

**FOURTEENTH ANNUAL
RONALD E. MCNAIR SCHOLAR
UNDERGRADUATE RESEARCH SYMPOSIUM**



FRIDAY, JUNE 7, 2013

A Message From the Director

Welcome to the Fourteenth Annual Ronald E. McNair Postbaccalaureate Achievement Program Symposium and Luncheon. I thank you for joining us in celebrating the achievements of our McNair Scholars, and I congratulate all the Scholars and Mentors for the wonderful presentations this morning.



The McNair Scholars Program has brought great distinction to Cal Poly Pomona, and the program continues to provide student Scholars with valuable research experience and encouragement that give them a distinct advantage when they undertake the demands of graduate school. The McNair Scholars Program has been a model for promoting academic success and for ensuring that underrepresented students pursue doctoral studies. Most of our Scholars hail from low-income, first-generation college backgrounds, and they have overcome economic, social, and cultural barriers on their academic journey. Few aspects of human endeavor are more stimulating than actions that nurture intellectual creativity among young individuals.

As Director of the program, I have had the privilege to interact with exceptional students, faculty, staff, and administrators. We are fortunate to have a wonderful staff and I am consistently awed and humbled by their dedication to the scholars.

I want to thank current and past McNair Scholars for continuing to demonstrate the power of moral integrity in their academic and personal lives, as they apply the virtues of enthusiasm, loyalty, cooperation, friendship, and industriousness. Since the inception of the program by Dr. Frank Torres in 1999, over twenty-five Scholars have completed their doctorates, and more than thirty-five are in Ph.D. programs across the nation.

Dr. Winny Dong,
Program Director
Professor Chemical Engineering

Program
Thursday, July 26, 2012
Kellogg West Conference Center

Research Symposium - 9:00 AM - 11:30 AM

Schedule of Oral Presentations

Mountain Vista #1 - Engineering

9:00 – 9:15	Raul Gonzalez
9:15 – 9:30	Samayyah Williams
9:30 – 9:45	Luis Valenzuela
9:45 – 10:00	Elvira Trabanino
10:00 – 10:30	Break
10:30 – 10:45	Ajay Singh
10:45 – 11:00	Miguel Rodriguez
11:00 – 11:15	Chris Ohara
11:15 – 11:30	Sevana Baghdasarian
11:30 – 11:45	Edward Guzman

Mountain Vista #2 - Mathematics, Anthropology, Economics and Science

9:00 – 9:15	Chris Mihiar
9:15 – 9:30	Vatche Kaprielian
9:30 – 9:45	Dianne Sanchez
9:45 – 10:00	Madilynn Santoyo
10:00 – 10:30	Break
10:30 – 10:45	Grace Lim
10:45 – 11:00	Melika Shayegh
11:00 – 11:15	Kristin Dettmers
11:15 – 11:30	David Kok

Campus Vista - Political Science, Psychology and Sociology, and Gender, Ethnic & Women's Studies

9:00 – 9:15	Ericka James
9:15 – 9:30	Ann Truong
9:30 – 9:45	Jessica Marquez
9:45 – 10:00	Dora Lopez
10:00 – 10:30	Break
10:30 – 10:45	Christian Murillo
10:45 – 11:00	Daryl Adkins
11:00 – 11:15	Anna Storti
11:15 – 11:30	Alejandro Zermeno

Celebration Lunch - 11:30 AM - 1:00 PM

Scholar Abstracts and Bios

MOUNTAIN VISTA #1

ENGINEERING

Raul Gonzalez

Mentor: Dr. Xin Ye

Title: *Development of a Smartphone Application for Travel Data Collection*

Abstract:

Travel data collection refers to the data collected as someone travels and generates a list of trips, destination/purpose, mode of transportation, company, departure/arrival time, and route choice. This research studies the use of cutting-edge travel data by taking advantage of the wide availability of smartphones. An Android smartphone application will be developed that will be able to detect longitudinal/latitudinal coordinates, exact time for those coordinates, and send these collected data to a server. The purpose of having a smartphone application is to diminish the burden on the user while participating in the research. This study focuses on the development of the smartphone application, setting up an appropriate server, and ensuring that the application is battery efficient and runs as a background application.

Biography:

Raul is a third year Civil Engineering major with a minor in Mathematics. Early on in his academic career, he decided to pursue a major in mathematic. This journey has been far from easy, but his passion, determination, and the McNair Scholars Program have helped him to prepare for his ultimate academic goal: a Ph.D. in Civil Engineering. Raul hopes to inspire young minds to pursue not only a higher education but to seek a degree in science or engineering. Raul's current research involves developing a smartphone application to collect travel data.

Samayyah Williams

Mentor: Dr. Monica Palomo-Martinez

Title: *Analyzing the Microbial Population in Woodchip Bioreactor*

Abstract:

Cal Poly Pomona obtains most of its water from the Spadra Basin. Unfortunately, because of the high levels of nitrate, extracted groundwater must be mixed with imported water from northern California to meet EPA drinking water standards. In an effort to reduce cost, woodchip bioreactors

have been proven to effectively remove nitrate to acceptable standards. With a sufficient source of carbon, anaerobic conditions, and excessive levels of nitrate, microbial communities can effectively remove nitrate through a respiratory process called denitrification. Denitrification is the process by which nitrate is reduced to nitrogen gas through the use of specific enzymes. The goal of this phase in the project is to explore the structure and dynamics of the microbial communities in woodchip bioreactors to optimize dissimilatory nitrate reduction (DNR) in nitrate-contaminated waters, including local carbon-poor, sulfate-rich ground waters. A second objective is to determine whether C-limitation and sulfide inhibition are significant factors in bioremediation of Cal Poly Pomona ground water. Ultimately, this researcher hopes to explore strategies to improve carbon availability in woodchip bioreactors and explore the nature of sulfate inhibition in DNR, to enhance nitrate removal.

Biography:

Samayyah is an undergraduate student at California State Polytechnic University, Pomona, where she studies Civil Engineering emphasizing Environmental Engineering. Samayyah is currently interested in studying wastewater treatment and hopes to obtain her Ph.D. in Environmental Engineering to become a professional researcher. She hopes to graduate in June 2014 and continue her studies at the University of Michigan. Samayyah is also very excited to be here.

Luis Valenzuela

Mentor: Dr. Saeed S. Monemi

Title: *Effective Smart Grid Techniques for Wind Energy Source Integration*

Abstract:

Wind is becoming an increasingly popular source of energy being demanded to grid integration. However, the current design of the electrical grid - a once succinct design in the 20th century - cannot handle large-scale integration of wind energy because of the intermittent nature of wind. Electrical energy generated by wind turbines cannot be forecasted as a steady and reliable source for electrical utilities to utilize in the grid. Otherwise, the fluctuations of energy exerted by wind into the grid would be troublesome for electrical utilities to meet market demand and current infrastructure (ramp-rate imbalance). This research will analyze solutions that can mitigate the intermittency of wind energy for effective grid integration. These solutions include a multi-agent design approach that includes battery energy storage systems and are based upon a common premise: creating an

electrical grid that is “intelligent” enough to allow significant penetration of wind energy - a Smart Grid.

Biography:

Luis is a third year Electrical Engineering major at California State Polytechnic University. His main academic interest revolves around the utilization of renewable energy sources in the electrical grid as a primary source of energy in efforts to reduce environmentally harmful fossil fuels and advance society’s energy consumption toward long-term sustainability. He will be pursuing a doctorate in Electrical Engineering in order to make contributions in the field of Smart Grid design for the electrical grid.

Elvira Trabanino

Mentors: Drs. Tanya Faltens and Winny Dong

Title: *Adsorption Kinetics for the Removal of Azo Dyes using Magnetite Nanoparticles*

Abstract:

Rapid industrialization and urbanization over the past decade has resulted in the discharge of large amounts of waste into the environment, including dyes that are used to color products. Azo dyes, in particular, are of concern since they are toxic in nature with suspected carcinogenic and mutagenic effects on aquatic biota and human beings. Of the methods used for removal of dyes from wastewater, adsorption is the best in terms of effectiveness, cost, and system and design implementation. Magnetic NanoParticles (MNPs) are adsorbents that are more cost effective and easier to synthesize than other adsorbents studied, including activated carbon. The current research investigates the adsorption kinetics of allura red, an azo dye, by Magnetite (Fe₃O₄) MNPs. Initial results show that the concentration of dye decreases as the amount of magnetite MNPs and contact time was increased for a 10ppm allura red dye solution with 30, 50 and 150 mg of MNPs over one hour. For the lower two concentrations of MNPs, the data followed a pseudo-first order kinetic model, and for the larger concentration the data follow a pseudo-second order kinetic model. This researcher continues to study the adsorption kinetics over a wider range of dye and MNP concentrations.

Biography:

Elvira is a senior at California State Polytechnic University, Pomona. She is pursuing a double major undergraduate degree in Chemical Engineering and Environmental Biology with a focus in Microbiology

and Biotechnology. She is interested in environmental remediation, more specifically, bioremediation and nanoremediation. She is interested in developing novel ways to help clean the environment. To accomplish her goals, she will pursue a graduate degree in either applied microbiology or environmental engineering.

Ajay Singh

Mentor: Dr. Vilupanur A. Ravi

Title: *Revitalization of a Thermogravimetric Analyzer*

Abstract:

Thermogravimetric analysis is commonly used to determine the oxidation characteristics of metals and their alloys. A thermo gravimetric analyzer (TGA) is utilized to perform this analysis. A team of mechanical, electrical and chemical engineers was assembled to study the growth kinetics of a unique ceramic composite utilizing the TGA as a key experimental tool. This composite is typically grown from a molten alloy using a process called DIMOX™ directed metal oxidation. A CAHN 1000 TGA was revitalized in this study. This TGA consists of a high-precision microbalance with a hang-down assembly that suspends a tungsten wire attached to a mini crucible, with the latter functioning as a sample holder. However, the instrument was not in working condition and needed to be revitalized to enable its use in this project. Towards this goal, some of the team members focused on understanding and implementing the analog and digital aspects of the device while others paid attention to the materials aspects, e.g., composite growth. The output voltage from the microbalance was amplified utilizing an instrumentation amplifier, and the noise in the output dc signal was reduced using a second order low pass filter (LPF). The conditioned signal was then passed through a 16-bit analog to digital converter (NI myDAQ) and the resulting digital output was acquired and processed using LabVIEW 2011. The next step in this process is to acquire test data that can then be displayed as mass change versus temperature and/or time plots.

Biography:

Ajay is senior pursuing his degree in Electrical Engineering at Cal Poly Pomona. His research interest is in the field of renewable energy and power systems. He is currently involved in research with an interdisciplinary team researching the characteristics of novel ceramic composites. He will be graduating in 2014 and plans to attend graduate school in the following fall.

Miguel Rodriguez

Mentor: Dr. John Arlo Caine

Title: *Fluid Flow: Understanding the Navier-Stokes Equations*

Abstract:

The purpose of this project is to provide a profound understanding of the Navier-Stokes Equations. These equations are believed to govern the behavior of fluids as a continuum. Tools of vector and tensor calculus will be explored to reveal how a description of fluid flow is accomplished. The physical significance of these mathematical constructions is verified through the use of example fluid flows. In addition, the difficulty in proving existence and uniqueness of solutions to the Navier-Stokes Equations is investigated.

Biography:

Miguel is an undergraduate student at California State Polytechnic University, Pomona where he studies Mechanical Engineering and Applied Mathematics. He is interested in Fluid Mechanics and its application to the study of blood flow and understanding cardiovascular diseases. He plans to attain his Ph.D. in Engineering or Mathematics to further understand fluid mechanics. He will be applying to graduate schools in the Fall of 2013.

Christopher Obara

Mentor: Professor Thomas Thoen

Title: *Autonomously Controlled Robot*

Abstract:

Every year, thousands of unnecessary traffic accidents cause over 40,000 deaths and damage worth billions of dollars. The purpose of this study is to examine the different aspects of robotics and engineering, including mechanical, electrical, electronics and computer programming, and construct a fully autonomous robot that will complete a pre-set course using specific coordinates via GPS, light/imaging sensors, proximity sensors and accelerometers. The goal of this research is to implement autonomous robotics into human routines to provide means of safety, efficiency and convenience. The methods used include mathematical calculations, trial and error procedures and previous research data. This researcher hypothesizes that it is possible to design a robot that can navigate the designated course using technology that is available to the general public. This research can be extended to a large array of future beneficial projects, making time-consuming and arduous tasks completely automated, allowing people to better spend their time and resources in a more desired fashion.

The outcomes of pursuing this research and lifestyle are exceedingly beneficial to the environment and the economy.

Biography:

Christopher is a fifth year student double majoring in Electronics and Computer Engineering (ECET) and Science, Technology and Society (STS). His current research combines engineering and robotics to improve the living standards of humanity. He will pursue a Ph.D. in robotics or nanoscience.

Sevana Baghdasarian

Mentor: Dr. Sabyasachi Sen

Title: *Applications of Virial-based Mixing Rules (VBMR) for Description of Thermophysical Properties of Multi-component Mixtures*

Abstract:

The effect of composition is usually the basis of any chemical process, and even the human body is considered a chemical plant. A precise tracking of such effect of composition is of great importance in both correlating and predicting the thermophysical properties, especially those of multi-component systems. There is a huge and ongoing demand for obtaining the corresponding values of such properties of chemical blends with respect to their composition. On the other hand, the current models to describe multi-component systems really only look at binary subsystems, and seriously lack the ability to model multi-component mixtures. As a result, recent publications and measurements on multi-component systems lack the ability of having a single systematic model for correlative and predictive purposes. It should be noted that the need for such model is even more essential in process design where multi-component systems are involved and the existence of such model is highly lacking in the field of chemical engineering. Therefore, it is very important that the composition effect is encountered in any calculation with respect to the mixture properties being examined and the main goal of this research project is to fulfill the current gap.

This research seeks to investigate the effect of composition dependency of thermophysical properties in blends of various chemical systems enhancing the Virial-Based Mixing Rules (VBMR) for both correlative and predictive purposes. In addition, the applications of Virial-Based Mixing Rules (VBMR) for phase equilibrium correlations and predictions are studied. The results obtained are compared with those of Non-Random Two-Liquid

(NRTL) and Wilson Models. This research study can serve beneficial not only for its applications in process design but also for enabling automated what-if studies of multi-component mixtures. It promises to fulfill the current gap in simulations systems where only an ideal mixing rule is programmed in the calculations engine, whereas more accurate results can be obtained via inclusion of more precise tracking of a composition effect in blends for which VBM is found to have the ability to be an excellent suit.

Biography:

Sevana is a senior majoring in Chemical Engineering. Her research interests focus on modeling thermophysical properties of mixtures as well as on carbon dioxide adsorption in a packed bed reactor. She plans to attain her Ph.D. in Chemical or Nuclear Engineering. She is a member of the Omega Chi Epsilon Honor Society, the Society of Women Engineers, and the American Institute of Chemical Engineers.

Edward Guzman

Mentor: Dr. Beverley J. McKeon

Title: *Control and Mitigation of Thermo-Acoustics Instabilities in a Rijke Tube*

Abstract:

In recent years, concerns about global warming, and thus interest in low emission technologies for power generation, have intensified the research in combustion of turbine engines. Several academic institutions and government agencies propose new combustion alternatives that promise to decrease emissions. Yet, successful implementation of these alternatives requires the analysis of combustion instabilities, otherwise known as thermo-acoustics instabilities. The goal of this research is to investigate, and eventually control, the pressure oscillations caused by thermo-acoustic instabilities. This researcher will construct a Rijke Tube and use it to replicate and analyze the combustion problems. He seeks to provide both new methods to manipulate the thermo-acoustics instabilities and a platform for future research on low emission combustions.

Biography:

Edward is a senior in Aerospace Engineering with a Minor in Mathematics. His research interests include fluid dynamics, heat transfer, and thermodynamics with emphasize on technologies for power generation. Upon completion of his undergraduate studies, he plans to attend graduate school to pursue a Ph.D. in fluid dynamics and heat transfer.

MOUNTAIN VISTA #2

MATHEMATICS, ANTHROPOLOGY, ECONOMICS AND SCIENCE

Christopher Mibiar

Mentor: Dr. Lynda Rush

Title: *Irrigation Water Policy and Valuation*

Abstract:

Issues in water resource management are becoming increasingly important as climate change increases water scarcity in many regions, while population growth increases the demand for fresh water. Because markets are often lacking for the allocation of water, valuing it is difficult. Economists must use, therefore, non-market valuation techniques to derive the demand for water. In addition, the value of water is elusive because of its spatial and temporal variability, which means that water may have a vastly different value at different points in time or in different geographic locations. Developing a single demand function is not appropriate. It is reasonable, therefore, to propose a suite of demand functions, each addressing the value of water relative to a particular use. In this presentation, the researcher will discuss the current legal and policy frameworks used for making irrigation water allocations, and explore potential improvements given current demand and scarcity conditions.

Biography:

Christopher is an undergraduate at California State Polytechnic University, Pomona, where he studies Economics and Mathematics. He will graduate this spring and begin a doctorate program this fall in Applied Economics at Oregon State University. His career goals center on the optimal management of natural resources, particularly water, as well as advancement and implementation of renewable energy through effective policy. He hopes to apply his doctorate training to further society's understanding of the effects of global change on the planet's scarce resources and how society can adapt to that scarcity.

Vatche Kaprielian

Mentor: Dr. Wendy Dixon

Title: *Radiation Effects on the DBF4 Protein Kinase*

Abstract:

DNA undergoes a precise cell cycle to ensure the proper translation and replication of its components. A protein complex composed of Cdc7 and Dbf4 kinases are vital aspects to the firing of DNA origins for replication.

Dbf4 can function without the presence of Cdc7, but Cdc7 cannot function without Dbf4. Both of these proteins are required, however, in G1, S, and the G2 phases of the cell cycle. Throughout the cell cycle, there are variables associated with a few checkpoints to make sure the replication process is going smoothly. In various experiments and procedures, it has been discovered that interference between Cdc7 and Dbf4 proteins will stop DNA from replicating. Inclusion of a specific inhibitor protein or RNA has been shown to cause these symptoms. In the current experiment, Ultraviolet and Gamma radiation are used on sample plasmids to observe their effects on DNA strands; most of the focus will be on the Dbf4 behaviors. Through various procedures, including Gel Electrophoresis, Western Blotting, and Fluorescent Microscopy, this researcher was able to observe the levels of Dbf4 present in the plasmid samples after being exposed to the radiation sources.

Biography:

Vatche is a Biology student at Cal Poly Pomona with an emphasis on the medical field. He has extensive volunteer experience in various hospitals and departments through the Clinical Care Extender Program. He has expanded his duties beyond the clinical rotations by taking on another volunteer role as Department Coordinator for the Gastrointestinal Department at Foothill Presbyterian Hospital in Glendora, CA. He has been involved as Historian for the Beta Beta Beta Biological Honor Society and will apply to Physician Assistant Programs in Winter of 2014.

Dianne Sanchez

Mentors: Drs. Barbara Burke and Samir Anz

Title: Synthesis and Characterization of α -alanine Coordination Complexes

Abstract:

The coordination complexes of $\text{Cu}(\text{ala})_2 \cdot \text{H}_2\text{O}$ and $\text{Zn}(\text{ala})_2$ were synthesized. A characterization was done on these complexes using scanning electron microscopy (SEM) and atomic force microscopy (AFM). From these instruments, data were collected on the morphology and surface roughness of the crystals. Force distance measurements and auto correlation data were also taken. Based on this information, it was possible to model and deduce structural characteristics of the complexes, the nature of the metal-ligand bonds, and the nature of the d electronic structure.

Biography:

Dianne is a senior undergraduate student at California State Polytechnic University of Pomona where she is majoring in chemistry. She plans on

applying to Ph.D. programs in the fall. Her research interests include atmospheric chemistry, marine chemistry, and physical chemistry. She hopes to gain acceptance to a graduate program where she can pursue one of her interests.

Madilynn Santoyo

Mentor: Dr. Denise Lawrence

Title: *The Cultural Influence on Environmental Behavior in Middle Class Households*

Abstract:

This research involves a psychological and socio-cultural analysis of environmental behavior in a middle class neighborhood located in Costa Mesa, California, and specifically focuses on Mexican American and Anglo American households. Environmental behavior is defined by its impact. These behaviors alter the availability of environmental resources and can even change the biosphere itself. The research data is gathered from in-depth, one-on-one interviews that covered a wide array of topics related to household consumption, daily habits, attitudes, values, and general background information. These topics gather information on specific aspects of the participants' relative cultures. Culture is a lasting disposition that develops in us and helps us to make sense of the world. Culture also can predispose us to make certain decisions in our daily lives based on our values and beliefs. This research is aimed at understanding the decisions that relate to environmental behavior.

Biography:

Madilynn is a senior at Cal Poly Pomona, and she is majoring in Cultural Anthropology with a minor in Regenerative Studies. Her current research focuses on the role that culture plays in determining environmental behavior. Her other interests include applied anthropology as well as sustainability and environmental management. She will receive her bachelor's degree in the Fall of 2013 and will continue her education by earning a Ph.D. in applied anthropology.

Grace Lim

Mentor: Dr. Randall J. Swift

Title: *Stochastic Rumors*

Abstract:

Rumors have been affecting the dynamics of social systems for centuries. This research examines the deterministic models and stochastic processes of

rumor spread with the assumption of a closed, homogeneous population. The population for this research is divided into three subcategories: ignorants, spreaders, and stiflers. Two classic models, the Daley-Kendall and Maki-Thompson, are analyzed while observing the limitations of each. Further insight will be gained by considering the total and partial cessation of rumors. System equations will be developed using backward and forward Kolmogorov equations. This researcher will solve the system by observing the moment generating function with techniques including the method of characteristics and numerical approximations.

Biography:

Grace is an undergraduate at California State Polytechnic University, Pomona, where she studies Applied Mathematics and Computer Science. Her current research involves different applications of epidemic modeling. She plans to attain her Ph.D. in Mathematical Biology and pursue a career in medical research. Eventually, she would like to become a professor and continue her research at a four-year university.

Melika Shayegh

Mentor: Dr. Sepehr Eskandari

Title: *Effect of γ -Aminobutyric Acid (GABA) on Motility Parameters of Bovine Sperm*

Abstract:

An increase in the world population has led to an increase in the demand for beef and dairy products. However, this high demand cannot be met readily due to limited access to bulls with desirable phenotypes. Although artificial insemination is used to increase productivity, efficiency, and cost-effectiveness of beef and dairy cattle production with desirable phenotypes, this process has a high rate of failure. The failure is mainly due to low sperm quality, which is caused by insufficient methods involving sperm collection, semen extenders (including cryoprotectants), and freezing/thawing prior to use. A better understanding of sperm motility parameters under different experimental conditions would lead to the development of better procedures for sperm freezing, handling, and thawing. The experiments of this study examine the effect of the transmitter molecule, γ -aminobutyric acid, on bovine sperm motility parameters. GABA is found at high concentrations in both seminal and vaginal fluids; however, its role in sperm physiology is not known.

Biography:

Melika is going into her fifth year as a Biology major at California State Polytechnic University, Pomona. Her current research involves the effect of γ -Aminobutyric Acid (GABA) on motility parameters of bovine sperm. She plans to attain her MD by applying to medical schools in Winter of 2014.

Kristin Dettmers

Mentor: Dr. Jenny Switkes

Title: *Settling the Waters: Exploring An Iterative Numerical Integration Technique*

Abstract:

This presentation is based on the iterative method of numerical integration referred to by Dr. Henry F. Ahner as “Sledge-Hammer integration.” Sledge-Hammer integration is a method of “integration averaging.” Given a function $f(x)$, the researcher carries out an iterative procedure which ultimately creates a sequence of new functions, each having the same integral as the original function on the interval $[0,1]$. The process can be continued recursively until the original function becomes approximately a constant function giving the value of the definite integral from 0 to 1. This research expands on Dr. Ahner’s findings by exploring patterns in the function iterates for powers of x and deriving a closed-form formula for $f(x)=x^2$. In addition, a similar “Sledge-Hammer” method for double integrals is constructed and then expanded to a general multi-dimensional case. A closed-form formula is also derived for $f(x,y)=x^2+y^2$ which employs the method of difference functions. These techniques are translated into MATLAB code for further investigation of various function types and graphical representations.

Biography:

Kristin is going into her fourth (and final) year as an Applied Mathematics major at Cal Poly Pomona. Her current research involves analyzing numerical integration techniques, and this summer she will be researching wave-particle modeling at MIT. She plans to attain her doctorate in Applied Mathematics and become a researcher and professor at a four-year university. This fall, she will be applying to Ph.D. programs at various universities, including Cal Tech, MIT, UCSD, and the University of Arizona.

David Kok

Mentor: Drs. Winny Dong and Tanya Falten

Title: *CO₂ Capture with Novel Materials*

Abstract: Carbon dioxide (CO₂) capture on solid sorbents is an important technique in the context of greenhouse gas emission reduction as well as adsorption enhanced reaction processes. Traditional CO₂ adsorbents such as hydrotalcite, alumina and zeolites have been extensively investigated. This work will focus on the study of sol-gel derived MgO aerogels, which have a great potential for CO₂ capture because of their large surface area and amorphous structure, which are two unique properties of aerogels. Amorphous MgO aerogels were compared with commercially available CO₂ adsorbents. A thermogravimetric analyzer (TGA) was used to determine the weight gain of the sample over time due to CO₂ adsorption from a gas stream containing selected partial pressures of CO₂. A nitrogen surface area analyzer was used to measure the surface area of MgO aerogels. Preliminary data shows that MgO aerogels have a higher CO₂ adsorption capacity than some currently used commercial materials.

Biography: David is an undergraduate at California State Polytechnic University, Pomona, where he studies chemistry. He plans to pursue a graduate degree in materials science upon completion of his undergraduate degree.

CAMPUS VISTA
POLITICAL SCIENCE, PSYCHOLOGY AND SOCIOLOGY,
AND GENDER, ETHNIC & WOMEN'S STUDIES

Ericka James

Mentor: Dr. Felicia Friendly Thomas

Title: *Non-traditional Students' Utilization and Satisfaction with Campus Resources*

Abstract:

In an attempt to find financial stability after the fall of the economy in the U.S., non-traditional students are returning to school to obtain higher degrees. The university setting is prepared to assist the needs of traditional students coming to college straight out of high school with only the responsibility of getting an education. Non-traditional students are students returning to school after being on hiatus to take care of family or pursue a career. These students have different needs when it comes to getting assistance to finish a college degree. This study will examine university resources that affect the success of a higher education. Specifically, this study will see what resources students are aware of, how students utilize the resources available to them, and how comfortable students are on campus.

Biography:

Ericka is a senior Psychology major at California State Polytechnic University, Pomona. Her current research focuses on how knowledgeable students are about the resources available to them on campus, and how this knowledge connects to student retention and graduation rates. She plans to obtain her Ph.D. in Clinical Psychology and apply her knowledge to future research concerning Veteran issues such as Post Traumatic Stress Disorder, PTSD. Eventually she will become a professor at a university.

Ann Truong

Mentor: Dr. Jeffery S. Mio

Title: *Rejection sensitivity in community college transfers to 4-year universities*

Abstract:

Past studies have looked at rejection sensitivity in romantic settings (Vorauer et al., 2003) and impersonally in interracial interactions between peers (Vorauer & Yumiko, 2006). Most research regarding rejection sensitivity between peers in the school setting is limited to general studies of transfers' experiences (Alexander 2009) which, though insightful, neglect rejection sensitivity as a specific issue. The present study looks at the levels of rejection

sensitivity of community college students who have transferred to a 4-year university compared to the levels of rejection sensitivity of non-transfer students. Some circumstances show that transfer students are less active on campus as opposed to other students. A possible explanation for this could be that transfer students have higher levels of rejection sensitivity. The present research took place at a public university in Southern California. The study examined rejection sensitivity on campus, with transfer students being more sensitive to rejection than non-transfer students. Rejection sensitivity was measured through a questionnaire that focused on campus interaction between peers and several questions involving the classroom setting. The questionnaire collected demographic information and measured the level of rejection sensitivity of each participant through vignettes, an adjusted extroversion test, and reactions to questions involving classroom situations. Results are discussed in terms of intimidation coming into new settings and how universities can make transfer students feel more comfortable with university engagement.

Biography:

Ann is a third year psychology major with a minor in philosophy. She is interested in developmental, clinical, and counseling psychology. Her current research project pertains to rejection sensitivity of college students. Ann plans to attend graduate school where she will earn a Ph.D. After receiving her doctorate, she plans to help others and to positively impact the lives of youth.

Jessica Marquez

Mentor: Dr. Murniz A. Coson

Title: *Democratic Transition: An Analysis of Education Enrollment and Employment Rates in China*

Abstract:

For the past decades, China has been a rising economic and political power. The Chinese's economy continues to grow at a record rate of 10% annually. However, the Chinese Politburo continues to limit several political freedoms that are essential to democracy, such as the freedom of speech or the freedom to assemble. Yet, as much as the Politburo tries to enforce its rule with an iron fist, there has been a rising opposition to the current regime in China. Therefore, this research attempts to analyze the effects of the public and private sector on China's potential democratization by focusing on two variables: employment rates and education enrollment in primary school. This study will be using a regression analysis that dates

from 1980-2000. Moreover, the study uses two case studies, Brazil and the United States. This researcher will be testing the hypothesis that if China continues to increase employment rates and education enrollment, then China will experience a democratic transition.

Biography:

Jessica is going into her fourth year at Cal Poly Pomona as a Political Science major with a minor in Organizational Communications. She is interested in International Relations and Public Policy. She will be applying to graduate school during Fall 2013.

Dora Lopez

Mentor: Dr. Corina Benavides-Lopez

Title: *Las Hibas Del Campo: Testimonios of Mexican/Chicana College students*

Abstract:

This research assesses college students' experiences about their educational experiences as daughters of farm workers. The research explores the problems and inequalities in the U.S. educational system as these problems and inequalities impact Mexican/Chicana college students who come from farm workers' families and are first-generation college students. This study examines the positive effects that Mexican farm worker parents have on the education of their children. The study may help illuminate lessons that are learned, furthermore, within the communities and families that support the educational struggles of the college students. Feminist testimonios (Latina Feminist Group, 2001) is the method used in this research to conduct a qualitative study to expose and explore the educational strengths and assets of the participants.

Biography:

Dora is a first-generation college student at Cal Poly Pomona who seeks to address the many social injustices within her community. Her first goal is to graduate from Cal Poly Pomona with a double major in Psychology and GEMS (Gender, Ethnicity, and Multicultural Studies). Her next goal is to matriculate into a graduate program and earn a Master's degree. Her third goal is to earn a Ph.D. in Education to research educational and race issues that impact Mexican/Chicano students.

Christian J. Murillo

Mentor: Dr. Erika DeJonghe

Title: *Risk Factors for Sexual Coercion at Fraternity Parties*

Abstract:

Several researchers have pointed out that rape prevention programs increasingly focus their efforts towards fraternity men because all male groups have been identified as more likely to foster rape acceptable environments. Some research suggest that rapes occurring at some fraternity parties are not solely the outcome of an individual's behavior or natural inclinations, but rather are highly influenced by other set of general factors that must be considered (Boswell, & Spade, 1996). Existing research identifies different important risk factors such as gender relations, peer pressure, the volume of the music, sitting arrangement, the control of setting, and the alcohol that could potentially lead to sexual coercion (Boswell, & Spade, 1996). This study will assess whether the aforementioned risk factors are indeed predictive of whether sexually coercive behavior is more likely to occur. In this study, fraternity men from a large, ethnically diverse university in Southern California complete questionnaires assessing specific characteristics of fraternity parties, gender beliefs, sexist attitudes, and acceptance of rape mythology. This study helps determine which specific risk factors are correlated with self-reported sexually coercive behavior, including rape perpetration.

Biography:

Christian is a self identified Xicano Feminist student pursuing a Bachelor of Arts Degree in Psychology and in Gender, Ethnicity, & Multicultural Studies with an Emphasis in Women's Studies at California State Polytechnic University, Pomona. He has a high interest in social justice issues, especially on the subjects of sexual coercion perpetrated by males and the effects of patriarchy and capitalism on society. He is seeking to obtain his Ph.D. in an area of Community Psychology in order to continue challenging social injustices.

Daryl Adkins

Mentor: Dr. Patricia de Freitas

Title: *Dancing Bomba: A Diasporic Context for Social Change and Meaning in California*

Abstract:

This qualitative study explores the performance of Bomba and its historical evolution from the rural regions of Puerto Rico to the urban spaces of Los

Angeles. Evolved in the 17th century, Bomba is a combination of dance, song and music inspired by the African diaspora, culture and heritage on the island of Puerto Rico. This research investigates the social reasons for Bomba's evolution over time and how different social contexts - urban Puerto Rico, New York, and Los Angeles – have changed the way the dance is understood and performed. Additionally, this study examines the extent to which this dance performance has the potential to affect and change context and social dynamics wherever the dance is performed. Specifically, this research explores the performance of the dance, largely by Afro-Latino performers, to bridge the generational divide between African American and Latino communities in Los Angeles.

Biography:

Daryl is a senior Ethnic and Women Studies major at Cal Poly Pomona. She plans to obtain her Ph.D. in Cultural Studies and become a researcher and educator at a four-year university. She will be applying to graduate and Ph.D. programs in Fall of 2013 and hopes to attend the University of Irvine.

Anna Storti

Mentor: Dr. Anita Jain

Title: *But You Don't Look Like a Lesbian: The Portrayal of Queer Life Through a Feminine Experience*

Abstract:

Much of the literature surrounding the experiences of queer women¹ revolves around the nonconforming characteristics of their lives, such as their sexuality, choice in partners, masculine gender presentation, or connection with a gay/queer community. A small amount of scholarly material details the conforming attributes these women possess, especially those of women of color. Perhaps one of the most conforming attributes a queer woman can embody is a feminine gender appearance. By embodying a queer identity, these women are automatically tagged as different and all other identities are sidelined by their queerness. For a woman to embody a feminine appearance, she then falls in line with the expected and socially acceptable female gender presentation. In doing so, she walks society's streets with an assumed heterosexuality. Because there are few studies that revolve completely around the experiences of queer feminine women, especially in their involvement with queer social justice pursuits, a collective case study dedicated to their experiences will ultimately enhance the discussion revolving queer politics and queerness in general. This researcher

will detail how femininity is articulated within a queer woman's experience by interviewing a total of 10 queer feminine women. By studying a marginalized and understudied population, this researcher will increase the awareness and understanding of femininity in relation to queer experience, queer politics, and queer theory.

¹ In this paper, the researcher will use the term queer to reference sexualities that are not heterosexual or gender binary. Considering that this study focuses on women, queer will denote female-bodied women who are lesbian, bisexual, fluid, or any other non-heterosexual label.

Biography:

Anna is a Southern California native who is double majoring in Ethnic and Women Studies & Non-Profit Management. She plans to pursue her Ph.D. in American Studies after graduating from Cal Poly Pomona. Her interests include feminist theory, post-Marxism, and the intersections of political economy, critical race theory, and queer theory. As a member of the McNair Scholar's Program, she is completing an independent research project revealing how feminine queer women interact with queer politics. Aspiring to be a professor, Anna plans to shift her research towards examining the importance of a mixed-race background on the development of queer identity. Anna is also passionate about Filipino Studies, and hopes to contribute to this growing scholarship. Outside of academia, Anna devotes her time to women and queer activism, writing poetry, and coaching basketball.

Alejandro Zermeno

Mentor: Dr. Anthony C. Ocampo

Title: Mexican American Identity and the Impact of Traditional Knowledge and Cultural Practices

Abstract:

There is limited literature on Mexican American identity and behavior influenced by social movements that focus on teaching and preserving indigenous knowledge, culture, and traditional values. In American society today, there are social movements that specifically focus on these teachings which instruct people to become more in tune with the mind, body, spirit, and the natural forces of the universe. Indigenous social movements outreach to the Mexican American community by word of mouth, websites, flyers, and community events. This study examines the social, institutional, and environmental factors that contribute to Mexican Americans choosing to explore, reconnect, and embrace their indigenous culture. In-depth

interviews are used to identify key factors such as family and upbringing, ethnic identity, cultural practices, and views on society. These interviews investigate how traditional knowledge and cultural practices impact how Mexican Americans perceive their social position in the U.S. and within the larger global order. The interviews also explore how traditional cultural values and beliefs (cultural toolkit) contribute to decolonizing strategies, ethnic revitalization, and solidarity among Latinos and indigenous people.

Biography:

Alejandro is an undergraduate at California State Polytechnic University, where he studies Sociology and Multicultural Leadership. His academic objective is to pursue a Ph.D. in Sociology with an emphasis on how race, ethnicity, and culture shape inequality among Latino communities in the United States. He would like to become a professor and researcher with a specific focus on how the practice of indigenous culture affects the way in which Latinos understand racial identity and inequality in their everyday lives.

2013 McNair Scholars



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About TRIO and the McNair Scholars Program

The Federal TRIO Programs (TRIO) are Federal outreach and student services programs designed to identify and provide services for individuals from disadvantaged backgrounds. TRIO includes eight programs targeted to serve and assist low-income individuals, first-generation college students, and individuals with disabilities to progress through the academic pipeline from middle school to postbaccalaureate programs.

Designed to assist first-generation, low-income students and those who are underrepresented at the graduate and doctoral level, the program at Cal Poly Pomona was first funded in 1999. The Ronald E. McNair Postbaccalaureate Achievement Program is named for Dr. Ronald E. McNair, one of those who perished aboard the space shuttle Challenger in January 1986.

The McNair Scholars Program at Cal Poly Pomona is a one- or two-year program designed to improve students' research skills and prepare them for entering graduate schools and advanced study. This education grant provides an internship opportunity for students to learn how to do research, present their findings at a summer symposium and at national conferences, and successfully apply for and enter graduate school. Through the efforts of the students themselves, the faculty mentors, and the program staff, these students can achieve their goals.

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