Program & Abstracts
for the 10th Annual

Pacific
Undergraduate Research & Creativity Conference

PURCC-2010

University of the Pacific
Stockton, CA 95211

April 30 - May 1, 2010

Sponsored by The Pacific Fund
Program

April 30
Senior Art & Design Show
Opening: 6 PM
Reynolds Art Gallery

Junior Art Show
Opening: 6 PM
Reynolds Art Gallery

May 1
Oral Presentations
9:00 AM – 12:00 PM
DeRosa University Center, Room 211A/B

Poster Presentations
Morning Session
10:00 – 12:00 PM
Afternoon Session
1:00 – 3:00 PM
DeRosa University Center, Ballroom B

Engineering Senior Project Demonstrations
2:00 – 3:30 PM
School of Engineering & Computer Science
## Senior Art & Design Show
Reynolds Gallery

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<td>Lauren Friedrich</td>
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<td>Glynnis Koike</td>
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<td>Christine Strain</td>
<td>A Star is Born</td>
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## Junior Studio Seminar Exhibition:
Reynolds Gallery

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<tr>
<td>9:00</td>
<td>Noah Fang</td>
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<td>9:20</td>
<td>Kevin Miguel</td>
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<td>9:40</td>
<td>Anna Accettola</td>
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<td>Nabeel Cajee</td>
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<td>Cassie Peters</td>
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<td>10:40</td>
<td>Christina Espinosa</td>
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<td>11:00</td>
<td>Lloyd D. Barba</td>
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<td>11:40</td>
<td>Anna Bernard-Hoverstad</td>
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# Poster Presentations
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<td>The (1,2)-Step Competition Graph of a Round Out-Tournament</td>
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<td>Manipulating Word Recall Using Pictures Depicting Sexual Orientation</td>
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<td>Rita Amine, Dylan Bacon, Haley Cunningham, Ryan Neitzel</td>
<td>College Students Attitudes Toward Individuals with Tattoos</td>
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<td>“I Want To Feel You On the Inside”: The Relationship Between Sexually Aggressive Music and Sexual Aggression</td>
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<td>Rebecca Kutcher</td>
<td>Attributing Negative Affect to Neutral Faces in Socially Anxious College Students</td>
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## Engineering Senior Design Project Demonstrations

### 2:00 – 3:30 PM

### Bioengineering

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<td>Kim Ortiz, Alex Elcenko, Ray Garcia, Sylvia Le</td>
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<td>Erin Ostby, Kristin Taylor, Jiovanna Vera</td>
<td>Pediatric Trainer: Giving Children a Helping Hand</td>
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### Civil Engineering

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<td>Delicia Borja (Project Leader), Emerson Baldoz, Akira Kak</td>
<td>DWR Delta Field Division Water Treatment Plant</td>
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<td>Andrew Mitchell (Project Leader), Phuo Dang, Daniel Meza, Audrey Puah</td>
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<td>Adrian Sanchez (Project Leader), Michael Franssen, Paulo Leal, Charley Scott</td>
<td>Port View Blackbeard’s Tavern</td>
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<td>Shawn Michael Kerns</td>
<td>99.999% Very Near the Speed of Light.</td>
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## Computer & Electrical Engineering

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<td>Wayne Arnold, Travis Damaso, Kimo Klask</td>
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<td>Robert Galetto, Erin Hardy, Shih-Yu Ni, Michael O'Rourke</td>
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<td>Alberto Sanchez, Nick Fujita, Kalei Lua.</td>
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## Mechanical Engineering

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<td>Robert Camfield, Miguel Hernandez, Robert LaDuca, and Michael Mugar</td>
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<td>Matthew Del Querra, Brian Domecus, Connor Halberg, Ashley Stubblefield</td>
<td>Bending Resistance Tester</td>
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<td>Aric Evins, Nicholas Gillett, Cora Van Dyk</td>
<td>Portable Drum Stage</td>
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Senior
Art & Design
Show
For the Hand

Brooke Cashion

The focus of my senior project is about the relationship between people and the objects they use to prepare and enjoy food. The individual pieces of pottery are conceived to promote a lifestyle of simple satisfaction and locality and produced to be emphasize the sense of touch among useful utilitarian forms. I believe my ceramics speaks to the user and emphasizes that it is made to appeal to their hands, to provide a larger sense of nourishment.

Functionality as a philosophy among ceramicists has matured over the past 18,000 years. Most of the functional ware that we use today is designed for industrialized, high-volume manufacturing; the result is inexpensive but stripped of handmade qualities. My philosophy of ceramics works to restore the traditional values and appreciation for handmade objects, offering an art that can be both useful and personal.

My philosophy of ceramics has also grown to consider an emerging concern in our society for sustainability and the importance of locality to the creation and consumption of goods. Locality encourages a relationship between the consumer and producer that is rarely experienced through commercial ceramics. Thinking and living locally provides a broad foundation from which to build stronger economies and relationships between the artisan and the public, between the products we create and consume. It is these larger social implications for the relationship of the potter to her community that I want people to consider when they use my ceramic wares to prepare and enjoy their food.

Faculty Mentors: Trentt Burkett, Daniel Kasser
Atonement: The Manifestation

Yolanda Cunningham

My Senior Exhibition is titled *Atonement: Manifestation*. The over-arching theme of my senior project is an extension of earlier artworks exploring the personal consequences of drug addiction. I have selected the transitive verb manifestation to guide my art making process. The *Manifestation* series expands my explorations to include atonement, following earlier work about guilt and reconciliation. Drug addiction transcends race, religion, age and social-economic status. In this respect my artwork draws upon medical research and cultural iconography to represent the phenomenon and pathways to drug addiction in our society.

In my sculptural installation titled, *State of Imprisonment*, my inquiry into drug addiction is designed to provide an intimate view inside the personal misery of drug addiction. I draw from the paraphernalia of the drug-world, the crack pipe. Here, I have rescaled the pipe to 10’ X 10’ to resemble a prison environment and an produce an analogy for the scale of drug addiction in our country. I have surrounded the large crack pipe with figurative sculptures of a malnourished pregnant woman with her uncared for babies crawling over and around her; an adult male beaten down by abuse; and a teenage boy on his hands and knees with his hands clenched, who may or may not escape the cycle of addiction.

My artwork is inspired by and builds upon the work of contemporary artists such as Kara Walker, Betye Saar, Rene Cox and Jeff Koons. These artists have reached into their lives and research to create what some may call horrific and controversial.

**Faculty Mentors:** Merrill Schleier, Trent Burkett, Steven Eakin, Jill Vasilef, Daniel Kasser
Traveler’s Spicebox, identity and packaging

Lauren Friedrich

I design to generate a concept driven message that changes and informs our outward perceptions of the world. In my work, I am influenced by all things around me — in nature and objects, from colors to shapes — but also from the variety of design styles from the past. Rather than set them as “rules,” I allow historical periods influence my designs. Such designs that inspire my appreciation of simplicity and use of dynamic space are the works from the Bauhaus. Although with minimal elements, this period is bold in form and communicates the meaning with straightforwardness. My designs have this sense of purpose.

My Spicebox packaging project shows how people connect through culture and history by the migration of spices. Coming from different regions around the world, my spices bring out the flavorful history of the specific cultures that has produced them. They bring awareness to the relation between cultures and the ways ideas are exchanged. We share our recipes, traditions, and our history with others, giving us a broader perspective of the world around us. My design keeps a natural, yet, clean look that is environmentally conscious, tapping into the natural goodness of the spices.

Faculty Mentor: Marie Hannigova
There is a certain beauty in the art of stories. How many times have we gotten lost inside a tale? How many times have we not wanted it to end? There is, without a doubt, a great power in words and it is this power and wonder that I hope to convey in my series of designs.

I have a wide range of styles that I use as a result of all my different influences. Some historical ones include Baroque design and ornamentation, Art Nouveau, the Bauhaus (in relation to their typography), Japanese prints, and a bit of Plakastil. I tend to lean towards period styles because I like the grace, the grandeur, and the elegance of what Baroque and Art Nouveau was. Yet, on the other hand, I really enjoy creating simple pieces that are also classic. In a way, I suppose I am always attempting to merge the two opposing forces together: simplicity with a burst of intricate images on the side. In addition, I also like to merge Eastern traditions with the West.

Yet, the subject matter that I have chosen has also played a large part in this particular series. It was difficult in deciding which great pieces of literature to do, but I am satisfied with the choices that I have made. There is a bit of everything from every time and every place: Kaguya from medieval Japan, Antigone hailing from classical Greece, The Secret Garden of Victorian England, 1984 of modern times, and beyond. Each design was given my full attention and research in order to reach the best solution possible. I hope that what I have produced here can be seen as something timeless, aesthetically pleasing, informative, and a proper homage to the power and beauty of the written word.

**Faculty Mentor:** Marie Hannigova
Grand Wailea Resort, magazine advertisement

Samantha J. Kowalski

I believe that good design should be driven by considerations for audience and concept. All of my works are concept driven, meaning that I strive for a thorough understanding of what I am designing and who it is for. The work that I will be showing for my senior exhibition will be works that are my own personal favorites during my time at Pacific. My works show my concern for typography, good composition, use of the grid, and my explorations in color. All the works I create center around the techniques of visual communication. I strive to make a connection with the viewer and to propose that they act on something. Ultimately, I want to create designs that are memorable and just simply beautiful.

Faculty Mentor: Marie Hannigova
Man or Machine, poster

David Mayman

I believe design has the ability to perform a function in the most efficient, beautiful, and essential way. I favor simplicity. I think there is something beautiful about the essential, the design stripped down to its core. With all the power of design, I believe I have a responsibility to ensure that my designs help people, help our world, and therefore foster a better future.

Faculty Mentor: Marie Hannigova
El Rápido Automatización, poster

Ivan J. Rocha

As a designer, I always try to design with intent and reason, so the concept and message is very important in my work. My goal is to engage my audience in a genuine and meaningful dialogue. My approach varies from one design to another and is in essence a response to the subject matter. However, the initial brainstorming phase is a step I try to keep consistent. I will often spend a greater portion of the design process researching, planning, experimenting and sketching before I do anything on the computer. This brainstorming phase is the most tedious and nerve-wrecking part of my process, but it gets to the heart of what I love about design. With every project I push myself to learn new techniques and pull from my experience ways to improve.

Faculty Mentor: Marie Hannigova
A Star is Born

Christine Strain

For my senior project I have been given the opportunity to create a public artwork for the St. Joseph Hospital Foundation’s “A Star is Born” capital campaign. The artwork is a large-scale donor recognition mural featuring the spirit of the Sacramento-San Joaquin Delta environs, the integrity of the fine arts and a unique opportunity to assist the Foundation’s practical need to attract patronage and recognize 375 patrons for its newly constructed Patient Pavilion. Each star embedded in the sky of the painting will recognize a patron’s donation and children born in the new facility.

I have drawn my inspiration and stylistic approach for this project from Japanese art depicting waterfowl and scenes visually compatible with our region. I am attracted to the timeless beauty and its heightened sense of the unique moment in Japanese art; each star as it is named will celebrate the unique birth of a child.

This project presented several personal and practical challenges to the conventions of materials and production within the fine arts. Alternative design and production methods, environmental health and safety codes were some of the necessary components guiding project development. I have integrated computer-based tools to draw and print on plywood to achieve large-scale dimensional stability: hand-applied industrial quality water-based stains to bring a hand-crafted quality and durability to this public artwork. I have collaborated with local craftsman to select materials and develop production methods that are safe and cost-effective solutions for a project of this scale and quality.

Faculty Mentors: Lucinda Kasser, Barbara Flaherty, Dan Kasser
Junior
Studio
Seminar
Exhibition
The Masculine Nude: An Exhibition

Jane Frost

Through a survey of art history, it is clear that the nude is prominent in presenting various gendered interpretations of the body. Contemporary artists now call into question the various masculinities performed through the representation of the aging and homoerotic male nude. Along with these two categories of the male nude, the employment of the female gaze produces yet another type of masculinity. As a censored and taboo subject, the male nude is emerging as a prominent subject in photography as well as in discussions of gender roles. In this exhibition, three artists' male nudes are portrayed, representing a damaged masculinity through the aged body, a male body as a sexual object, and the male body seen from the female gaze. Robert Mapplethorpe is considered a pioneer of the homoerotic male nude, especially in his titillating photographs of homosexual desire. While the male nude can function as an image of erotic desire, John Coplans' self portraits of the aging male nude suggest a completely divergent masculinity in which shame and lacking are linked. In contrast, Nan Goldin's photographs of the often post-coital male nude, depict a masculinity in which a man's own sexuality shows his vulnerability, thereby emasculating him. From these differing gender identities emerge the title, “The Masculine Nude,” an exhibition I have curated which presents the varying virilities inherent in the photography of the male nude.

Faculty Mentor: Merrill Schleier
Expressions of Isolation

J. Shiloh Gastello

This series of ten paintings convey the universal relationship between isolation and hope. Hope is eventually born from reflecting deeply during times of externally and internally influenced forms of introspection. I want to convey how isolation and hope "feels." Most works will include a single figure whose gender is not completely identified, which will allow the viewer to inquire about the nature of the person's struggles, and even insert himself or herself into the figure's place.

The use of warm colors reflect the emotional highs of isolation, when angst is at its zenith. Cool colors reflect the emotional lows, when angst has shifted, and given way to deep introspection or sadness. Texture is integral to convey the expressive nature of the angst and inner turmoil felt when one experiences isolation. The impasto layers were applied to the canvas with my hands, brush, and palette knife with quick and expressive movements to convey the exact imprint of a specific form of isolation captured at that fleeting moment of introspection.

I am influenced by the work of Edvard Munch and Francis Bacon. They both contrast warm and bright with lower value colors that display the figure's angst and despair. The figures' gestures and poses are abstracted and exaggerated to show their negative emotional states and man's seemingly temporary condition. This ultimately helps me appreciate the importance of abstracted and symbolic imagery that convey emotions visually.

Faculty Mentor: Merrill Schleier
Aging Series

LaDell Stonecipher

Like threads of intricate lace, wrinkles meander and crisscross on my cheeks, around my eyes, and across my body. Reflected wrinkles in my magnifying mirror reveal aging during life's inevitable cycles of change. Even the ocean swells with power from its' depths, breaks into waves and eventually slows to a line of foam sinking into sand.

In my paintings, a metallic mannequin stands frozen lifeless in time. Its' flawlessly smooth form is unaffected by gravity. In my paintings, idealized headless mannequins stand next to portions of my aging face, as a reminder that gravity takes its' toll over time. It pulls smiles downward and makes eyes appear sad, tired, and hidden beneath drooping eyelids, despite opposite inner feelings.

This aging series started with an acrylic painting titled, iAM, iAGE, iWRINKLE. While painting, I remembered my grandmother's sun-wrinkled face radiating love for me. As I discover my own wrinkles and struggle with a changing identity, I celebrate love and a life lived with family and friends of all ages.

My father was bedfast in a nursing home during his final years. Expressing feelings about aging through creating art helps me deal with grief and future unknowns. The last verse of an imaginative poem, "Life Doesn't Frighten Me," deals with fear, just as painting does for me.

"I've got a magic charm
That I keep up my sleeve.
I can walk the ocean floor
And never have to breathe.
Life doesn't frighten me at all
Not at all
Not at all
Life doesn't frighten me at all."

Maya Angelou

Faculty Mentor: Merrill Schleier
Oral Presentations
Oral Presentation:  9:00

Synthesis and Molecular Modeling of Oligopeptides

Noah Fang

Peptides are building blocks for enzymes that perform almost all functions in a living organism. The peptide’s shape or conformation is critical to its function. This research project is part of a larger study to evaluate how peptide conformations are influenced by having basic or acid amino acid residues on different positions within a peptide. A group of peptides with different sequences of lysine, diaminopriopionic acid, alanine, and glycine, such as Ac-Lys-Gly$_3$ and Ac-Ala$_3$-Dap, were synthesized. These peptides were synthesized using the solid phase peptide synthesis (SPPS) method. SPPS started with a solid anchor and amino acids are added one by one to build a fully sequenced peptide. The peptide's sequence is verified by Mass Spectrometry analysis. The three-dimensional structures of the peptides were examined through molecular modeling. Using a combination of Spartan and Gaussian computational programs, a large number of conformations were examined and the most stable conformers were collected and their energies were calculated. Proton affinities (PA), a measure of basic strength, were calculated from the most stable conformers. As preliminary data show, lysine-polyglycine peptide, with the basic residue at the beginning, adapts a globular shape. The polyglycine-lysine peptide adapts a more structured helical conformation with the basic residue at the end. This suggests that with a basic residue lysine at the end of the peptide is important for the helical conformation.

Faculty Mentor: Jianhua Ren

Oral Presentation:  9:20

The Impact of Social Networking on Political Participation

Kevin Miguel

In the past few years social networking websites such as MySpace or Facebook have become a growing popularity, but the social networking fad has also become an important factor in the democratic process. Social networking also plays a role in how a potential candidate campaigns and how these individuals allocate their money to ensure they reach the most possible number of voters. The current research examines to what extent social networking site use plays a critical role in the political participation process and the impact of this new media on shaping individuals’ political views. After conducting a review of social websites as well as political forums and looking at the frequency individuals used the websites and what they used the websites for, the current study, based on a survey of 300 college students, is examining how knowledgeable and how active these individuals are in the political realm, as well as how they reached their conclusion on how they vote in upcoming elections. Limitations and suggestions for future research are provided.

Faculty Mentor: Qingwen Dong
Oral Presentation: 9:40

La Delicatesse: Everything Good and Proper
The Mentality Concerning Women Murderesses in America, 1890-1920

Anna Accettola

At the turn of the nineteenth century, Americans were not sure how to deal with women committing murder. This was a phenomenon that had occurred previously, but had never been made public. With the prevalence of major newspaper reporting and the increase of yellow journalism, the delicate image of women was called into question. The traditional image of a Victorian woman was in revolution. This paper reconstructs the social perspective of “murderesses” by using primary source accounts from historical newspapers. Through three case studies from around the country, the patriarchy of the 19th century comes into clear focus through the socially acceptable image of the perfect woman and femininity, even in suspected murderers. The analysis includes the overall mentality of the populace, a section on the history of three notorious women—Lizzie Borden, Emma LeDoux, and Belle Gunness—and the reactions to their crimes. This paper demonstrates the power of patriarchal ideas during a period of considerable social change.

Faculty Mentor: Gesine Gerhard

Oral Presentation: 10:00

The Medellín Experience

Nabeel Cajee

Once home to Colombia's mightiest drug lords, Medellín, the country's second largest metropolis was considered only a few years ago one of the most dangerous places in the world – the "city of eternal violence." Since 2003, the Medellín community has experienced a civic transformation: increased per capita income, crime rates comparable to most U.S. cities, and rising school performance. Fundamentally, Medellín now offers a higher quality of life to each of its residents.

To gain a more engaging perspective of the Medellín wonder and its relevance as a model for the Stockton and San Joaquin County community, I conducted 18 interviews with various community members and officials in public safety, education, NGO’s, and business. Furthermore, I actually resided in three different parts of the city – in wealthy, middle-class, and low-income neighborhoods.

Medellín's success stems from a balance of community resource leveraging. We seek to understand the role of policing and social interventions as well as the philosophy embedded in their conceptualization.

Faculty Mentor: Gene Bigler
“Seeing” God and Taking Authority through Authorship: Female Medieval Visionaries

Cassie Peters

Hildegard of Bingen was a prominent German nun of the 12th century who wrote many works including a medical handbook, accounts of her visionary experiences, and collections of poetry. Julian of Norwich lived during the 15th century in England and was an anchoress, a woman “buried alive” within an enclosed room of her church, who also wrote an account of her visionary experiences. During the Middle Ages, women had very little influence on religious doctrine, but by choosing their words carefully, Hildegard and Julian obtained authority and made contributions to theology without disturbing the male dominated societies of their time. Through my research and close reading of their visionary texts, I have sought to understand how both women used the practice of writing literature to project their ideas into the world while living with little to no physical mobility. In my presentation I will cover a few of the rhetorical strategies each woman used to remain credible sources of visionary experiences including showing humility by representing themselves as lesser beings, and using the language of physical sight to prove their God-given authority and gain approval from the Catholic Church. I will also examine how Julian and Hildegard make similar theological points in two different regions at separate ends of the time period. Some of these shared contributions include the concept of God as feminine and love overcoming sin and evil in the world.

Faculty Mentor: Caroline T. Schroeder

Oral Presentation: 10:40

Water Policy, Management, and Development Project Implications: A Case Study in Tanzania of Behavioral Economics on the Perception of Risks Associated with the Consumption of Untreated Water

Christina Espinosa

Water is essential to human survival. In 2002, the World Health Organization found that over 1.1 billion people or 17% of the world’s population lack access to improved water sources. As new technologies have allowed for the development of water filtration and sanitation systems in developing countries, it is imperative that we study the effectiveness of these systems and how they are impacting people. This research accounts for different variables that can effect the perception of risks associated with the consumption of untreated water. More importantly this study examines the effect of risk perceptions on behavior towards untreated water consumption. The quantitative and qualitative research is composed of a case study I conducted during August through December 2009, and includes data from the Arusha, Tanzania region at seven different geographic locations in the Arusha district. The qualitative data included ethnographic interviews from the seven selected locations in the Arusha district and then was used to construct a 37 question survey which was then translated into Swahili. The sample size of the data included 300 surveys at all seven locations. Significant correlations between variables connecting different hypotheses were chained together to support the overarching theories. Preliminary results show significant correlations between variables suggesting the value of further analysis of the data using regressions. Research results may offer potential insights for designing more effective water sanitation policy, management, and development projects.

Faculty Mentor: Keith Smith
Oral Presentation: 11:00

Structure was Good: A Structuralist Approach to the First Biblical Creation Account

Lloyd D. Barba

The first biblical account of creation (Genesis 1:1-2:4a) is a highly structured work of ancient literature. Upon reading Genesis chapter 1, any reader quickly notices repeated phrases, such as: “God said,” “let there be,” “and it was so,” and “it was good.” Clearly, the phrases were not placed haphazardly, but are intended to define orderliness and a highly structured creation narrative. The school of Structuralism calls for two foundational methods of studying texts to find more meaning: syntagmatic and paradigmatic. These two approaches yield greater insight into this highly-structured narrative. Albeit, historically, these two dialectical approaches have been employed against each other, this presentation will illustrate the result of both approaches, and then will take a combinatory approach to the two.

Faculty Mentor: Alan Lenzi

Oral Presentation: 11:20


Minhchau Dinh and Benedict Leong

Drawing on a socio-legal framework, this presentation will critically explore the regulations enforced by the National Collegiate Athletic Association (NCAA) in the name of preserving the amateur model of collegiate athletics. It examines Oliver v. NCAA (2009), a case that considered whether the NCAA Bylaws could limit an attorney’s representation of a student-athlete. In Oliver, an athlete was suspended from the intercollegiate baseball team at Oklahoma State University (OSU) by the NCAA after it was reported that, while still in high school and prior to attending OSU, he met with the Minnesota Twins in the presence of his attorney. This action allegedly violated NCAA Bylaws 12.3.2.1 and 19.7. The athlete challenged the NCAA arguing that these Bylaws are void as a matter of public policy because they prevent a lawyer from competently representing a client. Specifically, the plaintiff argued that Bylaw 12.3.2.1 was arbitrary and capricious in that it had no relevance to the NCAA’s stated mission of preserving amateurism; instead, it only limited the player’s ability to effectively negotiate a contract. The NCAA responded that it had no contract with the student-athlete, and thus, no duty of “good faith and fair dealing”. However, the court determined the plaintiff was an intended third party beneficiary of the NCAA’s contract with OSU and granted the plaintiff equitable relief. This presentation will explore the legal and sociological implications of this case and, in so doing, will raise questions about the scope of the NCAA’s regulations. It highlights several concerns, including the excessive regulation of student-athletes’ rights within US intercollegiate sport and the possible exploitation of student-athletes.

Faculty Mentor: Margaret Ciccolella and Lara Killick
Oral Presentation: 11:40

Origin Stories: Forms and Expressions

Anna Bernard-Hoverstad

Folklore is a widespread and varied field. It includes everything from folk stories and fairy tales to jokes, proverbs and idioms of speech to song, dance, and art; in sum, objects produced by human groups that reflect their culture. Included in this are origin stories; that is, stories that describe the beginning of a world, a people, and event or a phenomenon. Folklore has been studied by different disciplines, all of whom had a unique view about what exactly folklore was, how it should be studied, and what it implies for humans. Folklorists have largely taken a comparative approach to the field, tending towards broad overviews of themes within folklore. Anthropologists tend towards single, in-depth case studies of how the folklore of one culture functions to reinforce or demonstrate aspects of that cultures worldview. This paper combines these approaches to answer the question of how relationships between human groups, between humans and the supernatural, and between humans and the natural world are naturalized within origin stories. Using 20 origin stories (ten from North America and ten from Oceania) collected at the UC Berkeley Folklore Archives as well as stories gathered by anthropologists and ethnologists in the 19th and early 20th centuries, this paper demonstrates how different story archetypes function to produce particular patterns of behavior and reactions for the different actors and forces in each story. It also reveals how the relationships between the human group concerned and other story actors are naturalized through the telling of these stories.

Faculty Mentor: Laura Bathurst
Poster Presentations
Morning Poster Session

Poster # 1

Mass Media and Misperceptions of the War in Iraq

Julianne Golingan

Mass media have played a critical role in shaping the views of individual. One of the critical examples is that the news coverage sets the agenda for the public perception of the war in Iraq. This current study contains a literature review about the influences of the media on the general public’s perceptions of the Iraq War. It also examines the uses of framing theory in mass media such as newspapers and television to shape the attitudes toward the Iraq war. The study connects the use of framing theory with the degree of misconceptions. The author tries to exhibit resonances of misperceptions with the initial study and a replication with college freshman through a questionnaire compounded with an experiment to determine the common misperceptions of the Iraq War and popular news media among freshmen at University of the Pacific. Some limitations and suggestions for future study are provided.

Faculty Mentor: Qingwen Dong

Poster # 2

How New Media Has Affected Bullying

Oscar Jimenez

There are people with malicious intent who have found the Internet to be an excellent means through which they can harass others. Research shows that cyber bullying has become a major concern for parents and educators. Where before, students were bullied only during school hours, now they can also be, and often are, harassed in their very homes through the Internet. Currently, there are few ways for school and government officials to stop or curtail cyber bullying. Results from a recently conducted survey on twenty high school juniors show that while these students don’t consider telling adults that they are being cyber bullied a mistake, they would rather not tell. Furthermore, results were inconclusive when the students were asked if ignoring cyber bullying is the best course of action. Oddly enough, only two students believed that the bullies from school would be the bullies in cyberspace. Perhaps this belief is based on the anonymity of the Internet; it could be anyone harassing a student, even the mother of an estranged friend. Beyond searching for methods to combat cyber bullying and stem the negative results, preventative measures should be researched. Additionally, it might be beneficial to study the occurrence of cyber bullying through other forms of media besides the Internet, like mobile phones.

Faculty Mentor: Qingwen Dong
Poster # 3

Stockton Speaks

Kathryn Crader, Jessica Semler, and Stephanie Choate

Stockton Speaks is an oral history project that showcases a collection of multi-cultural, multi-generational coming-of-age stories, from 54 individuals, in nine ethnic groups, from Stockton, California. Stockton Speaks is a collaborative effort between the City of Stockton, Jacoby Center at University of the Pacific and individuals representing a number of ethnic-based, non-profit community organizations. The project is made possible by a grant from the California Council for the Humanities as part of the Council's statewide California Stories Initiative. The Council is an independent non-profit organization and a state affiliate of the National Endowment for the Humanities.

In order to enhance the features of the site, we redesigned the web layout and built a search engine with both basic and advanced search options which allow users to navigate through all the stories on the site. Users may use the advanced search to search based on ethnicity, generation, gender and various search terms. We also created an administration page to help efficiently manage the site. From this page the administrator can add, delete and modify the two tables within the database that hold the stories and the searchable terms. They can also easily view the contents of these tables for easy reference and manageability.

Faculty Mentor: Michael Doherty

Poster # 4

Relative Deprivation and College Students: The Money / Happiness Link

Igor Reznik

Runciman (1966) provides one of the earliest and most comprehensive definitions of Relative Deprivation (RD). The basic idea is that an individual will feel relatively deprived if s/he does not have something (e.g., goods, money, respect, etc.) possessed by a reference group with whom s/he interacts. Similarly, an individual will feel Relatively Satisfied (RS) if s/he lowers relative deprivation in comparison to the reference group. Using 120 undergraduate students divided into four groups of 30, we constructed a controlled experiment that induced a sense of RD and RS within two of the groups. We then administered our happiness test, composed of a questionnaire and memorization test, to determine if RD and RS existed after controlling for external factors. Preliminary results show that at the 10% level of significance, subjects given money had higher levels of momentary happiness than those that were not. However, amongst those given money, the induced RD and RS did not significantly influence the level of happiness. Previous research as well as more details on the experimental method, results, and possible policy implications will be discussed during the Pacific Undergraduate Research & Creativity Conference.

Faculty Mentor: Michelle Amaral
Fish, Fields, or Front Yards: An Environmental Science Capstone Seminar’s Plan for Balancing Uses of the Sacramento-San Joaquin Delta

Carly A. Hiromoto, Christopher J. Brown, Kaitlen C. Colafrancesco, Win N. McLaughlin

California’s Sacramento-San Joaquin Delta is the heart of the state’s water supply system and estuarine habitat. Water from the Delta supports California’s largest industries such as agriculture and recreation while at the same time providing clean drinking water for municipalities. Human interaction has altered the diverse array of ecosystems within the Delta. Reclamation of the Delta over the past 150 years has resulted in an artificial system of levees and dams to create the current state of islands and channels. Ongoing subsidence as well as emerging threats such as climate change endangers the Delta’s stability. Historical conflicts between water quality and quantity add other layers of complexity to an already convoluted system. Future stability and vitality is still attainable at the cost of statewide efforts to improve water infrastructure, sustainable agriculture, ecosystem health, and urban conservation and planning. A small, well-designed and managed peripheral canal and improved levee design standards will provide adequate natural flows to maintain the Delta’s ecosystems while satisfying the needs of Central Valley farmers. Encouraged responsible agricultural practices and crops through subsidies will maximize water efficiency in the central valley. Reexamination of possible beneficial uses for Delta islands in key locations and enhancing habitat for native species will help to revitalize local ecosystems.

Urban improvements in water consumption and conservation through metering, pricing, and limitations on development will decrease municipal demand. If implemented collectively, these measures will alleviate pressures on the Delta while balancing the demands of farmers, ecosystems, and California residents.

Faculty Mentor: Lydia K. Fox

Poster # 6

The (1,2)-Step Competition Graph of a Round Out-Tournament

Yeoil (Steve) Yun

Originally derived from the idea of food webs of predator and prey, the relationship between digraphs and their competition graph has been a wonder in the world of mathematics since 1962. An exploration of round digraphs, competition graphs and (1,2)-step competition graphs. We show that round digraphs are out-tournaments, and find patterns between the competition graphs and (1,2)-step competition graphs of out-tournaments. Round digraphs have the property that the arcs from each vertex follow a clockwise pattern. A tournament is a digraph with the property that there is a single arc between any two vertices. An out-tournament is a digraph where the outset of each vertex is a tournament. From these unique direction graphs, we obtain the (1,2)-step competition graph; a graph that not only has edges between two competing vertices, but also between two vertices that compete through another vertex. We observe the patterns found between the different number of arcs of each vertices and the number of edges in the corresponding (1,2)-step competition graphs.

Faculty Mentors: Sarah Merz
Poster# 7

**Manipulating Word Recall Using Pictures Depicting Sexual Orientation**

Cathya Acuna, Ritz Castaneda, Erica Walker

Negative attitudes towards homosexuality have manifested causing a great deal of discrimination. LaMar and Kite (1998) found that heterosexuals viewed gay men more negatively than lesbians in the factors of tolerance, morality, contact, and stereotypes (LaMar & Kite, 1998). A limitation to past studies is the use of self-report and attitude scales. Although the scales are validated, potential participant sensitization or reactivity is at risk. The current study used a memory task in attempt to measure the subconscious attitudes towards lesbians and gay men between groups. Participants viewed a slideshow containing 24 negative (e.g., dyke), positive (e.g., love), and neutral (e.g., house) words pertaining to either lesbian or gay individuals. Participants then viewed three pictures denoting sexual orientation depending on the condition (i.e., lesbian or gay condition). After a minute of viewing the photos, participants were asked to write down any words they remembered from the slideshow. Both groups also viewed a “Heterosexual condition” where they viewed a slideshow of words and pictures representing heterosexuality. It was hypothesized that 1) participants in the gay condition would remember more negative words than participants in the lesbian condition, 2) participants who have had experience with homosexuals would remember less positive words than participants who have not, 3) participants will remember more positive words during the heterosexual condition as compared to the lesbian or gay conditions, and 4) results from an attitude scale would be different from results on the memory task.

**Faculty Mentor:** Gary Howells

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Poster # 8

**College Students Attitudes Toward Individuals with Tattoos**

Rita Amine, Dylan Bacon, Haley Cunningham, Ryan Neitzel

In America people with tattoos are associated with negative stigmas more often than those that do not have tattoos. Given that tattooing may be increasing and happening more commonly in youth than it was ten to twenty years ago, the negative stigma associated with tattoos may be diminishing. To examine perceptions of people with visible tattoos 100 undergraduate students at a private four year university, University of the Pacific, were randomly selected to view photographs of individuals with and without tattoos. The students were assigned to one of two groups, a control group assessed pictures of individuals without tattoos and the experimental group assessed pictures of individuals with tattoos. The expected conclusion was that individuals with tattoos would be perceived as more negatively than individuals without tattoos. Analysis showed that the initial hypothesis was correct; individuals with tattoos were perceived more negatively than those without. Our finding support previous research conducted on the matter.

**Faculty Mentor:** Gary Howells
Poster # 9

To Drink or Not to Drink? College Students’ Ideas of Self-Worth and Religiosity in Relation to Motivations, Frequency, and Consumption of Alcohol

Ana M. Blanco

Much effort has been put into assessing reasons for or abstinence from drinking in an attempt to discover variables that are predictive of heavy drinking behavior. Moderate, heavy, and binge drinking behavior in college directly predicts alcohol abuse and dependence later in life. The present study assessed drinking frequency and consumption among college students. Participants (n < 100) were recruited from undergraduate psychology courses offered at University of the Pacific. Participants were asked to fill out a survey consisting of the Contingencies of Self-Worth Scale (CSWS), the Daily Drinking Questionnaire (DDQ), the Drinking Motives Questionnaire, and the ‘Age Universal’ I/E scale. There were significant differences among drinking groups (i.e., abstinent/light drinkers vs. moderate/heavy drinkers) across all measures. Results and future directions are discussed.

Faculty Mentor: Scott A. Jensen

Poster # 10

“I Want To Feel You On the Inside”: The Relationship Between Sexually Aggressive Music and Sexual Aggression

Ana Blanco, Chevohn Taleb, Melissa Torres

There is a strong relationship between aggression and the frequency of exposure to graphic media and misogynous musical lyrics (e.g., Barongan & Hall, 1995; Daiches, 2004; Fischer & Greitemeyer, 2006; Richmond & Wilson, 2008). Conversely, researchers have investigated how prosocial media, including prosocial musical lyrics have modified the behavior of aggressive children and adolescents (Greitemeyer, 2008; Rickson & Watkins, 2003). Much of the research looking at music and aggression has focused on using rap as the music of interest (Barongan & Hall, 1995; Fischer & Greitemeyer, 2006) although some have looked at heavy metal and contemporary rock (Richmond & Wilson, 2008). The purpose of the current study is to expand the research looking at the relationship between music (industrial music) and aggression (sexual aggression).

Participants (n ≥ 60) were gathered from psychology courses and general education courses at a Northern California university. Participants were randomly assigned to one of two conditions, either the sexually explicit song prior to filling out the Aggressive Sexual Inventory (ASI) or listening to a neutral song by the same artist prior to filling out the ASI. We hypothesized that the group that listens to the sexually explicit song will be more likely to express sexually aggressive behavioral attitudes when compared to the group that listens to the neutral song. Statistical analyses (descriptive statistics and independent-samples t-test) looked at the differences between the two groups.

Faculty Mentor: Gary Howells
Poster # 11

Attributing Negative Affect to Neutral Faces in Socially Anxious College Students

Rebecca Kutcher

This study examined whether participants with none, mild/moderate, or severe social anxiety attribute negative affect to neutral facial expressions. The literature examined two reoccurring theories on why individuals with social anxiety disorder attribute negative affect to neutral faces, one being the “cognitive model of anxiety,” which involves “increased sensitivity to threat or avoidance and impaired processing of threat” (Garner et al., 2009). The other theory being, individuals with social anxiety disorder suffer a dysfunction of the “primary fear network” (part of the amygdala). When viewing fearful faces, the amygdala manipulates brain serotonin, which causes an inaccurate perception of fearful faces (Harmer et. al., 2003; Venn et al., 2006). The current research expanded on Csukly et al. (2008) study. In this study, participants with different disorders, such as somatization symptoms, depression symptoms, anxiety symptoms, and phobic anxiety symptoms were tested to ascertain whether they attributed negative affect to neutral faces. Csukly et al. (2008) results suggested that participants with anxiety symptoms were the second most likely to attribute negative affect to neutral faces. Expanding on previous research, the current study examined participants in groups and provided participants with an anxiety-eliciting scenario before having them rate the pictures. The results were not statistically significant.

Faculty Mentor: Carolynn Kohn

Poster # 12

Perception of Homosexual Marriage Based on Clothing Styles

Rebecca Kutcher, Mariciel Eugenio, Mai Tran

This study explored whether appearance (e.g. clothes) of homosexual couples had a positive or negative effect on societal perceptions. In general, non-traditional relationships (interracial marriages, same-sex marriages, or a younger woman having a relationship with an older man) have had negative perceptions from individuals who value traditional relationships (i.e. relationships between same ethnicity and heterosexual couples) (Lehmiller & Agnew, 2005). Lehmiller and Agnew (2005) suggested that gay and lesbian marriages have appeared to be less favorable: only 27% of participants supported same-sex marriages. The current study expanded on Horn (2005) examined high school student’s acceptance of homosexual peers, based on whether the individual was conventional or nonconventional in mannerisms, appearance, and activities. After a questionnaire was dispersed to students, Horn (2005) suggested that students who did not follow appearance norms were rated as less acceptable than peers who broke activity norms. The current study hypothesized that people walking by will more likely take a pamphlet supporting homosexual marriage when the background poster is of a sophisticated, traditional homosexual couple (i.e. a couple wearing tuxedos) as compared to a stereotypical, more flamboyant couple. To do so, this field study consisted of 200 participants, who were chosen if they were walking in front of the DeRosa University Center at the University of the Pacific. Data was collected by comparing the amount of pamphlets offered, to the amount actually taken. A one-way ANOVA was then used to interpret the results.

Faculty Mentor: Gary Howells
Poster #13

Do Ask, Do Tell! Conforming Tendencies in Attitudes Toward the Don’t Ask, Don’t Tell Policy in the College Population

Camay Bui, Brooke Engelbrecht, and Lauren Movlai

Attitude change is a very dynamic phenomenon that has been applied to various sections of psychological research (Hajjar, 2007). In three studies in particular, researchers analyzed attitude change regarding the Don’t Ask, Don’t Tell policy (Beklin, 2007; Hajjar, 2009; Moradi & Miller, 2009). In each of these studies, the researchers presented their participants with surveys measuring their attitudes on the controversial policy. This study consisted of modified versions of survey questions from the Belkin (2007) and Moradi and Miller (2009) studies, altered to be more applicable to participants of this study. Participants were recruited from psychology courses with an extra credit incentive and throughout the University of the Pacific. Every participant received a packet containing an informed consent and an attitude measuring survey. Participants assigned to the “for” and “against” conditions also received a corresponding list of information that either supports or opposes the Don’t Ask, Don’t Tell policy. The researchers hypothesized that the participants from the two treatment conditions (i.e. for and against) will demonstrate attitudes that correspond to the information presented to them. The researchers expect to find conforming tendencies in the participants’ attitudes toward the Don’t Ask, Don’t Tell policy in the treatment groups.

Faculty Mentor: Gary Howells

Poster #14

Attitudes Toward Same-Sex Marriage: The Effectiveness of Proposition 8 Commercials

Michael Quan, Lauren Bendik, Christina Hooton

Within the last two years, California has passed Proposition 8, banning same-sex marriage. Individuals in favor for the proposition have used many commercials targeting how the education for children will change while those against the proposition have argued about the equality the proposition diminishes. Recent studies in countries that have passed same-sex marriage such as South Africa (Mwaba, 2009) have assessed attitudes toward same-sex marriage. Pearl and Galupo (2007) constructed the Attitudes Toward Same Sex Marriage scale (ATSM) in order to measure and assess attitudes toward same sex marriage. This current study sought to see how commercials that either favor or oppose same-sex marriage affect attitudes toward same-sex marriage. Videos were shown that either promoted the banning of same-sex marriage or were in favor of same-sex marriage. Upon the groups viewing their respective video (or none at all), an attitudinal measure similar to Mwaba (2009) and Pearl and Galupo (2007) were used. Participants completed a concise demographics form first which included religious affiliation to see if it had any effect on the scores. A one-way ANOVA was used in order to interpret the results and a correlation was used as well in order to see if any variables were related. Limitations and implications of results are also discussed.

Faculty Mentor: Gary Howells
**Poster #15**

**Got Homophobia? Central Persuasion of Attitudes Towards Homosexuality in the Military**

Byron Miller, Katie Warnke, Angelica Gums, Maria Garcia

Don’t Ask, Don’t Tell (DADT) was put into law in 1993 that forbade openly gay service men and women from serving in the United States military. Currently, there is a movement in the United States government to repeal the law that has been met with strong opposition from military personal and soldiers alike. While there is an abundant amount of research looking into attitudes towards gay men and women in a variety of contexts, no attitudinal scale has been developed to evaluate attitudes towards DADT, except ones developed by the military for internal use (Stotzer, 2009). The goal of the current study was two fold. First, a brief attitudinal measure was created to assess attitudes towards the DADT policy, which was concurrently validated against existing measures. Second, participants were randomly placed in one of three experimental conditions. The first experimental condition exposed participants to a video that expressed negative views towards the DADT law, while the second experimental condition exposed participants to a video that expressed positive views towards the DADT law. A third condition where no video was shown was used as a control group. After being exposed experimental condition or control, participants were asked to fill out the attitudinal measure created in part one of this study as well as other previously created attitudinal measure. The second part of the study sought to investigate any increase or decrease in total score on the measure that resulted from being exposed to one of the two experimental conditions when compared to the control group. It was hypothesized that participants who viewed the video with negative attitudes towards the law would have a higher total score than those who were exposed to the positive attitude video. For the measure used, a higher score on the DADT measure indicates that the participant is more in favor of repealing the current law.

**Faculty Mentor:** Gary Howells

**Poster #16**

**Students’ Expectations for Marriage and Styles of Love**

Katie Warnke

People experience love in many different and unique ways. Stereotypically, college students are seen as engaging in loving relationships overcome with passion and intimacy. This belief adds validity to the idea that college students are not ready to marry because they are too caught up in the passion and intimacy of the relationship. This can prohibit them from properly understanding what it actually takes to maintain a happy marriage. The current study addresses the question of whether a college student’s style of loving is related to their current expectations of marriage. Ninety-nine participants were given a survey consisting of a demographic survey, the Marriage Expectation Scale (Jones, 1954), and the Love Attitudes Scale (Hendrick & Hendrick, 1986). It is expected that college students with realistic expectations for marriage will report higher levels of storge, pragma, and agape love styles, where as those with unrealistic expectations for marriage (pessimistic or idealistic) will report higher levels of eros, ludus, and mania love styles.

**Faculty Mentors:** Carolyn Kohn
Poster #17

Examining the Affects of Belief In A Just World Theory on one’s Judgments and Perceptions

Ruchi Shah, Kimberly Rector, Carina Oropeza

Undergraduate college students attending the University of the Pacific were recruited to participate in a study examining the affect of the Just World Theory on one’s perceptions and judgments. Initially, participants completed Rubin & Peplau’s (1975) Belief in a Just World Scale to estimate how just they view the world to be. Participants were then exposed to one of three mock police interviews regarding a sexual assault which were framed to blame the victim, blame the offender or blame neither (neutral condition). The vignette which was centered around blaming the victim discussed how the victim was at fault because of the clothes worn or how intoxicated the victim was. The second vignette of blaming the offender explained how the offender was the one intoxicated and was aggressive and the victim was an innocent person. The third and neutral vignette simply stated brief facts about the case. A 6 point Likert scale survey was utilized to measure their support toward either the victim or the offender. Each vignette was followed by a survey which consisted of 3 questions each. Following the established theory of Belief in a Just World, it was hypothesized that participants who reported to believe in a just world would place more blame on the victim after exposure to any of the mock interviews, even when framed to blame the offender. It was also estimated that female participants would empathize more with the victim and therefore be less likely to place blame on the female victim.

Faculty Mentor: Gary Howells

Poster # 18

College Students’ Attitudes Regarding Texting While Driving

Audrey Tam, James Jang, Daniel Ray

Using a handheld cell phone while driving has been shown to be hazardous, often leading to fatal car accidents (Bellinger, Budde, Machida, Richardson, & Berg, 2009). Correlational and statistical evidence support that using a cell phone while driving can impair one’s alertness and ability behind the wheel. There are several states that have already banned all drivers from using cell phones, imposing fines on those who continue to do so. When it comes to sending text messages while driving, teens are a particular risk group considering that the typical U.S. teenager now sends or receives an average of 2,899 text messages per month (Nielsen, 2009). The following study focused on college students’ attitudes regarding texting while driving. Participants were from the University of the Pacific and were randomly assigned to one of three conditions. The first group was shown a video of an accident caused by texting while driving. The second group was shown a neutral video that did not involve texting or driving. The third group was not shown a video. Participants were then given a questionnaire regarding their attitudes about texting and driving. It was hypothesized that participants who were in the first condition would be less accepting of texting while driving.

Faculty Mentors: Gary Howells
Poster #19

Asians really do look alike: Cross-racial identification research with Asians

Quynh Nguyen, Stephanie Kong

Many criminal convictions are based solely on eyewitness testimony. About 40% of convictions subsequently exonerated by DNA evidence relied on eyewitness testimony. Most people are better at identifying individuals of own ethnicity as opposed to other ethnicities (own-race bias). Extended contact with own-race persons permits individuals to recognize similar features and categorize the features as belonging to own-race, leading to better accuracy (Lipp et al., 2009; Bar-Haim, Saidel & Yovel, 2009). Two dozen studies have been conducted with African American, Caucasian and occasionally Hispanic observers, but no published studies have used Asians as observers. Violent Asian gangs, e.g., Vietnamese, Lao, Filipino, have become more prevalent in American cities, making this information essential to the justice system.

Participants were asked to watch five short video clips; each clip featured a perpetrator (wearing a cap) from one of the five target ethnicities. Participants viewed the tapes of thefts by Caucasian, Vietnamese, Hispanic, Filipino, or Mixed Asian perpetrators in counterbalanced order. After each clip participants described the perpetrator and were shown a photographic line-up containing the perpetrator. Response time and confidence estimates were collected.

Preliminary findings suggest an overall own-race bias with all participants more accurately identifying own-ethnicity perpetrators more accurately than other-race groups ($p < .005$). Individual comparisons suggest significance for Caucasian, Hispanic, and Filipino groups but not for Mixed Asian and Vietnamese groups. Preliminary confidence ratings ($r = .16$) were modestly correlated with accuracy. Participants took longer to make other-race selections but there were no time differences for accuracy.

Faculty Mentor: Gary Howells
Poster # 20

“Wow, I Didn’t Realize I do That?!” Using Emergent Technology to Develop Pedagogical Skills in PE Student-Teachers

Joey Gullikson

Research suggests that obesity rates and associated health problems such as diabetes are rapidly increasing in the US (World Health Organization, 2000, 2008). In addition, studies identify declining physical activity rates amongst our youth (World Health Organization, 2004). Physical education (PE) teachers are on the front lines of these health battles and can play a crucial role in developing life-long physical activity habits and healthy lifestyles in future generations of Americans. However, to do so they need to be proficient in a) the identification and implementation of effective teaching strategies b) the design of appropriate lesson plans that address the national standards in PE and c) reflexive teaching practices. This poster explores the use of emergent technology (iPod nano) to develop and improve these pedagogical skills in a sample of 26 elementary PE student-teachers. Over the course of three months I filmed 52 teaching episodes conducted by my participants. They then watched and critiqued their teaching episodes using the ipod footage to identify strengths and weaknesses in their teaching performance. My preliminary findings suggest that the use of emergent technology in this capacity has assisted student teachers in identifying and implementing effective teaching strategies, designing more appropriate lesson plans and reflexive teaching practices. In so doing, my research argues that emergent technology can contribute to the production of teachers who are able to cope with diverse PE environments and, more significantly, help address the needs of the current health climate.

Faculty Mentor: Lara Killick

Poster # 21

Engineering Art Explorations: An Undergraduate Research

Robyn Nariyoshi

The purpose of this research was to design, develop, and fabricate works of engineering art in the area of fluid motion. Three projects were completed, namely flow visualization, a mini-sand terrain device, and modified Hele-Shaw cells. For the flow visualization, experiments were conducted using household fluids including squeezing a bottle of honey into water and capturing the snaking flow as the honey fell to the bottom, timing falling water droplets to capture the resulting splash, and intermixing oil and milk to produce interesting patterns. The mini-sand terrain device is an interactive display that uses stencils to create intricate patterns in the draining sand. Experiments were conducted to determine geometrical parameters such as size and spacing of holes. The device can be disassembled easily and the stencils interchanged. For the modified Hele-Shaw cells, experiments were performed with liquids and air to determine the most aesthetically pleasing combination, which was found to be olive oil and air. Two types of Hele-Shaw cells were fabricated. The first being a cell with several dividers so when picked up and rotated the oil and air flows create interesting flow visuals. The other is a stationary cell on a stand, which allows a smooth interchange of oil and air bubbles through only one gap in a divider. The results of this research will comprise a portfolio to be submitted to Stanford University for admission to their Joint Program in Design.

Faculty Mentor: Said Shakerin
Poster # 22

Steampunk Jewelry for A Midsummer Night’s Dream

Ginger Mooney

For my Summer Undergraduate Research Fellowship, I manufactured Steampunk accessories and jewelry for Titania and Oberon in a production of A Midsummer Night’s Dream, by William Shakespeare, at the Livermore Shakespeare Festival. This project allowed me to explore a creative way to design with metal and leather, learning ways of designing and connecting materials together that are not typically combined. Cathie McClellan, the Costume Designer for the production, established a 1920s aesthetic for the human world of the play. For the world of the fairies, she chose a Steampunk aesthetic as a reflection of their magical ability to transcend time and place. Steampunk is a combination of Victorian/Art Nouveau with Industrial Age technology, inspired by the science fiction writings of Jules Verne, H.G. Wells, and other writers of the genre.

The photos on display picture the crowns and jewelry for these characters, made with found items and purchased materials. Oberon’s colors are red, gold and black. Titania’s colors are blue, white and silver. These color choices illustrate the distinct personality of each character and are complemented by the style and silhouette selections.

Oberon’s hyper-masculinity dictates the inclusion of spiky, heavy and large scale elements in his crown, necklaces and belt. Titania’s femininity aligns with flowers and moons, as seen in her main necklace with two half moons, connecting her with Artemis.

My research heightened my awareness of the connection between contemporary Steampunk and Victorian fashions. I gained a better understanding of creating costume crafts and increased my construction skills.

Faculty Mentor: Cathie McClellan
Afternoon Poster Session

Poster # 23

Inhibitory Effects of Vitamin D3 on Rad51 in MCF-7 Cells

Maeville Dela Cruz, Daniel Lu

Breast Cancer is the second most common form of cancer in women. Rad51 is a protein that participates in homologous recombination of DNA during double stranded break repair and has been shown to interact with the breast cancer proteins, BRCA1 and BRCA2. Vitamin-D3 (VD3) inhibits cell proliferation and initiates cell death, apoptosis, in some cancer cell lines. We are investigating whether VD3 inhibits Rad51 in MCF-7 line, a breast cancer cell line. MCF-7 cells were grown and harvested for western blots, and were used to spot on slides for microarray analysis. The Bradford assay was used to determine protein concentration in various cell lysates. It was found that MCF-7 lysates were positive for the Rad51 protein using both western blot and microarray techniques. Next, MCF-7 cells were treated with VD3 or an ethanol control and harvested during specific time points, generating a time course for VD3 treatment. Previous work in the Albala lab has shown that VD3 does inhibit the growth of head and neck cancer cells. We aim to demonstrate this in the MCF-7 cell line. Ongoing experiments will include comparisons of western blots with microarrays using the MCF-7 lysates after the time course of treatment with VD3. If VD3 inhibits Rad51 and DNA repair, then this may reveal a mechanism for the increased cell death in those cancer cells treated with VD3.

Faculty Mentor: Joanna Albala

Poster # 24

Examining the Effects of Vitamin D3 on the Attenuation of Rad 51 Protein on Tumor Formation in a Hamster Buccal Pouch Model

Karim Shallwani

Excessive alcohol and tobacco use have the potential to lead multiple genetic mutations that can result in abnormal cell growth in the upper aerodigestive tract leading to head and neck tumors. Vitamin D3 has been shown to suppress the growth of head and neck squamous cell carcinomas in vitro. In preliminary studies, the Albala has shown that Vitamin D3 can inhibit tumor formation in an animal model of hamster buccal pouch. In a histological study, decreased Rad51 (a DNA repair protein) was found to correlate with human malignancies in lung cancer patients. In this study, we have used a portion of the hamster buccal pouch tissue and tumors that were collected previously and prepared for immunohistochemistry by fixation in formalin to examine the expression of Rad51 in the hamster model after treatment with Vitamin D3. We have cut these fixed tissue samples using a microtome into 4 pm thick sections. The sections were then H & E stained for histological examination of tumors and buccal pouch morphology. The present study aims to extend preliminary findings by identifying the expression of the Rad5 1 in sectioned hamster tissues. We have performed immunohistochemistry using antibodies that detect RadS 1 protein on the buccal pouch tissues samples. Expression of RadS 1 has been examined on both Vitamin D3 treated and untreated hamster cheek pouch sections. Immunocytochemical analysis of the RadS 1 protein was performed using an avidin-biotinperoxidase complex. Our results attempt to correlate the affects of Vitamin D3 on Rad51 in head and neck squamous cell carcinoma.

Faculty Mentor: Joanna Albala
**Poster # 25**

**The All-Powerful Universal Secretor: Does it Really Exist?**

Seth Gomez, Namphuong T. Tran

Heterologous expression is the practice of using microorganisms to synthesize proteins they usually do not make. It has been useful in industry to make mass quantities of vital human proteins such as insulin. One microorganism, *Pichia pastoris*, is a popular strain of yeast selected by many academic and industrial laboratories for expression of these heterologous proteins. To date, over 800 proteins have been successfully expressed using *P. pastoris*’ powerful secretory machinery. Despite this fact, there are some proteins that *P. pastoris* is unable to efficiently express in significant quantities. Preceding this project, mutant super-secretor strains of *P. pastoris* were created and found to secrete substantial amounts of β-galactosidase; their disrupted genes were identified using BLAST sequence analysis, and these genes were isolated and cloned. Our current objective is to further investigate expression levels of two proteins HRP and SLPI in super-secretor mutants LL1, AH1 and AH2, compared to the expression levels observed in wild-type strains. Our experimental data suggest that the amounts of HRP and SLPI secreted by LL1, AH1 and AH2 slightly increased. The next steps of this study will include the development of knockouts to further examine the intricacy of *Pichia*’s secretory mechanisms and pinpoint the key to utilizing it to its full potential—becoming a more universal secretor.

**Faculty Mentors:** Geoff P. Lin-Cereghino, Joan Lin-Cereghino

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**Poster # 26**

**Taking the Sticky out of Spider Silk**

Craig Jeong, Lynna Nguyen

Black widow spider silk would be ideal for industrial purposes due to its high tensile strength and elasticity. Its fibers can potentially be used to manufacture different products such as bulletproof vests, sutures, and nanotechnology applications. Unfortunately, native silk proteins are difficult to acquire in substantial amounts due to the dangerous nature of black widow spiders. We are expressing the spider silk protein Pyriform Spidroin 1 (PySp1) in *Pichia pastoris*, a methylotropic yeast used for heterologous protein expression, in hopes of enabling its synthetic manufacture.

The C-terminal region of the spider silk protein was successfully expressed and secreted in large amounts by *P. pastoris*. The gene for the 40-kD protein was fused to a Myc-tag for easy detection and a His-tag for purification. Isolation of His-tagged protein was attempted under denaturing conditions with urea. Western analysis of the intracellular extracts indicated that the protein aggregated prior to secretion from the cells. Thus, due to this aggregation and the protein's large size, the purification was unsuccessful. We are currently attempting to selectively precipitate the PySp1 proteins with ammonium sulfate and heat. By developing a method to purify PySp1, we will enable scientists to manipulate the spider silk protein for synthetic mass production.

**Faculty Mentors:** Geoff P. Lin-Cereghino, Joan Lin-Cereghino
**Poster # 27**

**Fishing for Facts and Fiction**

Christopher Taing

Being an active fisherman of the Sacramento- San Joaquin Delta, I have noticed that striped bass (*Morone saxatilis*) are not as numerous or as large as they once were. I wanted to figure out whether my perception is consistent with that of other local fishermen and of those in charge of managing our fishery. Since I am currently working part-time at a local fishing tackle store, I was able to talk with the local fishermen and discuss about their thoughts on the local fishery. The main goal of my research was to determine if the California Department of Fish and Game’s (CDFG) biological resource data matched up to what the local Delta fishermen were experiencing. CDFG data were accessed on their website. Interviews were then completed at a local fishing retail store, Outdoor Sportsman, to provide some insight to the perceptions of local fishermen. The interview questions focused on fishing background, habits, and their perception of the status of the striped bass population. CDFG data show that there has been an overall decrease in the abundance of striped bass over the past ten years. Out of the 12 fishermen interviewed, 10 stated that they noticed a decrease in size and abundance of striped bass. Despite their different backgrounds and fishing habits, the majority of fishermen agreed with the data collected by CDFG.

**Faculty Mentor:** Stacy Luthy

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**Poster # 28**

**Using Hydroacoustics to Monitor Tidal Behavior and Movement of Fish**

Phillip Poirier

The Calaveras River is a Delta-area tributary to the San Joaquin River, and home to over 20 fish species, many of which are threatened or endangered including fall-run Chinook salmon (*Oncorhynchus tshawytscha*) and federally threatened steelhead (*Oncorhynchus mykiss*). Unfortunately, most studies focus on the San Joaquin or Sacramento River leaving relatively few studies involving smaller tributaries like the Calaveras which are just as significant indicators of the health and diversity of the Delta. The lower reaches of the Calaveras experience mixed semidiurnal tides; it is currently unknown how these influence fish populations. With rising interest in restoring the portion of the Calaveras that runs through the University of the Pacific, it is important to know when and what kinds of fish are present. In hopes of seeing order to detect differences in fish flux up and down stream at different tidal stages, we examined the tidal related behavior of fish using a Dual-frequency Identification Sonar (DIDSON). This high quality frequency multibeam sonar produces video quality images with enough resolution to differentiate behaviors and even possibly identify species. The sonar was deployed at varying tidal stages and water flows just west of the footbridge on the University of the Pacific campus in Stockton, CA. Each fish that was captured on screen would have its length measured, swim direction recorded, and behavior tallied. So far we have deployed during both flood and ebb cycles as well as during days of high flow. More data still needs to be collected to make definite conclusions, but preliminary results show a clear change of behavior between ebb and flood cycles. Continued study throughout the year and added seining for species verification should reveal clearer data and conclusions on behavior and species presentfish community composition and individual behaviors.

**Faculty Mentor:** Stacy Luthy
Unraveling the Mystery of Spider Silk

Huy Cao, Olivia Chu i

Spiders spin fibers that have incredible material properties. Modern spiders spin at least seven different fiber types with a diverse range of mechanical properties. Based upon spider silks high tensile strength, these threads are considered some of the strongest biomaterials in the world - even stronger than high-tensile steel. Manipulating the gene sequences that code for silk proteins assembled into the fibers would be of great commercial gain for society. In order to do so, scientists must first isolate and sequence the genes that code for products that are spun into the different fiber types. To hunt for new spider genes involved in the silk fibers or silk production pathway, we plated a spider cDNA library prepared from silk-producing glands to see if we could find novel genes involved in the silk pathway. Individual recombinant viruses carrying different spider cDNAs were picked at random and amplified. These clones were then retrieved from the recombinant viral chromosomes using single clone in vivo excision methodology. Retrieved plasmid DNA molecules were then digested with restriction enzymes to release the cDNAs prior to DNA sequence analysis. Results will be discussed after the DNA sequencing reactions are finished and their sequences analyzed by applying bioinformatic approaches.

Faculty Mentor: Craig Vierra

Spider Silk: Steel of the Future

Jyoti Contractor, Frances Pham

Spider silk has long been an avenue of research for scientists due to its many potential uses in various aspects of life. Due to its versatile and durable nature there are many prospects for the use of silk fibers in the military, the automobile industry, and even the aircraft industry. In light of this, the goal of our research was to isolate new cDNA sequences from a library to find proteins beneficial in the artificial spinning spider silk process. To do this, we first plated a cDNA library that was constructed from silk-gland tissue to obtain individual viruses carrying different spider silk genes. After plating, individual viruses were amplified and their corresponding cDNAs were retrieved by single clone excision from the recombinant viral chromosomes. Excised products, which were in the form of phagemid particles, were then transformed into bacteria. Recombinant plasmids carrying the spider cDNAs were amplified and plasmid DNA was isolated from the bacterial cells using a plasmid miniprep purification protocol. Plasmids were then subject to restriction digestion to release the cDNAs from the cloning vector. cDNA fragments were visualized using agarose gel electrophoresis to verify the presence of inserts. Clones carrying cDNAs were then subject to DNA sequence analysis. Following DNA sequencing, nucleic acid sequences will be analyzed using bioinformatics. Results of these findings and their relative importance to silk fibers or the assembly process will be discussed after the completion of this analysis.

Faculty Mentor: Craig Vierra
**Poster # 31**

**Isolation of cDNAs from *Lactrodectus hesperus***

Robert Costisevschi, Charles Kim

For the past years, experiments to obtain genes that code for proteins spun into spider silk fibers have been carefully conducted. The silk produced by *Lactrodectus hesperus*, commonly known as the black widow spider, is known for its high tensile strength and durability, and thus by manufacturing it as synthetic biological product, it would be possible to replace standard engineering materials such as steel. In our studies, we attempted to identify new silk genes that coded for proteins spun into spider silk fibers. Moreover, we also searched our library for gene products involved in the silk pathway. For our experimental work, we were given a cDNA library that was prepared from the abdominal silk-producing glands of the *L. hesperus*. To isolate different cDNA molecules from the library, we plated the library and randomly picked 25 individual plaques. Spider cDNAs were excised from the viral chromosome and the resulting recombinant plasmids were then transformed into the *Escherichia coli*. The plasmids were then isolated from the bacteria. In order to confirm that cDNAs were present within the recovered plasmids, the plasmid was digested with restriction enzymes and their products were subject to agarose gel electrophoresis. After confirmation the plasmids were subject to DNA sequencing and bioinformatics was used to study the identity of the retrieved genes.

**Faculty Mentor:** Craig Vierra

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**Poster # 32**

**When the Going Gets Tough, the Silk Keeps Going**

Christine Ho, Carolyn Tran-Math

Spider silk has extraordinary material properties. The goal of this project was to isolate novel cDNAs from the black widow spider that code for proteins that are part of silk fibers or the silk assembly pathway. These novel genes may prove instrumental in producing new kinds of silk, or provide insight into ways in which silk may be synthetically mass-produced for military applications, where strength is much needed for combat equipment. In order to search for new silk genes, we plated a cDNA library prepared from the silk-producing glands of the spider to help separate the different silk genes from one another. Twenty-five individual viruses from the library were plugged, amplified and subject to single clone *in vivo* excision using the ExAssist helper phage. After excision, the phagemid particles, which contained virally-excised plasmids carrying the cDNAs, were transformed into *E. coli*. Then, in order to achieve adequate amounts of plasmid DNA for downstream studies, colonies from the transformants were selected and grown to saturation in liquid cultures. Saturated cultures were used to isolate plasmid DNA for restriction digestion analysis, followed by inspection of the DNA fragments using agarose gel electrophoresis. Plasmids determined to contain cDNA inserts were then subject to DNA sequence analysis. The results will be discussed after the cDNAs are sequenced and examined using bioinformatics software such as BLASTn and the ExPASy protein translation tool.

**Faculty Mentor:** Craig Vierra
Poster # 33

Unwebbing the Unforeseen: Searching for new spider silk genes

Krishna Kansagra, Willie Tang

Spider silk is spun from a liquid protein solution. Silk fibers are about 1 micrometer in diameter. Despite spider silks thinness, it possesses high strength and elasticity. Due to its remarkable physical properties, spider silk has the potential to be used as an artificial material for bulletproof vests, parachute cords, surgical sutures and replacement ligaments. So far, seven distinct spider silk gene family members have been identified. In search for new silk genes, black widow spider cDNAs were isolated, amplified and sequenced. The library was initially constructed by inserting spider cDNAs into bacteriophage chromosomes to create a special cloning vector that is commonly referred to as a “pop-out” vector system. In order to retrieve individual spider cDNAs for DNA sequencing, we excised plasmids, along with their cDNAs, out of the recombinant viral chromosome using a single clone excision methodology. Following excision, cDNA-containing plasmids were transformed into XLOLR E. coli cells. Individual transformants were selected and grown overnight, followed by isolation of plasmid DNA using a standard miniprep DNA isolation procedure. In order to verify the presence of cDNA inserts, plasmids were digested with restriction enzymes to release cDNA inserts, followed by separation of the DNA fragments using agarose gel electrophoresis. Plasmids with cDNA inserts were sent for DNA sequence analysis. After completion of the DNA sequencing, we will analyze the sequences using computational biology to determine whether we have identified genes involved in the silk process.

Faculty Mentor: Craig Vierra

Poster # 34

The Secret Behind the Silk Web

Michael Lee, Constance Liu

Belonging to the diverse order Araneae, the black widow spider Latrodectus hesperus produces high-performance fibers with a broad range of biological functions and mechanical properties. The main focus of our research group was to seek out novel silk genes, at the same time determining which isolated components were involved, and to what degree, in the silk production pathway in spiders. With the practical objective of mass commercial production, spider silk genes were retrieved and analyzed using molecular biological techniques and bioinformatics, respectively. Specifically, black widow cDNAs were purified for DNA sequence analysis. Laboratory techniques performed included the plating of a cDNA library, single clone excisions, transformation, plasmid DNA purification, restriction enzyme digestions and agarose gel electrophoresis. The outcome of these techniques will be discussed following DNA sequence analyses of the retrieved cDNAs and a complete bioinformatics study. Computational algorithms such as ExPASy and BLAST will be used to help determine the identity of the retrieved cDNA sequences. The rationale for retrieving gene sequences from the spider cDNA library was to discover novel methods to advance silk manipulation for the production of artificial spider silk.

Faculty Mentor: Craig Vierra
**Poster # 35**

**Search for New Genes Involved in the Spider Silk Pathway**

Esther Pak, Thao Ho

Black widow spider silk is an excellent candidate for further scientific investigations since it possesses many desirable and beneficial traits for humans. It is not only environment friendly, but also very strong and flexible, allowing for broad applications in daily life. Silk can be used to engineer products such as light weight body armor, artificial ligaments and tendons, and airbags for the automobile industry. Over the past several years, researchers have identified seven different silk proteins that are spun into different fiber types. These silk proteins have great potential use for bioengineering applications. In order to search for genes that code for novel silk proteins, we screened a cDNA library prepared from the silk-producing glands from the black widow spider. To accomplish this task, single clone excisions were performed on over 25 different recombinant viruses. After the excision process, phagemid particles (contained the plasmid DNA molecules along with spider cDNA inserts) were transformed into bacteria.

Following transformation, plasmid DNA was retrieved and subject to restriction digestion analysis with the enzymes EcoRI and XhoI. The digested products were analyzed by agarose gel electrophoresis to confirm the presence and size of the cDNA inserts. Currently, we are in the process of examining the cDNA inserts by DNA sequencing. We plan to analyze the cDNA sequences using bioinformatics to determine their identity. This study has the possibility of leading to the identification of unknown sequences that have ties to silk production.

**Faculty Mentor:** Craig Vierra

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**Poster # 36**

**cDNA Library Screening to Identify Novel Silk Genes for Potential Use in Spider Silk Production**

Lisa Pham, Teri Chiang

The black widow spider produces silk threads that are a few micrometers in diameter but can be stronger by weight than high-tensile steel and elastic enough to stretch up to ten times their initial length. Future silk products for human applications include bulletproof vests, ropes and cords, and medical sutures. In order to identify new proteins involved in silk fibers, we screened a cDNA library prepared from silk-producing glands from the black widow spider. We hypothesized that cDNA sequences found in higher copy numbers in our library likely code for important products involved in the spider silk pathway. In order to determine this, viruses carrying black widow spider cDNAs incorporated into their viral chromosomes were excised and analyzed by DNA sequencing. Over 50 different recombinant viruses were analyzed in this study. Plasmids carrying the spider cDNAs were excised from the viral chromosome with the assistance of a helper phage, ExAssist, and their products were transformed into bacteria. Recombinant plasmids from the fifty different excised products were amplified, subject to DNA restriction analysis to verify the presence of cDNA inserts, followed by examination of their nucleic acid sequences using DNA sequence analysis. Our results will be discussed after the sequences from the different clones are fully analyzed using bioinformatic approaches.

**Faculty Mentor:** Craig Vierra
Poster # 37

Web of Spiderman — The Search for Novel Genes Involved in Spider Silk Production

Danny Tran, Adrienne Nguyen

Due to certain characteristics of spider silk, such as high elasticity and tensile strength, continued research in discovering different spider silk genes can result in many industrial uses, such as bulletproof vests and medical sutures. Ultimately, the goal is to be able to produce a spider silk-like protein for artificial fiber spinning. The goal of our research was to isolate cDNAs from the black widow and analyze the DNA sequence for novel silk genes. The initial unknown cDNAs, embedded in viral chromosomes, were isolated and amplified prior to single clone in vivo excision. The phage stock was added to XL1-Blue MRF’ cells and coinfected along with the ExAssist helper phage to obtain phagemid particles. The phagemid particles were transformed into XLOLR E. coli cells. Once the individual transformants were grown, the plasmid DNA was isolated using plasmid miniprep purification. The plasmid DNA was double digested with EcoRI and XhoI to release the cDNA from the cloning vector and gel electrophoresis was performed to confirm the presence of the cDNA insert. After the DNA sequencing reactions are completed, the DNA will be analyzed using bioinformatic approaches. The results will be discussed later.

Faculty Mentor: Craig Vierra

Poster # 38

Isolation of cDNAs from Black Widow cDNA Library

Linda Truong, Erik Lam

Spider silk is extraordinarily flexible, elastic, and lightweight, but it is also extremely strong. Because spider silk is also biodegradable and can be produced without pollution, if it could be synthetically made, some possible uses are body armor, parachutes, and ropes, but the possibilities are virtually endless. Because of its unique properties, we isolated cDNA from a Black Widow cDNA library to find novel silk genes or other components involved in silk production. By plating plasmids containing the cDNA library in a viral chromosome, we were able to separate individual viruses, each containing a distinct cDNA sequence. Using single clone in vivo excision, plasmids inside the phage were excised and then transformed into E.coli. Transformants were then selected and grown in liquid cultures. Using plasmid miniprep purification, the cDNA was isolated. Restriction double digestion with restriction enzymes EcoRI and XhoI allowed for release of the cDNA from the cloning vectors, and analysis was performed using gel electrophoresis and DNA sequencing. Results will be discussed after the DNA sequencing reactions are analyzed using bioinformatic approaches.

Faculty Mentor: Craig Vierra
Poster # 39

Identification of Novel cDNAs that Code for Spider Silk in Black Widow Spiders

Gerard Waworundeng

*Latrodectus hesperus* produces silk with high tensile strength and extensibility. This allows it to be up to five times stronger than steel, when compared on a weight-to-strength basis. There are no products on the market based on black widow spider silk because of the complications associated with its synthetic production. There is much to be learned about the natural production of black widow spider silk. The purpose of this study was to combine genetics and proteomics in order to understand more about the natural production of silk in *L. hesperus*. A cDNA library was constructed from the silk glands of black widow spiders. cDNAs were randomly selected from the library in hopes of discovering novel silk genes. Isolation of each cDNA was accomplished through single-clone excision to obtain recombinant plasmids, transformation of the vectors into *E. coli*, followed by double restriction digestion to verify the presence of cDNA inserts. Successfully isolated cDNAs were sequenced, and then translated into predicted protein sequences. These protein sequences were then searched against a database of black widow spider peptides, obtained experimentally by sequencing peptides using MS/MS analysis obtained from solubilized fibers digested with trypsin; these fibers were collected from the spider’s web, egg sac and attachment disc threads. Approximately 24 cDNAs were successfully isolated and subject to DNA sequence analysis. Further study of these cDNAs may reveal more information on their role in silk production.

**Faculty Mentor:** Craig Vierra

Poster # 40

Isolation and Analysis of Black Widow Spider cDNA Sequences

Jeongfill Yun, Bryden Regehr

Spider silk contains many qualities because of its high tensile strength to weight ratio and its elasticity that make it an advantageous for applications of civil engineering military, personal defense and medical fields. For instance spider silk could be incorporated into cables, bulletproof vests and suture material to make them more effective. The main problem is that efficient techniques for harvesting commercial quantities of this substance have yet to be discovered. Our research centered around picking pieces out of the black widow spider genome and preparing them for sequencing by performing single clone excisions, amplification in E.Coli and minipreps; in hopes that these genes can be one day incorporated into bacteria so they can be amplified into commercial quantities. Once sequenced we will compare them to known genes in other spiders and see if we have any homologues, doing this helps further our understanding of the black widow spider silk glands as any homologues found are entered into a scientific database. Our results will be discussed after the DNA sequencing reactions are analyzed and conclusions will be drawn upon using bioinformatic approaches.

**Faculty Mentor:** Craig Vierra
Poster # 41

Folding Events in Small Proteins: Gas-phase Versus Solvated Systems

Nakeeta Sawyers

The folding of large proteins can be examined in part through the simulation of smaller proteins or peptide using molecular dynamics (MD) simulations. The data generated in atomistic simulations is able to give a fine-grained picture of the dynamics of such systems, assuming that the force field used is representative of the real systems. A common problem with such simulations, however, is an inability to sample large-enough portions of the folding landscape of the protein. Replica exchange molecular dynamics (REX-MD) simulation is effective in solving this problem. Copies (replicas) of the molecule of interest are simultaneously simulated at a range of temperatures, allowing a more complete sampling of the folding landscape. We use REX-MD in order to compare folding in gas phase and solvated peptides and find that the processes are fundamentally different, both in lifetime and scope. These data provide insight in the how forces of solvation affect and drive protein folding, and provide understanding in the nature of systems of small proteins in both the gas phase and under more natural conditions.

Faculty Mentor: C. Michael McCallum

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Poster # 42

Folding Events in Small Proteins: Where, when, how often?

Eric Woo

The folding of large proteins can be examined in part through the simulation of smaller proteins or peptide using molecular dynamics (MD) simulations. The data generated in atomistic simulations is able to give a fine-grained picture of the dynamics of such systems, assuming that the force field used is representative of the real systems. A common problem with such simulations, however, is an inability to sample large-enough portions of the folding landscape of the protein. Replica exchange molecular dynamics (REX-MD) simulation is effective in solving this problem. Copies (replicas) of the molecule of interest are simultaneously simulated at a range of temperatures, allowing a more complete sampling of the folding landscape. We use REX-MD in order to investigate the folding processes of small peptides, both in detail (where the peptide folds or unfolds along its length; how the folding proceeds), and statistically (folding efficiencies and populations). These data provide insight towards understanding the overall folding processes in larger proteins.

Faculty Mentor: C. Michael McCallum
Poster # 43

The Building Blocks of Life: The Factors Affecting a Helical Structure in Proteins

Jiahui Kelly Chen

Amino acids are peptide building blocks for protein synthesis. When amino acids are joined together by peptide bonds, they form polypeptides. The folding, twisting, and coiling of polypeptides form a protein. The purpose of this research is to synthesize polypeptides using amino acids cysteine and alanine with the Rink amide resin through solid phase peptide synthesis (SPPS) to study the chemical properties of the alpha helical structure in peptides. The three peptides are Ala-Cys-Ala, Ala-Cys-(Ala)2, and Ala-Cys-(Ala)3. Each individual peptide was synthesized separately and successfully through the coupling reactions of amino acids to the Rink amide resin in a glass vessel. The peptides were then cleaved from the resin and purified. The peptides were examined by mass spectrometry to confirm its identities. Finally the peptide’s three-dimensional structure was analyzed by molecular modeling. The application of this research is to understand the nature of protein folding through the chemical properties of peptides.

This research fosters my interest in understanding how microscopic synthesis and factors involve in the synthesis can affect proteins. This project gives me the opportunity to apply the knowledge that I have learned in class in an on going research project. It will give me a better understanding of why certain interactions carry out the way it does—further emphasizing the idea of shape following functions in the human body.

Faculty Mentor: Jianhua Ren

Poster # 44

Effects of Ionic Strength on Aqueous Solutions of Xanthene Dyes

Nina Huynh, Deena Sadeli

Xanthene dyes tend to aggregate even in dilute aqueous solutions causing dimer formation, or higher order aggregates, which are strongly affected by structure, concentration, ionic strength, temperature, and the presence of other organic molecules. Rhodamine 6G was studied as a function of temperature in the range of 10 - 75°C in the absence and presence of ~2.0 M aqueous sodium chloride. The presence of electrolytes clearly induces dimer formation. The DATAN (DATa ANalysis) 3.1 software was used to determine the relative amounts of monomer and dimer present in solution, and the equilibrium constant for dimerization, in the presence of electrolytes, is $8.4 \times 10^3$. The Gibbs free energy of dimer formation is $-22.4$ kJ/mol and a van’t Hoff plot gives a standard enthalpy of dimerization of $-39.2$ kJ/mol. Then the standard entropy of dimer formation is calculated to be $-56.5$ J/(mol*K).

Faculty Mentor: Silvio Rodriguez
Poster # 45

Fluorescence Quenching of Tris(2,2’-bipyridyl)ruthenium(II) in 0.5 M Aqueous Sulfuric Acid by Copper(II) and Iron (III) at Room temperature

Deena Sadeli, Nina Huynh

The fluorescence quenching of Tris(2,2’-bipyridyl)ruthenium(II) cation by iron (III) and copper (II) has been studied at room temperature in aqueous 0.5 M sulfuric acid. Under these conditions, the Stern-Volmer constants $K_{sv}$ are determined to be 734 1/M for iron (III) and 25.8 1/M for copper (II). These are diffusion controlled processes, and the quenching rate constants and the self-exchange rate constants for the cations are analyzed in the context of Marcus theory.

Faculty Mentor: Silvio Rodriguez

Poster # 46

Analysis of Structure-Function Relationship in Taq DNA polymerase

Maricela Salcedo, Katherine Grutas, Lyly Doan, Matt Ono, Patrick Batoon, Joshua Espejo, Teresa Nguyen, Elaine Chau

*Taq* polymerase is a thermostable DNA polymerase named after the thermophilic bacterium *Thermus aquaticus*. It is widely used in polymerase chain reaction (PCR). *T. aquaticus* was isolated from hot springs and *Taq* polymerase was identified as an enzyme able to withstand the thermal cycling conditions required for rapid amplification of DNA. *Taq*’s optimum temperature for activity is 75-80°C, with a half-life of 9 minutes at 97.5°C.

In current research, we used *Taq* polymerase to study the relationship between its structure and function based on the hypothesis that primary structure (amino acid sequence) codes for it’s folded 3D structure and in turn it’s biological function. If the structure of protein is modified by substitutions of important amino acid residues, our hypothesis is that its structure and function are most likely altered.

To investigate this relationship, 25 single amino acid mutants of recombinant *Taq* polymerase gene were attempted using side directed mutagenesis. 23 of these mutants were successfully transformed into super competent cells. The wild type and all the mutant proteins were expresses and purified using ion-exchange chromatography. To observe the effect of mutation, we compare the melting behavior of the mutants with that of wild type protein. The protein denaturant guanidium hydrochloride was employed to generate denaturation profiles using circular dichroism spectroscopy to follow protein stability. 8 mutants have been analyzed so far.

Faculty Mentor: Jerry Tsai
Poster # 47  

**Carbon Sequestration Totals in a Managed Mixed Coniferous Forest vs. an Unmanaged Mixed Coniferous Forest**  

Cristina Autry  

A forest is a known source of carbon storage. Live trees are carbon sinks, as they grow absorb carbon. Dead trees are carbon sources, and through decomposition, release carbon back into the atmosphere. Questions have been raised as to whether it is more prudent to remove a small percentage of forest and risk losing valuable sources of carbon storage as opposed to not treating and run the risk of losing a forest to catastrophic wildfire. My hypothesis is that a forest that has been treated will store a higher percentage of carbon than an untreated forest. This study was conducted to determine whether the total amount of forest biomass in a treated forest holds more carbon than an untreated forest.  

The study site is the South Grove of Calaveras Big Trees State Park. In addition to containing a relatively undisturbed mixed coniferous old growth forest, it is home to approximately 900 giant sequoias, whose biomass were included in the study.  

1/10th hectare plots were established in randomly selected located within the basin; 5 were treated with a combination of mechanical thinning and fire, and 5 were left untreated. The plots were inventoried for live tree biomass, standing dead biomass, below ground biomass and lying dead/litter biomass. Protocols designed by the California Climate Action Registry were followed and formulas used for extrapolating the statistics were obtained from the California Energy Commission and other sources.  

Preliminary results show that a treated forest containing healthy trees does store more carbon than an untreated forest, which contains large amounts of dead woody fuels and growth suppressed trees. Further analysis is needed to confirm.  

**Faculty Mentors:** Laura Rademacher
Greenhouse gases, such as carbon dioxide, are accumulating in the atmosphere and contributing to the “greenhouse effect” and a changing climate. According to the Intergovernmental Panel on Climate Change (IPCC, 2007) scientific consensus indicates that increases in atmospheric carbon dioxide are primarily due to human activities. In its recent efforts to promote sustainability and environmental awareness on campus, as well as to establish a baseline for change, the University of the Pacific developed a greenhouse gas emissions inventory for the Stockton campus. The purpose of this inventory is to identify key areas in the university operations where simple, efficient, and cost-effective emissions reductions may be possible. Data for fiscal years 2006 through 2009 were available and collected during the summer and fall of 2009. Pacific’s Stockton campus emissions were calculated using data such as electricity usage, study abroad air-travel, solid waste generation, and campus commuting habits. Total greenhouse gas emissions were calculated using the Clean Air-Cool Planet Campus Calculator based on the collected institutional data and emissions coefficients from the Fourth Assessment Report released by the IPCC (2007). Results indicate that Pacific’s Stockton campus exhibits an overall decrease in greenhouse gas emissions over the past 4 fiscal years. In 2009, the campus emitted approximately 21,930 metric tons of carbon dioxide equivalents. Normalized to student population, this is equal to approximately 5 tons of carbon dioxide equivalent per student. Compared to other educational institutions of similar size and profile, Pacific’s total emissions and emissions per student are average.

**Faculty Mentor:** Laura Rademacher
Chemical Evolution and Hydrology of Northern Sierra Nevadan Mineral Springs

Kaitlen Colafrancesco

Mineral springs in the Sierra Nevada of California provide small but unique montane habitats which support rare biota. The geochemical evolution and hydrology of groundwater discharging in these springs provides insight into the stability of these rare environments in a changing climate. General geochemical, stable isotope, and chlorofluorocarbon age tracer measurements were collected from thirteen springs in the Northern Sierra Nevada. A GIS database was created to study geologic substrates and hydrology, and NETPATH was utilized to perform mass balance calculations. Five sites are located in Yosemite National Park, and eight are in the headwaters of the North Fork of the American River (NFA). All samples exhibited high levels of conductivity. All springs are bicarbonate waters, but the dominant cation varied between sites. Mineral waters of Yosemite are of sodium-potassium type. NFA waters are dominated by calcium, with an isolated two spring subset exhibiting the highest values of calcium, sodium, and chloride. Although these two springs are associated with granitic geology, a yet unidentified source of chloride influences their geochemistry. Mineral spring waters range in apparent ages from 40 to 60 years. Oxygen and hydrogen isotopes suggest a meteoric origin for all waters sampled. The Yosemite spring waters are more isotopically depleted than the Placer County waters due to a higher recharge elevation. Stable isotope values negatively correlated with geochemical age at each site, suggesting changing environmental conditions. This study provides insight on a slowly circulating hydrologic system which is responsible for producing important microhabitats.

Faculty Mentors: Laura Rademacher, Kurtis Burmeister
Poster # 50

Sustainable Living Guide for the University of the Pacific

Daryl D. Mar

As more Universities become aware of the growing issues concerning the environment, preserving it through practices of sustainability has been a priority. To aid in promoting sustainability on campus, a guide to sustainable living provides a resource for students, faculty, and staff. These guides provide information on how to conserve resources that would ordinarily be dismissed due to habitual use, in categories such as energy, water, transportation, food, and waste.

The University of the Pacific has been proactively working towards a more eco-friendly campus with achievements such as the first campus LEED certified Silver green building the DeRosa University Center and the upcoming John T. Chambers Technology Center in construction. The University has adopted a Sustainability commitment and updated its practices in landscaping, dining services, and recycling, but does provide a consolidated resource for students to improve their practices.

As a student in the Environmental Studies major, I was given the opportunity to create such a guide. The process started by gathering guides from other universities as examples, examining how they proceeded in addressing the needs of their campus. After reviewing the examples, I found the sectors that would be addressed in the guide that would be made for Pacific. Two versions of the guide, a complete internet accessible and a pocket guide to be distributed to incoming students, would provide enough information and resources to help start up a sustainable habit, allowing the Pacific community to go forward in helping the environment.

Faculty Mentor: Laura Rademacher

Poster # 51

Fishing for spider silk genes

Matthew Warnock, Ted Dodson

Spider silk is a remarkable material with respect to its tensile strength, ductility, and toughness. While remaining biodegradable, it is able to stretch to up to 140% its length and can even hold its strength down to forty degrees Celsius! We hypothesize that random selection of viruses from a cDNA library constructed in viral chromosomes will lead to the identification of new cDNA sequences that code for silk proteins. In order to test our hypothesis, we first isolated and amplified single recombinant viruses carrying different spider cDNAs. We used the method of single clone excision in vivo to excise plasmids containing the spider cDNAs from the viral chromosomes. The excised products, which were referred to as phagemid particles, were then transformed into a special strain of E. coli known as XLOLR. After selecting individual bacterial colonies carrying the plasmids and growing these cells to saturation, plasmid DNA was isolated and subject to restriction digestion. Digested products were analyzed using agarose gel electrophoresis to verify the presence of cDNA inserts. Following validation of inserts, the cDNAs will be analyzed by DNA sequencing and their corresponding sequences subject to bioinformatic analyses to determine the identity of the cDNAs and relevance to the silk pathway.

Faculty Mentor: Craig Vierra
Effects of Water-Miscible Organic Solvents on Thermal Stability of DNA Oligonucleotides

Mikael Minier, Farah Shaheen

A water-miscible organic solvent is commonly used to obtain homogenous solutions in studying the interaction between DNA and ligands that have poor water solubility. The amount of an organic solvent used is empirically kept to a minimum because the organic solvent can destabilize DNA by disrupting hydrogen bonds. However, guidance on what percentage of organic solvent is safe to use without affecting DNA stability is lacking in the literature. This study surveys the effect of five common organic solvents (methanol, ethanol, DMSO, DMF, and acetonitrile) on the thermal stability of duplex DNA oligonucleotides using UV denaturation. The thermodynamic parameters are derived from DNA melting curves. Our results reveal that the rank in order of increasing destabilization effects on DNA oligonucleotides is methanol < ethanol < DMSO < DMF < acetonitrile. Circular dichroism studies suggest the DNA conformation remains unchanged under the experimental conditions.

Faculty Mentor: Liang Xue
Senior Engineering Design Presentations
Bioengineering

The “Melting” Spoon

Jeremy Domen, Nick Merrier, and Franklin Corpuz

People with Parkinson’s disease experience difficulties eating. Occasionally, they will suddenly stop eating and are unable to start again (freezing and akinesia), until they are gently reminded to start eating again, by using some sort of signal or stimulus. Freezing cannot be predicted, so a tool is needed to help combat freezing when eating.

We have observed a patient at ARC San Joaquin who freezes up often and continually over the course of a meal and must be told every few seconds by a caretaker to continue to eat. Through our study of the patient, our proposed solution is an attachment for the handle of any standard fork or spoon that will detect a lack of motion and set off a stimulus, in this case a vibration. The vibration is to let the user know that they must start eating again. This removable attachment will contain an electric motor, accelerometer, on/off switch, micro controller and a battery. The microcontroller will monitor the output from the accelerometer and create the appropriate outputs to the electric motor.

The current model shows to be very promising. Preliminary results show that the accelerometer is able to detect a lack of motion occurring for more than two seconds. Upon this detection, the microcontroller will run the vibrator in intervals of 5 seconds. The vibration will stop once motion is detected again. This model is not aesthetically ready for the public, but work is being done to get everything into a presentable product.

Faculty Mentor: James Eason

Spreading the Glove: New Glove May Aid Injured Water Polo Players

Kim Ortiz, Alex Elcenko, Ray Garcia, Sylvia Le

The most commonly encountered acute injuries to the hand and fingers consist of lacerations, dislocations, and fractures of the phalanges and metacarpal bones. Due to the physical nature of the sport of water polo, there is a high chance that these issues may affect water polo players. We created 8 glove prototypes for the prevention of further injury, using a variety of materials. Our current and best design involves the sewing soccer glove spines onto a scuba glove made of neoprene, nylon, and polyurethane leather. This design was tested by a division I NCAA water polo goalie. It was determined that accuracy when passing and range of motion were not affected by the use of the glove. However, the transition from water to air created drag. Dry testing of finger spines was also performed, using table clamps and weights. This test suggested that the finger spines would not break or fracture beyond 45 degrees, the angle at which hyperextension is estimated to occur. Further testing may include the determination of the cyclical fatigue for the glove in terms of the number of passes a water polo goalie performs on average during a game, possibly involving the use of a motor under cycles of flexion and tension. Finally, the strengths of the threads used in the development of the glove may be performed, particularly for areas of the palm and the thumb of the glove. During our presentation, we hope to demonstrate the benefits of the glove for water polo players.

Faculty Mentor: James Eason
Pediatric Trainer: Giving Children a Helping Hand

Erin Ostby, Kristin Taylor, Jiovanna Vera

The Pediatric Trainer device is designed to be an add-on to a body-powered, voluntary-close pediatric arm prosthetic that will help children learn to use their prostheses faster. It will give auditory feedback based on the amount of force exerted by the toddler. The inspiration behind this design is Michael Haag, who was born without a fully developed left hand (unilateral congenital below-the-elbow deficiency); he started attending therapy sessions when he was just over a year old to learn how to use his body-powered voluntary-close prosthetic arm. These therapy sessions are short and sporadic throughout the year; therefore Michael does not receive constant reinforcement of how to use his new and unfamiliar prosthetic device. Although Michael Haag is the motivation behind the design of this product, it will ultimately be marketed to toddlers and young children, specifically ages 2-4 years old, who use body-powered voluntary-close arm prosthetics.

The add-on consists of a strain gauge mounted on a u-shaped aluminum mount, which is attached in-line to the cable on the terminal end of the prosthetic device. The strain gauge is connected into a circuit to produce a voltage output, which is then converted from an analogue signal to a digital signal. An FPGA (Field-Programmable Gate Array) chip is used to activate a specific sound chip according to the strain measured. The sound chip will then play a pre-recorded voice segment giving the child constant positive feedback when they use their prosthetic device; thereby aiding in the learning process of the toddler.

Faculty Mentor: James Eason
Civil Engineering

DWR Delta Field Division Water Treatment Plant

Delicia Borja (Project Leader), Emerson Baldoz, Akira Kaku

The Department of Water Resources (DWR) Delta Field Division, located in Byron, CA pumps water to southern California through the California Aqueduct. The DWR facility currently has a water treatment plant that has been in operation since the 1960s. The existing plant had met previous Environmental Protection Agency drinking water standards but due to changes in the law, the water is now considered to be unsafe for human consumption. The existing water treatment plant meets the facility’s needs for industrial water and fire protection. However, since concentrations of trihalomethane (THM) and haloacetic acids (HAA) - both carcinogenic compounds - in the drinking water are more than double the concentrations allowed by EPA standards for potable water, DWR must supply bottled water for employees onsite. We are designing a separate treatment plant to meet the drinking water needs of the Byron facility. A new raw water line connection will be made from the Banks Pumping Plant to the new treatment plant. The water will then go through a series of treatment processes to reduce contaminant levels before distribution to the existing buildings within the DWR facility through a new pipeline. The project includes design of the structure, foundation, treatment processes, and pump and pipe systems.

Faculty Mentors: Camilla Saviz, Luke Lee, Hector Estrada, Mary Kay Camarillo

Hammer Triangle Transit Facility

Andrew Mitchell (Project Leader), Phuo Dang, Daniel Meza, Audrey Puah

The Hammer Triangle Transit Facility senior design project involves design of a bus transfer facility located within the triangular plot at the intersection of Hammer Lane, N. Lower Sacramento Road, and Thornton Road in Stockton, CA. The site must safely accommodate general traffic, pedestrians, bicyclists, and public transit. Project team members are working closely with members of the San Joaquin Regional Transit District and the City of Stockton to make this facility a reality. The bus transfer facility will include lanes for the buses to stop for passenger loading while reducing the disturbance to traffic on the streets bordering the site. The facility will include spaces for eight buses to accommodate transfers and a structure that includes an indoor waiting area, commercial space, operator break room, a security facility, and public restrooms. Design components of the project include:

- A deconstruction analysis and report
- Site layout
- Grading plan
- Structure layout and design
- Foundation
- Stormwater management system

Faculty Mentors: Camilla Saviz, Luke Lee, Hector Estrada
Port View Blackbeard’s Tavern

Adrian Sanchez (Project Leader), Michael Franssen, Paulo Leal, Charley Scott

The project site is located near Interstate, I-5, along Fremont St. adjacent to the San Joaquin River levee. The parcel size is approximately 59,000 square ft. The Port View project is composed of three components: a restaurant, a park, and a parking lot. The restaurant, Blackbeard’s Tavern, will be a two storey structure with 3,840 square feet per level. The second floor includes a balcony deck facing the Port of Stockton. The park includes a bio-swale to provide filtration for the storm water runoff from the site. The design also includes an area for guests and visitors to enjoy the view of the Port of Stockton. The parking lot is designed to hold 51 cars, in compliance with City of Stockton standards, based on the expected building occupancy. The project plan is to use recycled and sustainable materials for the frame of the structure with a timber roof and use other wood to cover the steel to achieve an old fashioned pirate-themed look.

Faculty Mentors: Camilla Saviz, Luke Lee, Hector Estrada

Computer Science

99.999% Very Near the Speed of Light.

Shawn Michael Kerns

99.999% is a full featured, animated short film created to demonstrate the effects of space travel across several thousand years. Born out of a creative idea and scientific theory, the short film educates and entertains the audience. 99.999% was created in Autodesk 3DS Max and rendered out to standard, high resolution JPEG images in the 70mm IMAX, Panavision aspects. The final frames were imported into Virtual Dub (an open source video editing and interleaving program) and output as a high resolution (Audio Video Interlace) AVI file. Final editing and dubbing was done in Adobe Premiere Pro, part of the Adobe Creative Suite 4. In order to save space and make the video portable, the final AVI file was compressed again using Flash Video compressing technology to reduce the file size by as much as 300%.

99.999% is a unique film in many ways. One to note, is that the film is stop action, as each frame plays to the next. 99.999% was a project aimed to prove that one person can make an animated short film under a time and budget constraint, and that one can apply a computer science approach to make such a film. Sit back, and enjoy exploring space, at 99.999% of the speed of light!

Faculty Mentors: William Ford and Mike Doherty
Computer & Electrical Engineering

A Solar Power Sun Tracking System

Maha Al-Awadhi, Sven Cremer & Mallorie Gattie

Three undergraduates engineering students combined computer, electrical and physics engineering disciplines to form a team to design and implement their senior project. In addition to constructing a solar power system, the ultimate goal of the project was to optimize the generated power. Hence, tracking the sun’s position utilizes the solar system to its fullest potential. The team transformed this idea into a sustainable design over a period of four months! A standard photovoltaic solar panel and two light sensors will rotate along one axis using a stepper motor. The optimal position of the solar panel is determined based on the difference in voltage of the light sensors. Accordingly, the solar panel will be positioned in the direction of the light sensor that detects the highest amount of light. A balance sensor will be used to obtain the angle of the solar panel. The generated power will be stored in a rechargeable battery and a microcontroller will be used to drive the motors and to analyze the light sensors’ output.

Faculty Mentor: Jennifer Ross

Solar Panel Characterization

Wayne Arnold, Travis Damaso, Kimo Klask

The purpose of the solar panel characterization system is to find the power output of a solar panel at a given location, and characterize that location in terms of its power output. The power output is found by measuring the panel voltage and current. After the data is measured and interpreted, the data is sent wirelessly to a computer to log and record data and position of the system. The entire system will be running off the power produced by the panel. This system will help determine the amount of power that you can expect to collect at a particular site to best harness the sun’s energy with any solar panel implementation.

Faculty Mentor: Jennifer Ross
**Portable Heating And Cooling Testing System**

Robert Galetto, Erin Hardy, Shih-Yu Ni, Michael O'Rourke

As consumer electronic devices become ever smaller, heat dissipation in electrical components becomes a larger issue. Many small electronics today, such as cell phones and iPods, have no visible fans or vents to push cool air across the internal electrical components as they heat up during use. This trend requires that engineers be exposed to how circuit components will behave as they are heated beyond normal room temperature. Using small but powerful thermoelectric pads, our device will allow students to test their own electric circuits over a range of temperatures both above and below standard room temperature (4°C – 65°C). The device is powered by a standard wall outlet and a solderless breadboard is provided to use in the construction the circuit. Students can visually monitor the circuit's temperature using the display on the device or, with the help of a PC, can log changes in the circuit's temperature versus time. This portable and simple to use device will allow future engineers to have a hands on learning experience with electric circuit components at various temperatures.

**Faculty Mentor:** Jennifer Ross

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**iPhone RPS Gaming Glove**

Alberto Sanchez, Nick Fujita, Kalei Lua

Design and implement a game for the iPhone which takes input from a virtual reality glove. The virtual reality glove will accept inputs from the user via flex sensors, and will communicate with the iPhone via Bluetooth. In order to demonstrate the functionality of the Bluetooth virtual reality glove, a rock-paper-scissors game was created. The game can either be played by simply touching the screen, or with the use of the Bluetooth VR glove.

The iPhone has been one of the most successful pieces of technology during the last few years. Millions of customers have acquired this device ever since its release. A key feature of its success is the ability of users to create their own applications. The number of features that can be integrated in the iPhone seems to be endless.

For our project, we developed a new virtual glove to interface with the iPhone, and demonstrated it function by creating a Rock-Paper-Scissors (RPS) game. The iPhone version is played by two players. One player is the iPhone itself and the second player is the user. The user is able to input his/her guess (Rock, Paper, or Scissors) using a Virtual Reality Glove and wireless connection.

**Faculty Mentor:** Jennifer Ross
Mechanical Engineering

Residential Stirling Power Generation

Robert Camfield, Miguel Hernandez, Robert LaDuca, Michael Mugar

This project is designed to demonstrate the basic workings of a Stirling engine, both mechanically and thermodynamically. The motivation stemmed from the necessity to produce energy from renewable sources and the end goal of the project is a fully assembled, working Stirling engine.

Faculty Mentor: Kyle Watson

Bending Resistance Tester

Matthew Del Querra, Brian Domecus, Connor Halberg, Ashley Stubblefield

Bending is a type of loading that occurs in many physical applications and is a topic that is studied extensively in many engineering courses. The existing setup for testing materials under bending loads at the University of the Pacific could be improved in order to better reinforce this important concept. This project involves improving the capabilities of the Materials Testing System (MTS) in performing bending tests by designing, fabricating, and implementing a fixture that allows for more types of materials to be tested under different types of bending loads.

Faculty Mentors: Kyle Watson, Brian Weick

Portable Drum Stage

Aric Evins, Nicholas Gillett, Cora Van Dyk

A gigging drummer has a lot to do and set-up can easily take up to a half-hour on a simple drum set. A drum rack helps alleviate placement issues and gives the drum stands a place to “lock in.” While most professional venues have a drum riser, smaller venues typically do not. With no riser, the drummer disappears behind the band’s singer. This project involves the design and fabrication of a Portable Drum Stage that combines the features of a drum rack with a drum riser.

Faculty Mentor: Kyle Watson