The ARC/SC/UC LEADS Program provides mentored research experiences in all disciplines to scholars with the potential to succeed in graduate study, but who have experienced situations or conditions that have adversely impacted their advancement in their field of study. The program targets talented and motivated students who can benefit from additional encouragement and academic support, as well as foster students in scholarly research endeavors to help them achieve their personal and professional goals.

Scholars are matched individually with UCSB faculty and graduate student mentors who provide training and support during the summer program. As part of the ARC/SC/UC LEADS summer program, the scholars are provided the opportunity to explore their discipline, gain research experience, and receive support from their faculty and graduate student mentor.

Program Planning Committee:
Dr. Carol Genetti, Dean, Graduate Division
Christian Villaseñor, Assistant Dean, Graduate Division
Walter Boggan, Director of Admissions & Outreach, Graduate Division
Dr. Haley Orton, Assistant Director of Admissions, Graduate Division
Roxanna Quach, Admissions & Outreach Coordinator, Graduate Division
Hala Sun, Diversity and Outreach Peer Advisor, Graduate Division

Special thanks to our fellow colleagues for their training and support of the program!

Kyle Crocco, Funding Peer Advisor, Graduate Division
Ryan Dippre, Writing Peer Advisor, Graduate Division
Mario Galicia, Doctoral Candidate, Department of Education
Dr. Victor Rios, Associate Professor, Department of Sociology
Joe Sabado, Associate Director, Information Systems & Software Development
Associated Students | Center for New Racial Studies | Conference Services | Graduate Student Association

Academic Research Consortium/California Pre-Doctoral Sally Casanova/UC LEADS Scholars

SUMMER RESEARCH PRESENTATIONS

University of California, Santa Barbara — Graduate Division

Friday, August 8, 2014
9:30-12PM Multi-Cultural Center Theater
INTRODUCTION

Walter Boggan, Director of Admissions & Outreach, Graduate Division

PRESENTATIONS

1. Adeoye, Temitope – Morgan State University
   Education Department, Teacher Education Program - Mentor: Dr. Jason Raley
   Effects of “Academic Turning Points” on Academic Motivation
   An academic turning point can be defined as an event or occurrence in a student’s life which causes a shift in their academic pursuits. The current study sought to examine the effect of academic turning points on students’ academic motivations. Students were selected based on responses written on an academic turning point and interviewed in order to expand on the rationale behind the turning point as well as its effects on their academic careers. Results explain trends in turning points (such as teacher advocacy, discovery of an academic passion, and increased autonomy), student responses to the turning point, and student outcomes following the turning point. Findings justify a need for further investigation into effects of academic turning points on student performance, which could be used to strengthen students’ persistence in academia.

2. Barrios, Robyn – University of California, Los Angeles
   Psychological & Brains Sciences Department - Mentors: Dr. Brenda Major; Kathy Espino-Perez
   To Trust or Not to Trust: Latinos’ Perceptions of Whites’ Motives to Appear Unprejudiced
   The present research investigated whether Latinos perceived a White evaluator's decision to hire a Latin differently (e.g., as more/less fair or deserved) based on his resume and stated reason for hiring. Hiring conditions were manipulated by presenting participants with a Latino applicant with either a (1) deserved, (2) ambiguous, or (3) diversity reason for hiring. Data on participants’ Suspicion of Motives Indexes (SOMI) were also collected to investigate whether they were more skeptical of Whites' motives (i.e., appearing unprejudiced or equal applicant treatment) as a function of the hiring condition. Results demonstrate (1) a main effect of hiring condition such that fairness and deservingness were rated higher in the deserved condition, and (2) a marginally significant interaction between SOMI and hiring conditions. Future research directions are discussed.

3. Eiseman, AnaSophia – University of California, Santa Barbara
   Mathematics Department - Mentors: Dr. Padraic Bartlett; Benjamin Cote
   Constructing Quasi-Strongly Regular Graphs
   Strongly regular graphs have intrigued and frustrated graph theorists for decades. Their uniform connectivity makes them a valuable tool in measuring how well-connected a network is. Their definition is simple and intuitive, but except for very small cases, they are extremely difficult to construct. Given a set of parameters, there are no known ways to determine whether a corresponding strongly regular graph exists. It is easier to construct graphs meeting the intimately related, strictly weaker condition of quasi-strong regularity. Constructions and classifications of quasi-strongly regular graphs may lead to important breakthroughs in the study of strongly regular graphs. We hope to partially classify the quasi-strongly regular graphs by studying cartesian squares of graphs with interesting connectivity properties.

13. Wei, Kuang – University of California, Santa Barbara
   Mechanical Engineering Department - Mentors: Dr. Megan Valentine; Jamianne Wilcox; Dezhi Yu
   Effects of Tau Mutants on the Mechanical Properties of Microtubules
   Microtubules are dynamic cytoskeletal filaments that play important roles in intracellular transport and cell division. In cells, they are often stabilized by tau, a neural microtubule-associated protein that is critical for maintenance of a healthy nervous system. Several dementia disorders have been linked to mutations in the tau genes. In many cases these tau mutants fail to bind to and stabilize microtubules, causing filament disintegration; however, there is a subclass of tau mutants that maintain strong microtubule binding, yet still cause neurological disease. Therefore, in order to gain a fundamental understanding in tau related neurological diseases, we focus on studying the changes in the mechanical properties of microtubules stabilized by this subset of tau mutants. We will first determine the stiffness of tau stabilized microtubules in vitro by advanced microscopy. To further study the interaction between tau and microtubules, we will also monitor the binding and the motion of tau proteins on microtubules with laser-induced fluorescence microscopy. We will measure the binding affinity, the cooperativity of binding, and tau diffusion coefficient using different tau. Taken together, our data will provide an improved understanding in how tau modulates microtubule mechanics and its effects in tau related neurological diseases.

CLOSING OF PRESENTATION

Walter Boggan, Director of Admissions & Outreach, Graduate Division

THANK YOU FOR YOUR SUPPORT!
11. Vong, Daniel – University of California, Santa Barbara
Electrical & Computer Engineering Department- Mentors: Dr. Luke Theogarajan; Samuel J. Beach

The Fabrication of a High Density Neural Implant

There are many causes of paralysis – infections and diseases, tumors, poisoning, and even physical injuries. Paralysis can occur when the path for neural signals produced by the brain is damaged. In this case, the brain is producing the neural signals, but the signals do not make it to the limb that the brain intends to signal. One technological solution is a device implementation onto the skull which records neural signals. Although this method exists and is functional, there are some issues that need to be addressed and the technology innovated. The current method uses silicon pillars, which are very brittle and has a significant difference in elastic modulus compared to the brain. This significant difference can lead to scar tissue formation. A solution would be to fabricate pillars out of conductive polydimethylsiloxane(PDMS), as it is biocompatible and has a much closer elastic modulus than silicon. In our research, we fabricated the neural implant using a mixture of 1:1 PDMS to nickel particles and guided into a mold with neodymium magnets. The mold was used to release conductive PDMS pillars onto a wire out used for neural recordings. Further research would be to fabricate the neural implant onto a multielectrode array and record signals with grown neurons.

12. Walker, Jennifer – Rice University
Mechanical Engineering Department - Mentor: Dr. Kimberly Turner

DMMP Mass Sensing Using Microbeams

Sarin is a warfare chemical and in its vapor form is odorless, colorless, and lethal after just minutes of exposure. This project examined the sensitivity of a mass-sensing microbeams for the specific detection of Dimethyl methylphosphonate (DMMP), the non-lethal Sarin precursor. The sensor has fixed-fixed beam geometry and is attached to a piezo-actuator. A Moleculary Imprinted Polymer specific for DMMP coats the beam. The sensor was exposed to gradually increasing concentrations of DMMP. This resulted in the mass of the beam increasing as the polymer adsorbed the DMMP particles. The shear-piezo was periodically excited at a certain voltage and the response was sensed using a Laser Doppler Vibrometer. As the mass of the beam increased, the Parametric Resonance technique was used to monitor its resultant shift in resonant frequency. This technique drives the device at $\omega$ and an amplitude controller maintains a constant amplitude response by altering the bifurcation frequency - around $2\omega$. The shift down in bifurcation frequency was tracked over time as the beam adsorbed the DMMP.

The frequency changes due to the sensor’s exposure to several concentrations of DMMP were then plotted. The data was then fit to the Langmuir-Freundlich function. A linear fit identified the sensitivity of the sensor. The minimum change in frequency and the sensitivity determined the limit of detection of the sensor.

4. Hamalian, Lorie – California State University, Northridge
English Department - Mentor: Dr. Julie Carlson

Rearranging Marriages: Making Space for Women’s Friendship in the British Romantic Period

During the 1790s post-French Revolutionary decade, many radical British thinkers were inspired by France’s call for freedom from oppressive institutions, and they challenged them by publishing novels and treatises available to the masses. Prominent among them, Mary Wollstonecraft decried the institution of marriage as an exchange of property and most “pernicious” form of “slavery.” She argued that friendship was the greatest virtue, and if women were allowed to be educated, it could become the new basis for fulfilling marriages between like-minded individuals. In the wake of these revolutionary ideas, what was the role of friendship between and among women? For my research project, I study two texts that focus on women’s friendship implicated within a marriage plot. Eliza Fenwick’s epistolary novel, Secresy, Or, The Ruin on the Rock (1795), and Mary Shelley’s historical fiction, Valperga: or, the Life and Adventures of Castruccio, Prince of Lucca (1823) both portray a heroine’s tragic downfall as rooted in the miseducation of men and women. By examining the portrayals of female friendship in these novels within the sociopolitical context of the Romantic Period, we can begin to understand how authors were in conversation as they thought these ideas through.

5. Lopez, Jonathan – University of California, Irvine
Materials Department - Mentors: Dr. Steve DenBaars; Matt Laurent

Analyzing Gallium Nitride (GaN) Films To Improve Surface Morphology For Ideal Light-Emitting Devices

Gallium nitride (GaN) is a wide-gap semiconducting material with applications for blue, violet and ultraviolet light-emitting devices. Generally, GaN films are grown by the metalorganic chemical vapor deposition (MOCVD) yielding high crystal quality. These samples are then characterized by two distinct methods: Atomic Force Microscopy (AFM) and X-ray Diffraction (XRD). AFM utilizes a small cantilever and the forces between the tip and the surface of the material to illustrate the morphology. XRD identifies the atomic and molecular structure of the GaN crystal through the diffraction of an x-ray beam. Each individual lab instrument analyzes a specific aspect of the GaN sample. AFM deals with surface morphology that depicts step flow growth as well as undesirable pit densities. With the use of XRD, the unique peaks in the representative graph of the GaN film structure helps describe the lattice constant of each film. Comparing the lattice constants of two different layers of GaN, lattice mismatch or lattice symmetry reflects the quality of the GaN films. Ultimately through the use of these characterization methods, higher quality GaN can be achieved and result in efficient light-emitting devices such as light-emitting diodes or LEDs.
pressive symptomatology were significantly related to lower levels of adjustment to college. This study tested whether emotion focused disengagement coping and adjustment have a role in regulating psychological maladjustment (e.g., depression symptomology and stress). This study tested focused disengagement coping and adjustment whether emotion focused disengagement coping has been associated with higher levels of adjustment. 

Focused Disengagement on First-Year Students as Part of GauchoFYI. Data was collected at year students as part of GauchoFYI. Data was collected at one time point, one during the summer before the school year began and the other three-months later, during the school year. Linear regression was used to determine the relationships between emotion-focused disengagement coping and adjustment-related outcome variables. Results: Regression analyses revealed that higher levels of emotion-focused disengagement were significantly related to lower levels of adjustment to college (β = -0.287, p < .001) and depressive symptomatology (β = .321, p < .001). No main effect between coping style and perceived stress was observed (p=.11).

A Baseball Empire That Never Was: La Liga Mexicana and its Effects from 1942-1948

A Baseball Empire That Never Was: La Liga Mexicana and its Effects from 1942-1948 is about how La Liga Mexicana (the Mexican Baseball League) was framed and presented in English and Spanish-language media to U.S. (white) and Latino (Mexican) audiences within Los Angeles. The representations of La Liga Mexicana—and by default Mexicans—presented in the media gives insight to the race relations between U.S. (white) and Latino (Mexican) audiences during the 1940’s, a period that experienced the United States enter World War II which resulted in Mexican migration and labor increasing all over the country, specifically in L.A for the purposes of this project.

BREAK (10:30-10:45AM)

7. Nava, Paulina – DePaul University
Chicano & Chicana Studies Department - Mentors: Dr. Gerardo Aldana; Melissa Flores
Accidental Altars: Differential Consciousness and the Virgin of Guadalupe

This project developed out of a broader interest in the role of public art within predominantly Latin@ communities in Chicago. For the purposes of this project I developed a small case study that explores the relationship between method and theory in art history. This specific case centers on the Mexican/Latin@ artistic representation of the Virgin of Guadalupe. By examining the relationships between artist, artwork and audience, I confront the predominant theoretical constraints that exist within the field of traditional art history and subvert them through the work of ethnic studies, indigenous studies, and subaltern studies scholars.

8. Patallo, Brandon – Hunter College
Counseling, Clinical & School Psychology Dept. - Mentors: Dr. Maryam Kia-Keating; Diana Capous
The Role of Emotion-Focused Disengagement on First-Year Adjustment to College

Background/Specific Aim: Traditionally coping has been defined as a concept encompassing all the strategies we utilize in reaction to stress. Although coping strategies are extremely varied, they can be categorized based on their topic of focus (emotion-focused or problem-focused) as well as the attentional deployment of the coping strategy (Engagement or Disengagement). In particular, emotion-focused disengagement coping has been associated with higher levels of psychological maladjustment (e.g., depression symptomology and stress). This study tested whether emotion-focused disengagement level could longitudinally predict psychological and academic maladjustment among incoming freshmen. Method: Questionnaires were administered to 140 incoming college first-year students as part of GauchoFYI. Data was collected at two time points, one during the summer before the school year began and the other three-months later, during the school year. Linear regression was used to determine the relationships between emotion-focused disengagement coping and adjustment-related outcome variables. Results: Regression analyses revealed that higher levels of emotion-focused disengagement were significantly related to lower levels of adjustment to college (β = -0.287, p < .001) and depressive symptomatology (β = .321, p < .001). No main effect between coping style and perceived stress was observed (p=.11).