involving prenatal stress have been shown to contribute to changes in neuroanatomical development, linked to an increased evidence of psychopathology, particularly schizophrenia. Two particular nuclei, the lateral dorsal tegmental nucleus and the pedunculopontine tegmental nucleus, have been identified to contain an increased number of cells containing nitric oxide synthase (NOS). These nuclei have significant connections to the dopaminergic areas affected in schizophrenia. An animal model for schizophrenia has been developed to study the effects of prenatal stress on brain pathology in pups. In this study, four male rats were injected with d-amphetamine on embryonic days 12-15 while four control animals were injected with saline solution. After images of postmortem brain sections were studied and cells within relevant nuclei were counted, results showed an increase in the number of cells within the LDTg that stain for nitric oxide synthase and no increase in the number of PPTg cells. Further analysis by statistical programs using t-test for independent variables showed a significant p-value of 0.015 in the LDTg and statistical nonsignificance for the PPTg. The results demonstrate that injecting mother rats with d-amphetamine prenatally induces neuronal changes similar to those found in schizophrenic...
patients. An increased number of cells in the LDTg may increase dopaminergic activity to the rostral forebrain, an area which high dopaminergic activity is characteristic of schizophrenic symptoms. These findings are important because NOS-containing cells are increased in such regions provides support for the development of treatment using NOS-inhibition as treatment for schizophrenia.

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Title: Cerebellar Cortex Function in Motor Memory: Essential in Consolidation?

Abstract: Despite compelling evidence which has shown a strong link between consolidation of motor memory and the interpositus (IP) nucleus of the cerebellum, one finding not only refutes the existing link, but offers a new one. This finding asserts a link between the consolidation of motor memory and the cerebellar cortex of the cerebellum. In search of the evidence that justifies the new link, an experiment will be conducted using standard delay conditioning of the nictitating membrane response in rabbits. A tone conditioned stimulus (CS) will overlap with a 100-ms airpuff unconditioned stimulus (US) over a 250-ms interval. Directly after training, the cerebellar cortex of the rabbits will be infused with the GABA A receptor agonist muscimol, a chemical agent that acts to erase short term memory and prevent consolidation when the infused area is integral to the consolidation process. To substantiate the claim that the cerebellar cortex is necessary in the consolidation of motor memory, interference of consolidation will have to occur only with infusion into the cerebellar cortex, with rabbits demonstrating baseline levels of performance in the following training session. However, as it is not the cerebellar cortex but the IP nucleus that prevents motor memory consolidation, infusion into the cerebellar cortex does not inhibit consolidation. Rather, it is the rabbits with infusion into the cerebellar nuclei (particularly the IP) which demonstrate baseline levels of performance with further training.

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Title: Cognitive Outcomes Following Rat Perinatal Brain Injury Are Age Dependent

Abstract: Purpose: Following a neonatal hypoxic ischemic (HI) brain injury, children often present with cognitive disabilities. To differentiate the impact that time of injury has on the development of cognitive disabilities, we utilized postnatal day (P) 3 and P7 rat models of unilateral HI brain injury. These models mimic brain injury in second and third trimester human infants respectively. Following injury, we longitudinally investigated the impact of injury on cognitive outcomes using the open field paradigm.

Methods: P3 and P7 rats underwent right carotid artery cauterization or sham surgery followed by 1.5 hours (P3) or 2.5 hours (P7) exposure to 8% oxygen or room air (shams). All rats were tested in
the open field on P7-9 (preweaning) and P22-24 (postweaning). A number of behaviors including rearing, grooming, circling, and line crosses and wall time were quantified. Behavioral data were analyzed using Observer Software by Noldus, Inc. and analyzed using SPSS statistical software.

Results: P7 injured animals demonstrated open field deficits only during the preweaning testing period. P7 injured animals were characterized by increased circling behavior and decreases in both wall time duration and frequency. P3 injured animals showed deficits, characterized by a paucity of movement, which persisted through the postweaning period.

Conclusions: Rats with neonatal HI brain injury at P3 or P7 show a different set of cognitive deficits as measured in the open field paradigm. Our data suggests that earlier brain injury results in the persistence of cognitive deficits.

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Category: Life Sciences
Name(s): Sara Kreimer
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Christian Pike, Gerontology
Format: Laboratory-based Research
Title: Gender Differences in Alzheimer's Disease Neuropathology in 3xTg-AD Mice

Abstract:
Alzheimer’s disease (AD), an age-related neurodegenerative disorder characterized by the accumulation of β-amyloid (Aβ) and hyperphosphorylated tau protein in the brain, occurs with greater frequency in women than in their male counterparts. Consistent with this observation, several transgenic mouse models expressing β-amyloid demonstrated that female mice exhibit higher levels of β-amyloid than age-matched male mice. In this study, we sought to investigate the gender differences in the age-related progression of AD neuropathology in a triple transgenic mouse model of AD (3xTg-AD). We evaluated β-amyloid and tau pathology in male and female 3xTg-AD mice at the following three stages: 2-4 months of age, 6-8 months of age, and 12-14 months of age. We found that female 3xTg-AD mice at 12-14 months of age suffered a greater β-amyloid burden in the subiculum and CA1 regions of the hippocampus and in the frontal cortex of the brain. Male 3xTg-AD mice at 12-14 months of age, in contrast, demonstrated higher levels of hyperphosphorylated tau protein. Taken together, these results suggest that significant gender differences exist in the age-related progression of AD neuropathology in 3xTg-AD mice. This has important implications for therapeutic strategies for AD involving the administration of sex steroid hormones.

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Category: Life Sciences
Name(s): Kristi Lieber
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Lawford Anderson, Department of Earth Sciences
Format: Laboratory-based Research
Title: Human Lower Extremity Muscle Design

Abstract:
Currently, models of the human lower extremity are based on studies of the skeletal muscle architecture using either two or three cadaveric specimens. Clearly, these statistics are not representative of the population. The purpose of this study was to create a database of human lower extremity
architecture and their respective skeletons which would be internationally accessible. Ten formaldehyde-fixed lower extremities were scanned using magnetic resonance imaging. The mass and muscle length were measured, fibers were subsequently microdissected and the sarcomere length was measured using laser diffraction. In order to predict force generation, physiological cross-sectional area (PCSA) was calculated. Unlike the previous reports of lower extremity muscle architecture, the muscle fiber lengths were not significantly different between the quadriceps and hamstrings. PCSA was much larger in the quadriceps, which is not surprising as quadriceps are antigravity muscles at the knee. However, the surprising result is that the muscle fiber lengths of the quadriceps are not significantly different from those of the hamstrings, since the hamstrings are mainly two-joint muscles. It is also noteworthy that the only two-joint muscle in the quadriceps, the rectus femoris, had the shortest fiber length of all the quadriceps. These data support the notion that the vastus lateralis muscle is the “key” to knee function. The previous report that hamstring muscles are designed for excursion is not supported by these data. These data will undoubtedly provide clinicians and scientists with a new view of lower extremity muscle design in these muscles.

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Abstract:
Evidence from previous studies supports the notion that a subset of ethanol induced behavioral effects is mediated via ligand-gated ion channels (LGICs), such as the glycine (GlyR), GABA_A (GABA_A_R) and purinergic receptors (P2XRs). However, the sites on these receptors responsible for ethanol action are unknown. We have begun to elucidate these sites through the use of molecular strategies, namely chimeric receptor construction and site directed mutagenesis. Using site-directed mutagenesis (mutating a single amino acid residue) we have shown that the Loop 2 region in the extracellular domain of GlyRs is important for ethanol action. Next, we used a chimeric receptor construction approach to extend the study of the role of the Loop 2 to GABA_A_R which is highly sensitive to ethanol amongst LGICs. After sequence alignment between the Loop 2 domains of GlyR α1 and GABA_A_R δ subunits, the Loop 2 region of the GlyR α1 subunit was replaced with homologous amino acid residues from the GABA_A_R δ subunit using site directed mutagenesis. The resulting chimeric receptor demonstrated GABA_A_R sensitivity to ethanol, supporting the importance of Loop 2 in ethanol action in LGICs. A different chimeric strategy involving introduction of restriction sites, restriction digestion, and ligation of appropriate fragments was used to search for sites of ethanol action in P2XRs. Results of this chimeric receptor suggested that the target of ethanol lies within the extracellular region of the P2XRs. These findings illustrate that molecular strategies can be successfully utilized to elucidate the sites of ethanol action in LGICs.

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Category: Life Sciences
Name(s): Anuj Aggarwal
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Daryl Davies, Molecular Pharmacology and Toxicology
Format: Laboratory-based Research
Title: Molecular Strategies to Identify Sites of Alcohol Action in LGICs
Novel repellant activity of motorneurons in the guidance of commissural axons

Abstract:
During embryonic development, maturing neurons project axons which function as essential informational connections within the nervous system. As axons grow, they receive and interpret chemical signals which dictate how to reach their targets. One model system for studying axon guidance is the trajectory of commissural axons (c-axons). C-neurons originate in the dorsal spinal cord and send out axons that project ventrally towards the floorplate. To investigate the guidance activity of the floorplate, we first attempted to examine the role of Sonic Hedgehog (Shh), a proposed chemoattractant, in c-axon guidance by misexpressing Shh in chick embryos. While our misexpression experiments revealed the morphogenic power of Shh, we were unable to evaluate Shh’s role as a guidance cue. We then took a different approach and analyzed the Gli2-/- mouse and the BMP7-/-Gli2-/- mouse. Since Gli2-/- mice lack a floorplate, we were able to examine c-axon growth in the absence of guidance cues from the floorplate. Our analysis of the Gli2 mutant revealed that although c-axons still reach the ventral midline, their trajectories become highly disorganized as they project through the ventrally shifted population of motorneurons. To further investigate the interaction between c-axons and motorneurons, we performed open book preps on Gli2-/- spinal cords and found that c-axons avoid areas rich in motorneurons and favor regions with few motorneurons. Thus, we propose a model in which motorneurons possess a repellant activity that facilitates the guidance of c-axons in the ventral spinal cord.

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Progesterone blocks the neuroprotective effects of estrogen in aged female rats

Abstract:
While the neuroprotective effects of estrogen in young rodents are well-known, the influence of progesterone in both young and aged rodents remains to be elucidated. In this study, we investigated the neuroprotective effects of estrogen and progesterone, both alone and in combination, against a kainic acid lesion to the CA2/3 of hippocampus in 14 month old reproductively senescent female rats. Our results suggest that estrogen, but not progesterone, treatment was partially neuroprotective. When replaced in combination, progesterone significantly blocked estrogen’s beneficial effect. This study suggests that the aged female rat brain is responsive to estrogen in the regions involved in learning and memory. Despite these findings, the case for a loss of hormone-responsiveness in the brain with age is apparent in this study, due to the fact that our results were not as pronounced as previously seen in experiments with younger animals. These results have important implications for hormone therapy in light of the Women’s Health Initiative Memory Study (WHIMS). This study also furthers the discussion in
relation to hormone therapy and its benefit for the treatment/ prevention of Alzheimer's Disease.

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Category: Life Sciences
Name(s): Ryan O'Shea
Submission Type: Individual
Faculty Sponsor(s) and Department(s):
Steve Finkel, Biology
Format: Creative Work
Title: Selection of an acid resistant strain of Shewanella oneidensis MR-1

Abstract:
Shewanella oneidensis MR-1 is a microorganism that converts chemical energy into electrical energy, making it of potential utility as an alternative energy source. At this time, its abilities are limited and its efficiency and power density must be improved before its integration into technological devices. In this study, adaptive/directed evolution was utilized to select for Shewanella oneidensis MR-1 that can tolerate an acidic environment. Acid profiles and serial dilutions were used to search for an acid resistant strain that will increase power output in a microbial fuel cell (MFC). Several trials were conducted in which MR-1 was placed in progressively more acidic media over time in order to select for the most resilient strains. Using directed evolution techniques, four acid resistant strains were isolated (Larry, Bird, #33 and Son of Bird). Bird and Son of Bird are capable of growing to full density (10^9 CFU/mL) in MES buffered (50mM - 225mM) minimal media with an initial pH of 5.5. Wild-type MR-1 cannot survive in buffered media lower than pH 5.8. Acid resistant mutants of MR-1 will increase the electrical output of the MFC.

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Category: Life Sciences
Name(s): Nihal Patel
Submission Type: Individual
Faculty Sponsor(s) and Department(s):
Daryl Davies, Pharmacology and Pharmaceutical Sciences
Format: Laboratory-based Research
Title: Sites of Ethanol Action in Purinergic P2X3 Receptors

Abstract:
P2X receptors (P2XR) are cation-selective ion channels activated by extracellular ATP that are widely expressed in the CNS and may play a role in mediating some of the cellular and behavioral effects of ethanol. Our laboratory has previously shown that ethanol inhibits ATP-gated currents in P2X2Rs but potentiates currents in P2X3Rs. However, sites of ethanol action in P2XRs are unknown. Our laboratory has been utilizing a chimeric strategy that exploits the opposing effects of ethanol on P2X2Rs and P2X3Rs to search for regions within P2XRs that play a role in ethanol action. The present study extends chimeric strategy to test the hypothesis that P2XR ectodomains (extracellular) contain important sites for ethanol action. We constructed chimeras that contained exchanged ectodomain sequences of P2X2R/P2X3Rs. The effects of ethanol on ATP-induced currents were measured in Xenopus oocyte expression system using two-electrode voltage clamp. Ethanol sensitivities of wildtype P2X2R and P2X3R were transferred to the chimeras that contained the corresponding ectodomain sequences. However, for the P2X3R there was a critical length of the ectodomain for the potentiating action of ethanol. Ethanol inhibited the function of the chimera that contained shorter P2X3R ectodomain sequence (amino acids 60-301 versus 45-318). These data indicate that the P2XR ectodomain is an important site for ethanol action. Moreover, P2X3R ectodomain regions 45-59 and 302-318 (proximal to the transmembrane domains)
are involved in the potentiating effect of ethanol.

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**Title:** Startle Responses in Wild Type Mice

**Abstract:**
The cerebellum may play a crucial role in memory retention for classical conditioning paradigms. A Thompson et al. (1996) experiment, lesioned the interpositius nucleus (one of the major cerebellar nuclei) in wild type mice, implicating the necessity of the IP nucleus in eyelink conditioning. A similar experiment published by Koekkek et al. (2003) contradicts the Thompson study implying that the IP nucleus is not essential for learning. The Koekkek study used a 10 kHz tone (CS), while the Thompson study used a 1 kHz tone (CS). The proposed project is an attempt to indicate that perhaps Koekkek’s reported CR was a startle response by mice to a high frequency tone. The experiment uses two groups of mice exposed to unpaired sequences of tone and shock: one group exposed to a 1 kHz tone, while the other group is exposed to a 10 kHz tone. The experiment is seeking to prove that Koekkek et al. (2003) research findings are flawed due to the lack of a proper definition of a CR, resulting in the substitution of the CR for the startle response. This study merits significance since operational definitions are significant tools in the field of research, when studying classical conditioning paradigms in animals, and especially when experimental studies warrant replication.

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**Title:** The Evaluation of Different Strains of Shewanella sp. in a Microbial Fuel Cell

**Abstract:**
As the cost of current energy sources rapidly increases, one possible alternative is the microbial fuel cell; an electrochemical device that produces electricity through the oxidation of organic acids into protons and electrons using bacteria as catalysts. Bacteria that can be used as catalysts are rare because they must be able to use a solid substrate as an electron acceptor. It has been determined that Shewanella oneidensis MR1 is a successful catalyst, yet, other strains of Shewanella sp. have not been characterized within a fuel cell.

Twelve different strains of Shewanella sp. were studied. They were grown in identical liquid cultures using sterile techniques and injected into a fuel cell. The fuel cell is connected to a computer-automated digital multimeter that continuously monitors the voltage output of the fuel cell over an extended period of time given an external resistance. In addition, electrochemical impedance spectroscopy tests and polarization sweeps were performed to characterize the theoretical potential of the fuel cell, both with and without bacteria. High pressure liquid chromatography was also used to assess which organic acids were present in the anodic and cathodic compartments of the fuel cell as the metabolism and growth phases of the bacteria changed with time.
Thus far, six of the twelve strains have been tested. Results show that all six have the potential to work as catalysts in a fuel cell, with varying success among the strains as compared to S. oneidensis MR1. The remaining six strains have yet to be tested.

**Category:** Life Sciences  
**Name(s):** Paula Tran  
**Submission Type:** Individual  
**Faculty Sponsor(s) and Department(s):** Susan Forsburg, Molecular & Computational Biology  
**Format:** Laboratory-based Research  
**Title:** The Histone Acetyltransferase Mst1p Plays a Role in the Hyperosmotic Stress Response Pathway in *Schizosaccharomyces pombe*  
**Abstract:**

In budding yeast, the arginine methyltransferase HSL7+ was first isolated in a screen for proteins that were histone synthetic lethal. The mutant hsl7Δ was later shown to be salt-sensitive. Similarly the fission yeast homolog of HSL7+, Skb1p, is necessary for polarization of actin to cell ends in the presence of high salt concentrations. Previous work by the Forsburg lab demonstrated that Skb1p interacts with the histone acetyltransferase Mst1p via a yeast two hybrid assay. This study examines whether Mst1p also has a role in salt response. Results garnered from exposing Δskb1 and temperature sensitive *mst1*Δ and *mst1*ΔΔskb1 fission yeast strains to potassium chloride media suggest that Mst1p plays a part in hyperosmotic stress adaptation. Evidence that Skb1p and Mst1p share responsibility in helping *S. pombe* fully combat hyperosmotic conditions challenges future experiments to look at the placement of these proteins in a genetic pathway.

**Category:** Life Sciences  
**Name(s):** Nisha Alle  
**Submission Type:** Individual  
**Faculty Sponsor(s) and Department(s):** Wendy Gilmore, Department of Neurology; Peili Li, Department of Neurology  
**Format:** Laboratory-based Research  
**Title:** The influence of estrogen and progesterone on immune function during and after pregnancy in women with multiple sclerosis (MS).  
**Abstract:**

Objective: The project was designed to determine the effect of progesterone alone, and in conjunction with estradiol (E2), on the development of Tregs in vitro by measuring the level of foxP3 expression.

Background: Pregnant MS patients show a significant reduction in MS relapses. This benefit from pregnancy is believed to result from hormone-induced changes in immunity. These changes may result in an increase in function and/or in number of regulatory T cells (Tregs) to control a pathological T cell response. Studies have shown that E2 may contribute towards Treg proliferation, but the role of progesterone, the major pregnancy hormone, remains unclear. We hypothesized that progesterone promotes foxP3 expression, an indicator of a Treg response, and that progesterone and E2 together have an additive effect in promoting development of Tregs in vitro.

Design/Methods: Peripheral blood mononuclear cells were collected from a pregnant MS patient. CD25- cells were isolated and treated with anti-CD3/28 in
culture to induce foxP3 expression under four conditions: no hormone, E2 only, progesterone only, and 10:1 ratio of progesterone to E2. After a seven-day incubation period, cells were stained with fluorochrome-labelled antibodies to measure the percentage of foxP3+ and IFN-gamma+ cells by fluorescence activated cell sorting (FACS).

Results: On average, the number of cells that expressed foxP3 was slightly higher with E2 treatment (43.83%) than cells treated with both progesterone and E2 (39.34%) or progesterone (34.19%). Cells showed increased foxP3 expression when treated with hormone(s) over no hormone (28.28%).

Conclusions: While E2 alone was the strongest in promoting foxP3 expression, progesterone does play a role, perhaps secondary to E2. However, progesterone and E2 have a synergistic, not additive, effect in promoting development of Tregs. Further studies need to be conducted to determine if one hormone antagonizes the other.

Category: Life Sciences
Name(s): Martin Wainstein
Submission Type: Individual
Faculty Sponsor(s) and Department(s): KennethNealson,EarthSciences
Format: Senior Honors Project
Title: Ultrabasic Geomicrobiology from the Cedars Peridotite: Life at pH 11.5
Abstract:
The Cedars Peridotite, located in coastal Northern California, is a geobiological Mecca composed of ultramafic rocks (of mantle origin) which react at low temperature with liquid water to produce hydrogen-rich ultrabasic fluids (~pH 11.8) in an ancient geological process called, “serpentinization”. The Nealson Lab is working to elucidate and understand the microbial community within this ultrabasic spring complex in a search for some of the world’s most extreme alkaliphiles. The astrobiological significance of this type of site is potentially very high since serpentinization reactions are a possible explanation for the methane found on both Mars and Titan. In turn, serpentinization is thought to have occurred since the Earth first cooled sufficiently to enable water-rock chemistry; therefore, these serpentinizing aquifers may be very similar to the earliest niches for life on Earth. Life in the ultrabasic springs of the Cedars Peridotite endures one of the most extreme low temperature environments on the planet (high pH, low salinity, Eh < - 650mV, lack of obvious e- acceptor, and the insolubility of many important biological elements). Despite these challenges, extremely alkalitolerant enrichment cultures of both methane and hydrogen-oxidizing bacteria have been obtained that have pH tolerances up to 11.5 and 10.5 respectively. Enrichment cultivation and isolation strategies, phylogenetic affiliations, as well as preliminary physiological data for cultivated organisms will be presented.

Category: Life Sciences
Name(s): Chad Agy, Michael McCaughan
Submission Type: Group
Faculty Sponsor(s) and Department(s): Kathleen Burke, Institute of Genetic Medicine; Jack Turman, Department of Cell & Neurobiology
Format: Creative Work
Title: UNILATERAL NEONATAL HYPOXIC-ISCHEMIC BRAIN INJURY ALTERS PREFRONTAL CORTEX DEVELOPMENT
Abstract:
Purpose: Severe hypoxic ischemic (HI) injury in the perinatal period is a major cause of motor disorders such as cerebral palsy. However, even mild HI injury can lead to deficits in attention and memory indicative of abnormal prefrontal cortex (PFC) functioning. A rat model has been developed to investigate the effects of HI injury on brain development; however, the prefrontal cortex has not been examined in this model. In this study we used anatomical methods to assess the effects of right hemisphere HI injury on neuron growth in the rat PFC.

Methods: Postnatal day (P)7 rat pups underwent right carotid artery cauterization or sham surgery followed by 2.5 hours exposure to 8% oxygen or room air (shams). Rats were perfused at P15 or P150 (adulthood). The brains were removed, processed for paraffin sectioning and stained with hematoxylin. Medial and lateral PFC regions from a single section (Bregma +3.70) were digitally imaged and cell somal areas measured using ImageJ software. Data were analyzed using SPSS statistical software.

Results: On gross examination, right cerebral hemispheres of injured animals showed either mild (atrophy) or severe (cystic infarct) injury, while left hemispheres appeared normal. However, in HI rats, PFC cell sizes were significantly altered in both hemispheres. In general, mean PFC cell sizes in injured rats were reduced at P15 and enlarged at P150.

Conclusions: Taken together, these data show that unilateral neonatal HI injury induces a bilateral response in the rat PFC with both early and long term effects on neuron growth.

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The prevalence of coronary heart disease (CHD) in the United States is alarming. It is of great concern that a great number of those afflicted by this complication are unaware of their condition. Therefore, it is critical for the biomedical community to develop non-invasive methods for assessing the health of seemingly healthy individuals. We have developed a computer program that enables computer users to observe their electrocardiogram (ECG) while they use their personal computer, allowing them to track their cardiovascular health on a regular basis. Although problems remain with our program, this preliminary version is working successfully.

Title: A Non-Invasive Method for Evaluating Cardiovascular Health

Category: Physical Sciences & Engineering
Name(s): Mario Bialostozky
Submission Type: Individual
Faculty Sponsor(s) and Department(s): David D’Argenio, BME
Format: Laboratory-based Research
Title: An Interdisciplinary Study of Apoptotic Effects Induced by Nanoelectropulses on Cancer Cells

Category: Physical Sciences & Engineering
Name(s): Pavitra Krishnaswamy, Israel Morales, Jeanie Paik
Submission Type: Group
Faculty Sponsor(s) and Department(s): Martin Gundersen, Electrical Engineering, Physics and Astronomy, Material Science
Format: Laboratory-based Research
Title: An Interdisciplinary Study of Apoptotic Effects Induced by Nanoelectropulses on Cancer Cells

Abstract:
We present a set of interdisciplinary projects conducted to advance studies of nanoelectropulse-induced electroperturbation of malignant cells and tumor tissues. Ultra-short (< 30 ns) high electric field (1.5 MV/m – 6 MV/m), low energy nanopulse technology induces apoptosis (programmed cell death) in mammalian cell lines. Past research has shown that pulsed cells externalize phosphatidylserine (PS) - a phospholipid marker for phagocytosis – from within the inner leaflet of the cell membrane to the outer leaflet. Since PS externalization is expected to serve as a signal for phagocytotic clearance, we have begun preliminary research to study whether pulsing cells would cause increased phagocytosis by macrophages. Particularly, we have been able to determine appropriate experimental conditions for such phagocytosis experiments using various dyes such as Yo-Pro 1 and Hoescht to observe changes in cell membrane permeability and cell morphology respectively.

Further, we use novel pulse generators we have designed to vary pulse parameters from the 30 ns regime down to the...
subnanosecond regime and investigate how cellular responses change with pulse width. In addition to discussing changes in cell responses, we discuss the technical issues faced in integrating the pulse generators we have developed with our biological loads, and present methods to improve our current designs.

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Category: Physical Sciences & Engineering
Name(s): Andrew Horning
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Stephen Bradforth, Chemistry
Format: Laboratory-based Research
Title: Around the Ring: Molecular Geometry & Energy Transfer In Photosynthetic Systems

Abstract:
Common natural photosynthetic systems consist of circular structures built of absorbing chromophores subunits, arranged in such a way that energy can hop around the molecule from chromophore to chromophore before relaxation. To further understand the dynamics and properties of this intramolecular energy transfer process, especially the impact of a circular molecular geometry, both naphthalene and fluorene-based synthetic analogs of natural polymers have been studied using a variety of modeling and computational methods. This work demonstrates an unexpected dependence of energy transfer properties upon the uniformity of the ring array – most notably dramatic differences in energy transfer between a cyclic arrangement of chromophores and other molecular shapes. Using synthetic naphthalene polymers in both cyclic and linear forms, energy transfer processes were examined experimentally using ultrafast laser pulsed TCSPC measurements for polymers of different sizes and shapes. The purpose of this experiment is to elucidate the correlation between structure and energy transfer properties in photosynthetic systems, helping to refine the hopping model of energy transfer, confirm and interpret simulated data, and provide both understanding of natural molecules and guidance in the synthesis of more effective artificial light harvesting systems.

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Category: Physical Sciences & Engineering
Name(s): Benedikt Riedel
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Dr. Edward Rhodes, Department of Physics and Astronomy
Format: Laboratory-based Research
Title: Comparison of Solar Internal Dynamics using Ground- and Space-Based Observations

Abstract:
One of the primary goals of modern solar physics is an improved understanding of the mechanism underlying the solar activity cycle, which is essential in order to develop improved methods for predicting solar activity. Solar activity is thought to originate within the convection zone in the outer interior of the sun. The generally-accepted theoretical models of solar activity involve a complicated interplay between zonal (East-West) and meridional (North-South) flows and vertical convection motions—the Dynamo Model. Within the past five years the tools of local helioseismology have been used to produce the first subsurface flow maps during Solar Cycle 23.

Our project focuses on the measurements of the meridional and zonal flow patterns at different depths during Solar Cycle 22. Our primary contribution lies in the investigation of a possible instrumental misalignment at the 60- Foot Solar Tower at Mt. Wilson Observatory (MWO) and an
increase in capacity to process MWO and SOHO Michelson Doppler Imager data. This paper presents the analysis of the observed misalignment of the MWO and flow patterns produced using corrected data. We have compared images taken during the transition between Solar Cycle 22 and 23, to develop a difference in flows between cycles and develop a correction for the instrumental misalignment.

Our goal is to increase the accuracy of the correction and number of flow maps for Solar Cycle 22. These results will allow us to analyze solar internal flows back to the beginning of the MWO observations in 1988.

Category: Physical Sciences & Engineering
Name(s): Howard Harris
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Kenneth Nealson, Earth Science
Format: Laboratory-based Research
Title: Demonstration of Metal Oxide Sensing by Shewanella oneidensis

Abstract:
Shewanella oneidensis MR-1 reduces numerous electron acceptors including metal oxides such as FeO_x and MnO_x under anaerobic conditions. These electron acceptor substrates are insoluble, and therefore are expected to be either undetectable by classical chemosensory processes or to require as yet identified sensory network that enables MR-1 to detect insoluble electron acceptor substrates. In order to determine whether MR-1 actively seeks out FeO_x and MnO_x in the environment, a suite of targeted deletion mutants disrupted in various functional classes has been constructed in MR-1.

The wild type and mutants were evaluated in experiments specifically designed to obtain data that could be processed by statistical computer image analysis, to investigate the mechanism of metal oxide reduction.

Thirteen experimental variations clarified that high velocity activity in the immediate proximity of the metal oxide particle was directly correlated to rapid reduction of metal oxides. Competition with other electron acceptors demonstrated that substrates including nitrate, fumarate, and thiosulfate slowed reduction and impaired the bacteria’s metal oxide seeking behavior. Results obtained with mutants in chemotaxis genes CheA_1 (∆SO2121), CheA_3 (∆SO3207), and a double mutant lacking both genes demonstrated that the inability to detect MnO_2 leads to slow proximal velocities and subsequently a hampered reduction. Furthermore, mutants lacking genes essential for metal reduction (MtrA and MtrB) and normal pilin and type II secretion (PilD) function demonstrated retarded reduction rates. The results indicate that the ability of the bacteria to detect and move toward the MnO_x is essential for the reduction process.

Category: Physical Sciences & Engineering
Name(s): Wendy Mata
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Edward Rhodes, Physics & Astronomy
Format: Laboratory-based Research
Title: Do the Solar Oscillation Amplitudes Increase with Increasing Altitude in the Sun

Abstract:
The sun is constantly filled with acoustic waves which are trapped within its interior. These sound waves cause the surface and atmosphere of the sun to
constantly move radially inward and outward. These waves can be modeled with a sophisticated mathematical model which predicts that the amplitudes of these motions grow with increasing height above the solar surface. In this project I have used a combination of both ground-and space-based observations to measure the amplitudes of these waves at three different heights in the solar atmosphere. Initially, I processed two different sets of solar Dopplergrams which were observed using the 60-Foot Solar Tower at the Mount Wilson Observatory. I converted these two sets of Dopplergrams into two sets of power spectra. I then fit the peaks in both sets of MWO power spectra and demonstrated that the amplitudes of the waves which originated higher in the solar atmosphere were higher than the amplitudes of the waves which originated lower in the solar atmosphere. I am now finishing the processing and fitting of a similar set of Dopplergrams which were observed by an instrument onboard the SOHO spacecraft.

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Category: Physical Sciences & Engineering
Name(s): Noelle R. B. Stiles
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Armand R. Tanguay, Jr., Electrical Engineering, Materials Science, Biomedical Engineering, Neuroscience Graduate Program
Format: Laboratory-based Research
Title: Intraocular Camera for Retinal Prostheses
Abstract:
One million Americans are blind, suffering from debilitating diseases such as macular degeneration and retinitis pigmentosa. Retinal prostheses may restore their vision by stimulating the functional retinal ganglion cells with an implanted microsimulator array. Current prosthetic devices use an external camera, but rapid head movements induce dizziness and nausea. To minimize head movements, social estrangement, and limited mobility, we are developing an internal camera to couple to the electrode array. Through simulations and testing of prototype cameras, we have found that an aspherical lens provides extensive depth of field and makes implantation feasible. My research studies camera depth of field and the psychophysics of low-resolution vision.

In retinal prostheses, the resolution is limited to the number of electrodes on the electrode array, currently only 16 pixels. The resolution required for recognition, and the effects of motion and blur, provide resolution goals that correlate with desired functionality. My psychophysical analysis showed that 625 pixels are adequate for object recognition given a significant degree of image blur. Another important factor for the intraocular camera is the incorporation of accommodation, and the extensive depth of field of the prototypes eliminates this constraint. In this study, I derived the analytical equations for depth of field and determined how prototypes can be engineered with this feature.

The results of these studies will reduce camera design constraints, making further ultra-miniaturization possible. These intimately coupled low-resolution vision and optical design limitation studies are critical for the design and fabrication of future generation cameras.

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Category: Physical Sciences & Engineering
Name(s): Elizabeth Ball, Glenn Fischer, Bradford Foley, Jeffrey Thompson
Submission Type: Group
Faculty Sponsor(s) and Department(s):
Lawford Anderson, Earth Science;
Valbone Memeti, Earth Science; Scott
Paterson, Earth Science; Geoffrey
Pignotta, Earth Science
Format: Field Research
Title: MAGMATIC AND VOLCANIC
PLUMBING SYSTEMS, CRUSTAL
EVOLUTION, AND THE SEARCH
FOR THE MYSTERIOUS MOJAVE-
SNOW LAKE FAULT: 2006-07.
EARTH SCIENCES
UNDERGRADUATE TEAM
RESEARCH IN THE HIGH SIERRA

Abstract:
The Mojave-Snow Lake fault is a
hypothesized structure that
accommodated as much as 200 to 400
km of Cretaceous dextral displacement,
bringing Precambrian through Ordovician
miogeoclinal rocks from the Mojave
Desert north to the central Sierra Nevada,
where they became “host rock” for the
formation of a Mesozoic magmatic arc.
Our Research Team used geologic
mapping, and structural, stratigraphic,
geochemical and geochronologic analyses
to: 1) test possible links between
metasedimentary pendants in the Sierra
Nevada to miogeoclinal rocks found in the
western Mojave, and 2) to evaluate the
temporal and genetic relationships
between volcanic and plutonic rocks
exposed in the Cinko Lake area. Mapping
in the 102 Ma Harriet Lake granodiorite
(HLG), 94 Ma Cinko Lake quartz diorite
(CLQD), Fremont Lake granodiorite (FLG)
and ~148 Ma metasedimentary and ~107
Ma metavolcanic pendants, found no
evidence for the large-scale dextral shear.
Any fault must have been active between
~148 and ~107 Ma and is no longer
exposed in this area.

The HLG and FLG plutons and host
metavolcanics exhibit distinct, but
overlapping chemical trends suggesting a
common magma source and comparable,
but not identical magma lineages. The
plutons were emplaced at ~ 2.5 kbars (10
km depth). The metavolcanic units display
considerable vertical ductile strain and
peak metamorphic conditions at 650-750
°C. The overlapping ages, present
juxtaposition, high temperature, strain,
and similar chemistries suggest that the
volcanic rocks were immediately displaced
downwards to 10 km depths after they
formed at the surface, where related
magmas intruded them, all within less
than a few million years.

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Category: Physical Sciences & Engineering
Name(s): Christopher Der, Toan Vo
Submission Type: Group
Faculty Sponsor(s) and Department(s):
Will Berelson, Earth Sciences; Frank
Corsetti, Earth Sciences
Format: Laboratory-based Research
Title: Novel Application of Carbonate
Associated Sulfate Methodology to
Climate Change

Abstract:
Walker Lake is a closed basin lake in West
Central Nevada. Carbonate deposits on
the adjacent hillside have been used
previously to reconstruct lake level change
over time (and by extension, climate
change over time), given the assumption
that they formed at or near the shoreline.
We have investigated the CAS
composition of these carbonate deposits
and determined that this assumption may
not be valid; ancient lake level history
needs to be reexamined.

Sulfate is an excellent chemical proxy of
salinity, which is directly related to lake
level, thus we propose that CAS
constitutes a paleo-lake level indicator.
This is a new application of the CAS
methodology. We collected carbonate
structures from various locations adjacent
to the lake. We have analyzed the sulfate
content of the carbonate accretions on a mm-cm scale sampling transect, thus creating a time series of CAS. Our results show that CAS contents of these forms vary by a factor of 2 or more, suggesting lake volume variability of 2 or more, hence, there is no way that these carbonate accretions formed during a static lake level. Our results suggest that the climate record based on previous assumptions needs to be reevaluated.

To test CAS integrity, we are measuring this quantity on lake sediments on which we have radioisotope age dating information indicating sediment age as a function of depth. We also have historical data relating age to lake level. Our CAS analysis on sediments will test the reliability of this widely used geological/geochemical tracer.

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Category: Physical Sciences & Engineering
Name(s): Kristy Akullian, Austin Elliott, Becky Gallagher, Christine Marie Kahn, Kevin Milner, Pius Pack, Nick Rapp, David Richardson, Randall Robertson, Tom Robinson, Jared Sain, Lauren Schenkman

Submission Type: Group
Faculty Sponsor(s) and Department(s): Sue Perry, Southern California Earthquake Center
Format: Creative Work
Title: SCEC/UseIT: Virtual Display of Earthquake Related Objects

Abstract:
The 2006 Southern California Earthquake Center /Undergraduate Studies in Earthquake Information Technology (SCEC/UseIT) multi-disciplinary intern team experimented with software design and applied principles of end-user programming and usability engineering to develop fault-system tools to detect anomalous earthquake behavior, especially behavior that could be precursory to future large earthquakes. The group created tools for research conducted by graduate student (and UseIT alumnus) Jeremy Zechar to quantify the success of earthquake predictions, beginning with the Relative Intensity prediction scheme, which states that the more earthquakes that have occurred in a given area, the more likely a large earthquake will occur there in the future. Our software tools allow a user to view these data in adjustable graphs layered onto 3D landscapes, and will help Zechar and other scientists illustrate and communicate this exciting theory that may assist seismologists in better preparing for earthquakes. Each year’s interns build upon UseIT’s SCEC-VDO (Virtual Display of Objects), an open-source, interactive, 3D visualization software that currently lets users display, study, and make movies of earthquakes and related datasets as they occur globally. Some of the most drastic new developments occurred during this year’s research. While adding new features, we also accepted the overwhelming challenge of compiling years of work into an easily installable distribution package that worked without annoyances for users with and without “domain science” knowledge. In addition to earthquake scientists, USC students in a new multimedia literacy lab course now use our software to better understand earthquakes and make movies illustrating significant events.

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The Efficiency of Biogenic Silica Burial in Cascadia Basin Sediments

Abstract:
Diatoms consume silica in the ocean and use it to construct their shells. They are the most important member of the phytoplankton community that takes up CO₂ from the surface ocean and atmosphere. Their efficiency in removing CO₂ depends on the overall biogenic silica cycle in the ocean. I am attempting to calculate the rate at which the diatom remains (biogenic silica) are buried in Cascadia Basin sediments and the efficiency with which they are re-dissolved and returned to the overlying water column. This is a critical part of the silica cycle. The study location was selected because of the enrichment of silica in its bottom waters.

The burial rate can be calculated by obtaining oceanic mud cores, determining the porosity of the sediments by weighing them wet and dry, measuring the radioactive decay of excess lead-210 by Gamma Spectroscopy, and determining the percent biogenic silica in the sediments using an alkaline leaching technique.

The excess Pb-210 measured in the sediments is incorporated from seawater by falling particles, to which Pb-210 easily adsorbs. Ideally, sediment burial rates can be calculated from the downcore decrease of Pb-210. Due to mixing of sediments by burrowing organisms (bioturbation), the Pb-210 profile gives an upper limit for the burial rate: 0.17-0.23 cm/yr. Given this upper limit and silica dissolution rates measured by others in our group, at least 27-55% of the biogenic silica reaching the sea floor is recycled back into the water column to embark on another segment of the silica cycle.

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Wave Generation for a Surfing Environment by Bottom Moving Bumps

Abstract:
This experiment was completed as part of a larger study with an objective of reproducing consistent waves of pro-surfing quality and of variable difficulty, within the laboratory. However, unlike conventional methods of wave generation (e.g., pneumatic, paddles, hydraulics, etc.), the analysis focused upon waves generated by flow over two-dimensional objects on the bottom. In order to analyze these topographic effects within the laboratory, the bumps along the bottom were held stationary while a water channel was utilized to circulate water over the bump with varying velocities and water depth. This creates a standing swell or wave that can be easily analyzed as opposed to a traveling wave from a moving bump in stationary water which is much more problematic to observe. Specific objectives included determining the relationship between the blockage factor of the bump and the upstream Froude number (function of water velocity, water depth and gravity) of the water flow, determining the effects of bump geometry, obtaining the maximum swell or wave height from a minimized bump height, reproducing...
wave regimes from previous fluids research and identifying a wave regime which yields a swell or wave with the specified characteristics. Additionally, particular emphasis was placed upon the analysis of supercritical Froude numbers (greater than one) and whether a swell can be produced at a height greater than the bump height. The result of this analysis concluded that turbulent hydraulic jumps and swells from supercritical flow are the most realistic regimes for producing waves with surfing characteristics.

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Title: Why Do the Solar Oscillation Frequencies Change?

Abstract: Helioseismology is the study of the internal structure and dynamics of the sun through analysis of the motion of trapped acoustics waves. These standing waves, known as the solar p-mode oscillations, cover wide ranges in frequency and spherical harmonic degrees. Previous studies have shown a direct correlation between changes in the frequencies of many of these harmonic modes and the 11-year solar cycle activity. Most of these studies have utilized long time series of observation, which often cover two or more solar rotations. Such long time series average out regions of different properties on the sun.

Our study analyzes 17 short-duration (three-day) time-series of data taken by the six stations of the Global Oscillation Network Group Project (GONG). Our fitting methods use an asymmetric profile for the observational GONG power spectra in place of the symmetric profiles that were employed in past studies.

This paper presents analysis of temporal shifts in the solar p-mode frequencies. We have compared frequencies from these short-duration observations in an attempt to maximize the sensitivity of the frequency changes to changes in the underlying levels of solar activity.

Our goal is to compare the correlation between the frequencies of the oscillations and different indicators of solar activity at times of solar maximum with earlier correlations obtained at the time of the last solar minimum, in order to determine whether or not the use of the asymmetric profile supports any of the earlier results.

§§§

Name(s): Hector Pang, Lawrence Yu
Faculty Sponsor(s) and Department(s): Edward Rhodes, Physics and Astronomy
Submission Type: Group
Category: Physical Sciences & Engineering
Format: Laboratory-based Research
Political and military experts agree that the spread of nuclear weapons is one of the greatest threats to world peace. Since making public its intermittent pursuit of these destructive armaments, North Korea has gained public attention and infamy, culminating in the placement on George W. Bush’s “Axis of Evil.” The United States gives high priority to eliminating North Korean potential or capability, however in two decades of addressing this issue it has yet to formulate a concrete policy on North Korean disarmament. Presently, the debate considers whether to engage North Korea or to isolate it, placate it with incentives or chastise it with sanctions, reach out to its people or bomb its nuclear facilities. This heated discussion of the best approach to negotiating with North Korea begs a close examination of one of the few resounding successes of U.S.-North Korean relations: the 1994 Agreed Framework. This landmark document set the stage for unprecedented cooperation and mutual trust-building between these long-time rival states. One way of analyzing this series of interactions is through the Prisoner’s Dilemma model. By qualitatively translating the U.S. and North Korea’s actions as symbols of cooperation or defection, a linear narrative emerges. This “story” represents the joint process of relationship development and the growth of cooperation. A map to fruitful negotiation among these states can be gleaned from the lessons contained within this analysis, as well as prospects for the viability of Prisoner’s Dilemma in the present context.

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This study tested the influence of group identity salience on participants’ collective and implicit self-esteem as measured by the Collective Self-esteem Scale and the Implicit Association Test (IAT) respectively. Participants were 63 adolescents recruited from the San Pedro Body’s and Girl’s Club, and consisted of youth involved in a variety of social, academic, sport, and leadership groups. Participants were instructed to
concentrate on either a core group membership or a fringe group membership. Participants then completed a computer-based measure of implicit self-esteem as well as measures that served to manipulate group salience, and a manipulation check. Results showed a significant difference between the two groups on the measure of Collective Self-esteem, but found no significant difference between the groups when it came to their Implicit Self-esteem.

The corollary of implementing the suggested decision thresholds is discussed.

Title: Applying Value to Decisions in Actuarial Predictions of Violence: A Bayesian Analysis

Abstract:
The developments in the science of violence risk assessment have lead to the creation of numerous actuarial violence risk assessment tools, reaching their culmination in the Macarthur Study of Mental Disorder and Violence. One inchoate aspect is in the decision making process, determining which cases possess sufficient risk to qualify as being predicted to be violent. The decision thresholds of the Macarthur tool are based on a heuristic, admittedly for illustrative purposes. Using a Bayesian approach, the implications in terms of societal values, of utilizing such thresholds were calculated. It is revealed that de facto methodology implies false negatives are worse than false positives, something diametric to judicial sentiment and case law. Through the use of Signal Detection Theory, more efficacious decision thresholds are suggested that are both mathematically sound and in accord with societal values.

Title: Are They Crying for Justice? Children’s Testimony in Sexual Abuse Trials

Abstract:
In child sexual abuse cases, the child and the perpetrator are often the only witnesses to the crime. Thus, the child’s credibility as a witness strongly affects trial outcomes. Jurors often doubt a child’s credibility if the child does not display emotion during testimony. This study examined eighty criminal child sexual abuse trial transcripts (children aged 5-19) for 905 relevant questions and analyzed the extent to which different types of questions elicited emotional or evaluative information from child witnesses. Three different kinds of emotional or evaluative information were examined: references to emotions, references to cognitive states, and references to physical sensations. Across all three topics, “How” questions (e.g. “How did you feel?”) and “Wh” questions (e.g. “What did you think?”) reliably elicited the most overall information. Option-posing questions (e.g. yes/no questions) elicited the least information. Additionally, “How” and “Wh” questions elicited the most emotional and evaluative information; option-posing elicited the least. These results were established by examining where the reference to emotion or evaluation was made (in the question,
the answer, or both). These results were also established by identifying whether the child’s response was elaborative (going beyond the words in the attorney’s question) or non-elaborative (merely repeating words mentioned in the attorney’s question or choosing an option posed by the attorney). This study can lead to the development of better methods for questioning children in court with the ultimate goal of producing more accurate trial outcomes.

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**Title:** Assessing the Validity of the Get Ready to Read Screener in Spanish and English

**Abstract:**
This proposed study will investigate the validity of the Get Ready to Read! (GRTR) screener. Participants will be children of diverse backgrounds (racially, ethnically, or linguistically) from low income families. This research will compare the GRTR screener (in its English and Spanish forms) with measures of emergent literacy skills. The children will be given a variety of previously validated literacy assessments. Their scores will be compared to their scores on the GRTR screener administered in only English or both Spanish and English, when applicable, to determine the screener’s accuracy and reliability as a more concise assessment capable of measuring cross language transfer of cognitive skills on reading ability from Spanish to English and English to Spanish.

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**Title:** Baby Linguists: Infants attend to complex vowel patterns to understand speech

**Abstract:**
Before infants acquire language, they must determine where spoken words begin and end—but how? Unlike printed text, pauses rarely occur between words in speech. Our study investigates a property of some languages (like Turkish) that infants could use to segment speech: vowel harmony (VH). VH requires vowels within a word to match in particular articulatory dimensions. We hypothesize that points of disharmony within speech could provide infants with segmentation cues.

Previous work demonstrates English-reared infants can conjecture word boundaries using VH patterns when harmony affects all dimensions (Mintz & Walker, 2006), despite English not having VH. The present study investigates VH as a potential cue when harmony restricts a single dimension—backness—requiring all vowels within a word to be produced either in the front (/e/, /i/) or back (/u/, /o/) of the mouth.

We tested our hypothesis by familiarizing seven-month-old, English-reared infants to 90 seconds of continuous synthesized speech. The stream consisted of four two-syllable nonsense words with backness harmony (dite, pubo, bide, tupo) repeated in sequence—ditepubobidetupo—without pause between words. Using the Head-Turn Preference Procedure (Kemler Nelson et al., 1995), we measured infants’
attentiveness to two types of sequences from the familiarization stream: words (dite, tupo) and part-words across word boundaries (podi, detu).

Infants listened longer to words than part-words in the experimental condition, suggesting they segmented harmonic words from the stream and were exhibiting a familiarity preference. Results support our hypothesis that infants can use VH patterns to parse speech, regardless of ambient language.

Category: Social Sciences
Name(s): Ashley Brown
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Michael Dawson, Psychology
Format: Senior Honors Project
Title: Contingency Awareness During Emotional Learning: The Role of Working Memory

Abstract:
This study examined the relation between working memory capacity and detection of a CS-UCS contingency within emotional learning paradigm. Previous research has shown that pattern recognition was found to be related to becoming aware of the CS-UCS contingency using fear-relevant stimuli. Recognition of systematic occurrences requires an individual to hold past factors in their working memory. It was hypothesized that participants who become aware of the contingency will have larger working memory spans. Awareness was determined using a post-conditioning survey and a concurrent verbal task. Working memory span was measured using forward and backward digit span tests. The hypothesis of this study was not supported. It was determined that the digit spans capacities of aware and unaware participants are not statistically significant. These results may suggest that awareness of the CS-UCS contingency is more of an unconscious and emotional process than previously thought. Although this original hypothesis was not supported, preliminary data suggests that working memory span is related to emotional reactivity of the subject. This effect appears to be mediated by the awareness of the individual.
Title: Coping with the Threat: The U.S. and the Imposition of Regional Multilateral Security Institutions.

Abstract:
Institutionalist scholars converge on the ability of regional multilateral security institutions to foster cooperation and reduce the perception of threats. When the United States faced the Soviet threat during the Cold War, the establishment of the North Atlantic Treaty Organization (NATO) was pursued to deter the threat and increase cooperation among the North Atlantic allies. However, the Asia-Pacific, then devoid of a substantial threat to U.S. interests in the region, was overlooked. The current rise of China, regionally and globally, presents the U.S. with a post-Cold War threat to its interests in the Asia-Pacific. While the approach in the North Atlantic constituted the establishment of a formal regional multilateral security institution, the U.S. approach in the Asia-Pacific has been marked with inconsistency and ambiguity due to the government’s shifting perceptions of China and weak support for the application of the multilateral approach. Why do states shift support for the establishment of regional multilateral security institutions when faced with threats? Since coping with threats is significant to the maintenance of security and the formation of foreign policy, it is of importance to examine how powerful states manage to interpret threats and respond to them. The author of this article argues that there are essential factors that need to be present for states to establish multilateral security institutions in particular regions.

Category: Social Sciences
Name(s): Isabelle Lacson
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Andrew Manning, School of International Relations and Department of Political Science
Format: Creative Work
Title: Coping with the Threat: The U.S. and the Imposition of Regional Multilateral Security Institutions.

Cost Impact of Automated Construction on the Building Industry

Abstract:
As part of a larger project to commercialize Contour Crafting as a competitive method of construction in the building industry, the purpose of this research is to predict the impact of Contour Crafting, a fully automated method of construction through a cost analyses comparing it to conventional and prefabricated construction methods. Specifically, the cost analyses compares the average US square foot costs for the new construction of a 1600 square foot home in 2007 using Contour Crafting, conventional stick built, and prefabrication. Related to the investigation of cost impact, the project also identifies the potential social impact of automated construction on the building industry after examining the differences in labor, material, equipment SF costs and needs among the three techniques.

Category: Social Sciences
Name(s): Joanne Zhang
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Behrokh Khoshnevis, Industrial and Systems Engineering
Format: Field Research
Title: Cost Impact of Automated Construction on the Building Industry

Abstract:
As part of a larger project to commercialize Contour Crafting as a competitive method of construction in the building industry, the purpose of this research is to predict the impact of Contour Crafting, a fully automated method of construction through a cost analyses comparing it to conventional and prefabricated construction methods. Specifically, the cost analyses compares the average US square foot costs for the new construction of a 1600 square foot home in 2007 using Contour Crafting, conventional stick built, and prefabrication. Related to the investigation of cost impact, the project also identifies the potential social impact of automated construction on the building industry after examining the differences in labor, material, equipment SF costs and needs among the three techniques.
This research continued a longitudinal study on reading development in Spanish-speaking English language learners. It examined differences in how well English and Spanish decoding skills (phonological awareness and print knowledge) and oral language skills (expressive vocabulary and listening comprehension) from grades three, five and seven predict grade seven reading comprehension in 208 subjects. Based on Hoover and Gough’s (1990) adaptation of the simple view of reading, decoding skills were expected to explain most of the variance in younger children’s RC, while oral language skills were expected to explain more variation in older children’s RC. As expected, grade three English decoding skills were the strongest predictors of English RC. At grade five, English LC and EV increased in predictability, while PK decreased and PA increased. At grade seven, English LC and EV continued to increase in predictability, while PK and PA decreased. Similarly, grade three Spanish PK explained the most variance in grade seven Spanish RC. At grade five, Spanish LC and EV measures increased in predictability, as did PK and PA. At grade seven, LC and EV increased further in predictability, as did PA. PK decreased slightly but still accounted for the most unique variance in grade seven Spanish RC, contrary to expectations. These results suggest that English reading intervention in Spanish-speaking ELLs should target decoding skills at early grades and oral language skills at later grades, while Spanish reading intervention should primarily target decoding skills but give increasingly more emphasis to oral language skills.

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When the New York Times designated the 2006 Midterm election “The YouTube Election” in August, the role of the Internet in democracy rose to prominence. Another area of national prominence is the traditionally low turnout of young voters in elections. We wanted to find out whether all this new technology could solve the very old problem of low youth involvement in politics. Our research into “digital democracies” took us into three main areas: civic engagement, political consumerism, and participatory culture. Our research into civic engagement explored how the internet affected both traditional avenues of political engagement and non-traditional avenues such as community service and Jr. ROTC. When one participates in “political consumerism,” one chooses whether or not to support a company based on how the company’s policies line up with one’s viewpoints. Examples include a boycott of Nike for using sweatshop labor or a “buycott” of New Balance for using American labor. When people create their own culture and then share that with the world via YouTube or flickr, this is “participatory culture.” Another way to explain participatory culture is that in a participatory culture average citizens go
from passive consumers of culture to active producers of culture. In short, we examined both the past impacts of the internet in democracy, and the bright future for the internet to change youth involvement in democracy.

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Category: Social Sciences
Name(s): Marjorie Slater
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Penelope Trickett, Social Work
Format: Senior Honors Project
Title: Exploring Childhood Sexual Abuse: How Attitudes about Eating and Sexuality affect the Development of Eating Disorders.

Abstract:
This exploratory study will examine the relations among childhood sexual abuse (CSA), eating disorders (ED), attitudes about eating and attitudes about sexuality. This proposed study will carry out a secondary data analysis based on longitudinal data collected on 166 sexually abuse females from the greater Washington D.C., metropolitan area, who were between ages 6 and 16 initially, where approximately one-half was sexually abused by a relative and the other half was a demographically similar comparison group. The purpose is to determine if attitudes about sexuality and eating affect the development of eating disorders as defined by Body Mass Index (BMI).

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Category: Social Sciences
Name(s): Camille Boudreau
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Thomas Lyon, USC Law
Format: Senior Honors Project
Title: Finding An Effective Way to Question Children Using “Before” and “After”

Abstract:
In fields such as child witness testimony concerns are rising about the fact that the way children are asked questions can affect their answers. For instance, in sexual abuse cases where children may be the only witness to a crime, much importance is placed on their ability to communicate their knowledge in court. Many times a child's confusion about a question can be mistaken as dishonesty. This is just one of the many reasons why it is important to find an effective way to question children by using questions that are worded to match the level of a child's cognitive development. In this study preschool children were read stories and asked questions to test their ability to understand the concepts of "before" and "after." The wording of the questions was varied to test not only for their understanding of these terms but also to check for a forward order bias, and an order of mention effect. By finding out how a child's understanding is affected by the wording of questions, we can hope to find a way to question children at a level that matches their cognitive development in order to produce the most accurate responses.

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Category: Social Sciences
Name(s): Stephanie Grayson
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Jo Ann Farver, Psychology; Margaret Gatz, Psychology
Format: Senior Honors Project
Title: Going for the Goal: Evaluating the Efficacy of a Life Skills Intervention
Abstract:
This study evaluates a middle school life skills intervention called Going for the Goal (GOAL). It was designed by Steven J. Danish at the Virginia Commonwealth University in 1992. The GOAL program’s purpose is to teach fundamental life skills to high risk urban adolescents. Two 6th grade classrooms participated in the program at St. Vincent Middle School, one in 2005 and the other in 2006. Undergraduate students from the University of Southern California taught the program material to the middle school students. Data regarding the effectiveness of the program was gathered through questionnaires given to the 2005 class, the 2006 class, a subsequent follow-up with the 2006 class, one middle school teacher, and the undergraduate leaders.

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Category: Social Sciences
Name(s): Dominica Hernandez
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Stan Huey, Department of Psychology
Format: Senior Honors Project
Title: Manipulating Skin Tone: The Effects of Skin Tone on Self Esteem and Mood
Abstract:
In a recent clinical trial (Huey & Pan, 2006), Asian American students with simple phobias (e.g., fear of spiders) were found to benefit most from culturally-adapted one-session treatment (OST-CA) compared to standard one-session treatment (OST-S) or manualized self help. The present study assessed whether OST-CA was indeed more culture-responsive than OST-S, and whether greater responsiveness to culture predicted better clinical outcomes. Two coders were trained to rate each OST-S and OST-CA therapy session for culture-responsiveness (e.g., using directives/commands, extensive psychoeducation, problem normalization). Outcome data was collected at pre-treatment and post-treatment. Preliminary analyses showed that OST-CA sessions were more culture-responsive than OST-S sessions. Moreover, culture-responsiveness appeared to be associated with reductions in phobic anxiety. These preliminary results suggest that Asian Americans may benefit most from treatment that incorporates Asian cultural values.

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Category: Social Sciences
Name(s): Kimberly White
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Brian Lickel, Psychology
Format: Senior Honors Project
Title: Investigating Cultural Modifications to One-Session Treatments for phobias in Asian American Adults.
Abstract:
Colorism is discrimination based on skin tone. An experiment was conducted to explore how skin tone affects the self-image of young African-American women, using measurements of self-esteem and mood. Knowledge of the role skin tone plays among African-American women increases our understanding of colorism and also improves our ability to build positive self-regard among African-
American women. Issues of race and gender are ever-changing and must be consistently studied. Skin color stratification is a topic that must also looked at from every angle possible as its sources and effects are varied. Preliminary results show us that when African-American women are led to believe that lighter skin is favored, feelings of shame and anger increase as skin tone becomes darker. Also, when lighter skin is favored, women with fairer complexions experience feelings of guilt.

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Category: Social Sciences
Name(s): Meghann Sherman
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Gia Robinson Shurgot, Psychology
Format: Senior Honors Project
Title: Mastery and Perceived Stress in Latino Caregivers of Dementia Patients
Abstract: As advances in medicine and healthcare continue to grow, so does the average life span and, in turn, the prevalence of dementia. Consequently more family members are placed in the caregiving role. In the next fifty years elderly ethnic minority populations will rise as well. Population diversity requires understanding how different ethnic groups experience illness and the caregiving experience. This study examined the mastery and stress in Latina caregivers of dementia patients. It was hypothesized that perceived stress would be negatively associated with caregiver mastery. Latina caregivers of dementia patients (N=41) completed questionnaires on perceived stress and mastery. The results showed a moderately strong relation (Pearson r = -.614) between mastery and perceived stress, indicating that the hypothesis was supported.

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Category: Social Sciences
Name(s): Hala Mohammad
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Ellen Seiter, Cinema Critical Studies
Format: Creative Work
Title: Media portrayal & Middle Eastern women: Reconstructing Orientalism & Empire?
Abstract: In today’s technically advanced age, media holds an unprecedented status in conveying information regarding people from far-away places. People are more receptive to consider the information supporting the preconceived notions and ideas about a group that is most distant (Shaheen, 1985). This article examines representations of Middle Eastern Women in News photographs printed in the Los Angeles Times as well as New York Times, and compare them to images from 19th century colonial photographs and postcards. I argue that contemporary western media is heavily influenced by the political and social divide between East and West, and continue to misrepresent Middle Eastern women by echoing themes of colonial power dynamics.

This article will look closely at the literature of significant authors in the field of Middle Eastern Studies such as Edward Said, and Lila Abu-Lughod, to give a backdrop about how the visual representation of Middle Eastern women have been shaped and continue to be shaped by political and social tensions and intentions. The methods for this research are primarily qualitative; analyzing the images of these photographs as well as critically evaluating the captions by utilizing Stuart Hall’s research on semiotics as well as the study of semiotics for studying pictures.
This study augments a timely critical subject, that being “During this time of history when the Americans are more prone to accepting any (mis) information, the News media should give a wider and fuller perspective of history and politics with regards to Women of Middle East”.

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**Title:** Origins of Tolerance: Race and National Identity in 20th Century America

**Abstract:**
In the early 20th century, all Asians were excluded from immigrating to the United States because the country was deemed a white nation. Today, Asian immigration and multiculturalism is a pillar of the American experience and yet, historians still cannot fully explain this change. Our project examines the early development of multicultural nationalism through key intellectuals who articulated a more inclusive definition of national identity through their interactions with Asians in America and overseas. For example, David Starr Jordan was a product of a Social Darwinist society, believing that white was on top of a racial hierarchy, but he still glorified Japan as equal to any European nation. John P. Irish embraced the Asian immigrant as vital to American business in California. Finally, Carey McWilliams, whose tolerant opinions were influenced by the writer Louis Adamic, ardently fought for minority rights in California and across the nation with intellectual and passionate arguments.

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**Category:** Social Sciences

**Name(s):** Hannah Buerano, Katie Gibelyou, Victor Lee, Lauren Nakamura

**Submission Type:** Group

**Faculty Sponsor(s) and Department(s):** Lon Kurashige, History

**Format:** Field Research

**Title:** Patterns of Religious Coping and Health in Latina Dementia Caregivers

**Abstract:**
This cross-sectional study examined the relationship physical health as measured by cortisol levels and perceived physical health, and religious coping methods in a help-seeking sample of 39 Latina women caring for a family member with dementia. Participants were administered questionnaires primarily through in-person interviews conducted in their home and were also asked to provide saliva samples for two consecutive days after the initial interview to assess cortisol levels. It was hypothesized that the adoption of positive religious coping methods will be associated with both higher ratings of perceived health and higher slope values of the cortisol stress hormone in comparison to participants who primarily used negative religious coping methods. No significant results were found, which may be due to the small sample size. Furthermore, this sample was not representative, given that most participants were religious and used only positive religious coping methods. Future studies should address methodological issues to obtain a more accurate understanding of the Latina caregiving experience.

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Prosody in Second-Language Acquisition

This study looks at how second language learners acquire the stress and intonation system of their second language. As part of the cross-linguistic analysis, data from second language learners of Spanish and English were examined to determine how stress is computed in their native language, and if this in turn affects how stress is computed in their second language.

The research question asks whether English and Spanish differ with regards to prosody for certain linguistic constructions, and where evidence of this difference can be found. We investigated the hypothesis that a transfer effect from the native language would be observed with respect to prosody and focus alignment in second language speech.

The experiment compared two speaker populations: native English speakers who learned Spanish as adults, and native Spanish speakers who learned English as adults. Ten participants from each population completed three tasks as part of the experiment: Question and answer pair reading task, narration of stories, a Cloze test to determine proficiency.

Results from the experiment confirmed the hypothesis, namely second language learners transfer stress patterns from their native language for the linguistic constructions under study.

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Religiosity and Perceived Stress among College Students

Stress is a societal, economic and individual problem that has been linked to physical and mental health. Previous research has identified religious involvement as protective against psychological stress among a variety of populations including among females, Protestants, and low-income African Americans. In the current study, the goal was to analyze the association between religiosity and stress among college students in an urban university who were interested in health promotion and maintained relatively healthy lifestyles. We expected religiosity (daily spiritual experiences and religious involvement) to be negatively associated with perceived stress among college students, despite their healthy lifestyles. To assess the association, self-report surveys were distributed to a sample of 59 undergraduate students enrolled in a research methods class. The survey contained questions on respondent background, lifestyle attributes, perceived stress, daily spiritual experiences and religious involvement. After controlling for year in school and lifestyle factors (diet, sleep, exercise, tobacco, alcohol, social activity, social network, social support, time management, and utilization of quiet time), linear regression analyses revealed that daily spiritual experiences and religious involvement were predictive of perceived stress. Specifically, the more religiously active and the more spiritual experiences, the less perceived stress that

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the healthy college students reported. The results of this study will be used to provide direction for a larger study on religion as a coping mechanism for the reduction of stress among college students. Implications of the current study and future directions (e.g., intervention strategies to reduce stress among college students) are discussed.

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Category: Social Sciences
Name(s): Ashley Sands
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Lynn Swartz Dodd, Religion
Format: Laboratory-based Research
Title: Rewriting the History of Technology: unique proof of tin bronze manufacture

Abstract:
My research investigates metal artifacts at an ancient Assyrian city and provides unique evidence for how bronze was made from tin and copper.

In 800 BC, Assyria established a massive capital city, Tushhan, in the northernmost reaches of its empire. In 2001 AD, metalworking installations were discovered on the high mound at Tushhan. A small copper prill (a tiny mass of congealed copper metal) was found containing intact flecks of tin. My research used X-ray diffraction (XRD), X-ray Florescence (XRF) and scanning electron microscopy. Normally, tin melts immediately when placed in melted copper. Thus, the only way a tin fleck can survive in molten copper is if, once thrown into the liquid copper, it immediately causes a small splash (a copper droplet) that carries it out of the molten mass, giving the tin no time to melt.

Why is our ability to describe this process in detail so significant? Because, until this prill was found, no direct evidence existed demonstrating that ancient metalsmiths mixed refined tin with copper to achieve the much harder bronze alloys. Indirect evidence (such as tin ingots) made that a likely scenario. But, our analysis of this prill likely provides the first and only direct evidence of this method of bronze manufacture for the time period.

Additionally, this prill provides data for this specific case study of metal production at this ancient Assyrian northern capital city and also demonstrates that bronze was manufactured onsite.

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Category: Social Sciences
Name(s): Chloe Menon
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Norman Miller, Psychology
Format: Senior Honors Project
Title: Rumination and Displaced Aggression

Abstract:
Thirty six university students participated in a study in which they were evaluated negatively on several writing tasks and asked to judge the competency of their evaluator as a being and potential researcher. This assessment of the evaluator was done in a written form, formally and confidentially. Participants were assigned to one of two conditions: The rumination condition, and the no rumination condition. Students' assessment of their evaluator's competency was measured as an indicator of displaced aggression. Results revealed that participants who were made to ruminate over the negative evaluation of their performance tended to engage in more displaced aggression than students in the no rumination condition.
Sources of Linguistic Knowledge in Second Language English Article Acquisition

Abstract:
English learners are known to make two errors with English articles: omission and substitution. Proper use of articles by learners of English can be affected by the knowledge of their native language or innate linguistic knowledge. In this project we investigated the use of English articles by native speakers of Russian and Spanish. For languages with articles, speakers were expected to transfer their use of English articles based on their native languages. Therefore, Spanish-speakers, who use articles in Spanish, should be able to transfer this use of articles to English. Languages lacking articles do not have transfer abilities. Russian speakers are then expected to draw on their innate language knowledge since Russian has no articles. We tested adult and child Mexican Spanish and Russian learners of English to see differences between exposure to English as well as age differences. We also had 6 native English controls and obtained our data using a written elicitation task with dialogues. We found that Spanish speakers transfer the meaning of Spanish articles onto English, regardless of age and type of exposure to English (in the US vs. in Mexico); and that Russian speakers have direct access to semantic universals, again regardless of age and type of English exposure (in the US vs. in Russia). So we found evidence for universality - learners are influenced by the transfer of their native languages (when their native language has articles) or semantic universals (when it does not). Age and type of exposure don't make a difference.

The Effect of Perceived Provocateur Status and Rumination on Displaced Aggression

Abstract:
The aim of this study is to examine the relationship between provocateur status and justification of provocation and its effect on displaced aggression with rumination acting as a moderating variable. Research has already confirmed a strong link between rumination and displaced aggression as well as the status of a provocateur, justification of the provocation and resulting displays of aggression. This proposed study seeks to combine these pieces of knowledge and investigate the effects of status and justification combined with a period of rumination on ensuing displaced aggression. Participants will read a scenario involving a provocation with varying provocateur status and provocation justification. All participants will then be placed in either a rumination condition for 20 minutes before entering the trigger or no-trigger condition. In the trigger condition, participants will receive a harsh evaluation of a writing sample while in the no-trigger condition; participants will receive an average evaluation. Levels of aggression will then be measured through different dependent variables.
The relation between self-esteem and eating behavior.

Abstract:
The rate of dieting, especially among females, has drastically increased over the past few decades. Additionally, a strange phenomenon is occurring—as the rate of dieting increases, so does the rate of obesity among the same population. Many studies have found a relation between these restrictive eating behaviors (limiting types or amount of certain foods) and low self-esteem. Recently, the theory of Intuitive Eating was developed, which discourages restrictive behaviors by encouraging people to listen to the body signals of hunger and satiety. First, the study aims to research self-esteem as it relates to intuitive, disordered and restrained eaters. The study also compares self-esteem and eating behaviors among sorority, and non-sorority populations. To test this, females from a private university in Southern California were recruited to complete a questionnaire assessing their self-esteem, level of restrained eating, eating disorder history, level of intuitive eating, and involvement in Greek life. Results suggest that self-esteem correlates positively and significantly with intrinsic eating behavior, extrinsic eating behavior, anti-dieting, and self-care, and there are significant negative correlations with dieing, bulimic tendencies, disinhibition, and hunger. Analysis of variance found that the sorority group had higher self-esteem, and cognitive restraint of eating, and lower intrinsic eating. These results suggest that dieting and other restraint-type eating behaviors are inversely correlated with self-esteem, and that these behaviors are found more frequently among sorority women.

The Role of Genetics and Electroencephalogram Asymmetry in Antisocial Behavior

Abstract:
This project uses a subset of data from the Southern California Twin Project to examine the degree of heritability of electroencephalogram (EEG) power and asymmetry and the relationship between EEG and antisocial behavior. Five homologous electrode sites, representing the frontal and parietal brain regions, and two alpha power bands from 843 nine and ten year old twins were analyzed to determine the heritability for alpha power at each site for boys and girls. After computing asymmetry scores by subtracting the power of each left hemisphere site from its homologous right hemisphere site, the heritability for asymmetry was also computed. Results show a high degree of heritability for alpha1 and alpha2 in boys and girls, which is confirmed by other research, but no heritability was found for EEG asymmetry. Because asymmetry is correlated with a person’s ability for regulate his or her emotion, the relationship between asymmetry and emotionally charged antisocial behaviors, namely violence, was examined. For boys higher left than right asymmetry in the frontal sites is correlated with violent
behavior, and in girls higher right than left
asymmetry in the parietal site is correlated
with violence. In conclusion, EEG
hemispheric asymmetry is correlated with
violence, although the direction of
asymmetry is dependent on gender, and
this relationship is mostly due to
environmental factors, as genetics have
little effect on EEG asymmetry.

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Category: Social Sciences
Name(s): Martha Monroe
Submission Type: Individual
Faculty Sponsor(s) and Department(s):
Karen Hennigan, Center for Research on
Crime and Social Control
Format: Senior Honors Project
Title: The Role of Self-Stereotyping
Among Antisocial Youth
Abstract:
This research was conducted to explore
self-stereotyping among antisocial
adolescents. Previous research (Pickett,
Bonner, and Coleman, 2002) showed the
presence of self-stereotyping among
prosocial, college students although
neglected to test any antisocial groups. It
was proposed that self-stereotyping
would be exhibited in antisocial group
members the same as prosocial group
members. Thirty antisocial teenagers
ranging from fifteen to eighteen were
given a series of questionnaires to
investigate groups in their lives. The
needs for assimilation and differentiation
were manipulated and preliminary results
suggest the need for self-stereotyping
among antisocial group members.
Although the power is weak, the results
show that this is a promising area of study
and should be explored further.

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Category: Social Sciences
Name(s): Shinichi Daimyo
Submission Type: Individual
Faculty Sponsor(s) and Department(s):
Ruth Chung, Counseling Psychology,
School of Education
Format: Senior Honors Project
Title: The Secret to “Good” Parenting
Abstract:
The connection between self-esteem and
parenting style is consistent within the
present literature: authoritative-type
parenting correlates with high self-
estee, while authoritarian parenting
correlates with low self-esteem (Lau &
Cheung, 1987; Kawash, Kerr, & Clewes,
1985). However, studies conducted by
Chao (2001) and even Kawash et al.
(1985) reinforce the idea that parenting
practices and self-esteem need to be
considered under a culturally specific
lens. Moreover, Chao (2001) further
emphasized the effect of acculturation on
parenting style in the academic
achievement of Asian-Americans, which
implies that acculturation may
consequently act as an influential factor
on self-esteem. Therefore, the current
study will examine the relation between
parenting style and acculturation and self-
estee in Asian-American and European
American college students. Data from
measures of self-esteem and parenting
style in Asian-Americans and European
American college students, and measures
of acculturation administered to Asian-
American college students, will be
analyzed to examine this relationship.
Not only will this study further the
knowledge on cultural differences in
parenting style and its impact, but it will
also contribute to the gap of knowledge
between parenting style and acculturation
and their effects on self-esteem.

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Category: Social Sciences
Name(s): Melanie Billow
Submission Type: Individual
Faculty Sponsor(s) and Department(s): Thomas Lyon, Law
Format: Senior Honors Project
Title: Young Maltreated Children’s Ability to Answer and Understand Oath-Taking Compete

Abstract:
In child sexual abuse cases, the victim is often the only witness to the abuse. Before children can testify in court, however, they must be found competent. They need to understand the difference between telling a truth and a lie, their obligation to tell the truth, and the consequences of lying. To ensure that children’s cognitive abilities are accurately assessed, it is important to ask children questions that are easy for them to understand and appropriate for their level of development. This study examines transcripts of testimonies of 118 children aged 6-15 years who were questioned in felony sexual abuse trials. The transcripts were analyzed to test children’s comprehension of concepts such as meaning, morality and oath that they need to understand to qualify as competent to take the oath. The results indicate that children under the age of ten have more difficulty answering competency questions. Children had high accuracy in answering questions about the meaning of truth and lies and had near perfect scores in evaluating the ethics of lying in general. They found it more difficult, however, to admit to ever having lied and to express the consequences of their own lies. These findings suggest that children are so acutely aware of lying and its consequences that they are unwilling to admit what would happen to them if they were to tell a lie.

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